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OTTAWA LIGHT RAIL TRANSIT PROJECT

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Schedule 4	–	Lenders' Direct Agreement
Schedule 5	–	Direct Agreements
Schedule 6	–	Independent Certifier Agreement
Schedule 7	–	**[Intentionally deleted]**
Schedule 8	–	Energy Matters
Schedule 9	–	Key Individuals
Schedule 10	–	Review Procedure
Schedule 11	–	Quality Management
Schedule 12	–	**[Intentionally deleted]**
Schedule 13	–	Project Co Proposal Extracts
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Schedule 18	–	Communications and Public Consultation Protocol
Schedule 19	–	Milestone Payments
Schedule 20	–	Payment Mechanism
Schedule 21	–	**[Intentionally deleted]**
Schedule 22	–	Variation Procedure
Schedule 23	–	Compensation on Termination
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Schedule 38	–	Extension and Additional Phases
Schedule 39	–	Operations Matters
Schedule 40	–	Highway Work
Schedule 41	–	Intellectual Property
Schedule 42	-	**[Intentionally deleted]**
Schedule 43	-	Procurement Support Services
Schedule 44	-	Stage 2 Additional Vehicles
Schedule 45	-	Belfast MSF Expansion
Schedule 46	-	Stage 2 Interface and Design Management Services

THIS PROJECT AGREEMENT is made as of the 12th day of February, 2013

BETWEEN:

CITY OF OTTAWA

(THE "CITY")

AND

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP, by its Partners ACS RTG PARTNER INC., SNC RTG PARTNER INC. and ELLISDON RTG PARTNER INC.

("PROJECT CO")

WHEREAS:

A. The City wishes to procure (i) a new light rail transit system in Ottawa, Ontario, as the first of several phases in the City's Transportation Master Plan and which includes a 12.5 km line along the City's Bus Rapid Transit corridor from Blair station in the east to Tunney's Pasture station in the west, a tunnel through the Downtown Core and 3 underground stations, (ii) the widening of Highway 417 and (iii) the completion of related Civic Works.

B. Project Co will carry out and perform the Project Scope (the "**Project**").

C. The City and Project Co wish to enter into this project agreement (the "**Project Agreement**"), which sets out the terms and conditions upon which Project Co shall perform the activities within the Project Scope.

D. The construction of the System and the Highway Work will provide an overall improvement to the quality of life of the citizens of Ottawa and its outlying regions as well as to visitors to the City.

E. IO is engaged as a consultant by the City as its commercial procurement lead with respect to the Project. IO is not acting as a Crown Agent in connection with this Project Agreement or the Project and, accordingly, HMQ will not be liable for any liability of IO in connection therewith.

F. Public ownership and control of the System and Highway 417 will be preserved.

G. With a view to ensuring that both Parties are able to properly and effectively discharge their respective duties, functions and responsibilities under Applicable Law, it is the intent that the City and Project Co work collaboratively, responsibly and cooperatively throughout the Project Term.

H. This Project Agreement was amended on April 19, 2017 to add a new Schedule 43 entitled Procurement Support Services.

I. This Project Agreement was further amended on June 21, 2017 to add a new Schedule 44 entitled Stage 2 Additional Vehicles.

J. This Project Agreement was further amended on September 26, 2017 to add a new Schedule 45 entitled Belfast MSF Expansion DBF Schedule.

K. This Project Agreement was further amended on April 24, 2019 to add a new Schedule 46 entitled Stage 2 Interface and Design Management Services.

L. The Project Agreement was further amended on September 16, 2019 to amend the Maintenance Services to include the maintenance of the Stage 2 Additional Vehicles, the Belfast MSF Expansion, Stage 2 East and Stage 2 West.

NOW THEREFORE in consideration of the mutual covenants and agreements of the Parties hereinafter contained and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties covenant and agree as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 Definitions and Interpretation

(a) This Project Agreement shall be interpreted in accordance with Schedule 1 – Definitions and Interpretation.

(b) This Project Agreement is comprised of this executed agreement and the following documents, all of which are hereby incorporated by reference into and form part of this Project Agreement.

Schedule No.		**Description**
Schedule 1	–	Definitions and Interpretation
Schedule 2	–	Completion Documents
Schedule 3	–	Custody Agreement
Schedule 4	–	Lenders' Direct Agreement
Schedule 5	–	Direct Agreements
Schedule 6	–	Independent Certifier Agreement
Schedule 7	–	[**Intentionally deleted**]
Schedule 8	–	Energy Matters
Schedule 9	–	Key Individuals
Schedule 10	–	Review Procedure
Schedule 11	–	Quality Management
Schedule 12	–	**[Intentionally deleted]**
Schedule 13	–	Project Co Proposal Extracts
Schedule 14	–	Commissioning
Schedule 15	–	Output Specifications

15-1	–	Technical Definitions and Reference Documents
15-2	–	Design and Construction Requirements
15-3	–	Maintenance and Rehabilitation Requirements
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Schedule 17	–	Environmental Obligations
Schedule 18	–	Communications and Public Consultation Protocol
Schedule 19	–	Milestone Payments
Schedule 20	–	Payment Mechanism
Schedule 21	–	**[Intentionally deleted]**
Schedule 22	–	Variation Procedure
Schedule 23	–	Compensation on Termination
Schedule 24	–	Expiry Transition Procedure
Schedule 25	–	Insurance and Performance Security Requirements
Schedule 26	–	Record Provisions
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Schedule 37	–	Mobility Matters
Schedule 38	–	Extension and Additional Phases
Schedule 39	–	Operations Matters
Schedule 40	–	Highway Work
Schedule 41	–	Intellectual Property
Schedule 42	-	**[Intentionally Deleted]**
Schedule 43	-	Procurement Support Services
Schedule 44	-	Stage 2 Additional Vehicles
Schedule 45	-	Belfast MSF Expansion
Schedule 46	-	Stage 2 Interface and Design Management Services

(c) The documents comprising this Project Agreement are complementary and what is called for by any one of them shall be interpreted as if called for by all, except in the event of ambiguities, conflicts or inconsistencies, in which case Section 1.2 shall apply.

(d) Except for those parts of Project Co's proposal which are incorporated by reference into this Project Agreement by the Project Co Proposal Extracts, on Financial Close, the Request for Proposals and Project Co's proposal shall be superseded entirely by this Project Agreement and rendered null and void, and shall not be relied upon or used by Project Co, the City or anyone else (including anyone pursuant to Schedule 27 – Dispute

Resolution Procedure or any arbitral body or any court) in any way to interpret or qualify the scope of the Project Scope, any obligations or liabilities of Project Co, or anything else contained in this Project Agreement.

(e) Unless it is specifically provided that a consent, approval or satisfaction is in the Discretion of the City, no consent, approval or satisfaction of the City or the City Representative shall be unreasonably withheld or delayed.

(f) Unless it is specifically provided that a consent, approval or satisfaction is in the discretion of Project Co, no consent, approval or satisfaction of Project Co or the Project Co Representative shall be unreasonably withheld or delayed.

1.2 Conflict of Terms

(a) In the event of ambiguities, conflicts or inconsistencies between or among any of the provisions of this Project Agreement, the provisions shall govern in the following order of precedence with each taking precedence over those listed subsequently:

(i) the provisions of amendments in writing to this Project Agreement signed by the Parties and Variation Confirmations shall govern and take precedence only over those specific provisions of this Project Agreement expressly amended thereby;

(ii) any provision establishing a higher standard of safety, reliability, durability, performance or service shall take precedence over a provision establishing a lower standard of safety, reliability, durability, performance or service;

(iii) Schedules 43, 44, 45 and 46;

(iv) the body of this Project Agreement;

(v) Schedule 1 – Definitions and Interpretation;

(vi) Schedule 27 – Dispute Resolution Procedure;

(vii) Schedule 19 – Milestone Payments;

(viii) Schedule 20 – Payment Mechanism;

(ix) Schedule 15 – Output Specifications;

(x) Schedule 17 – Environmental Obligations;

(xi) Schedule 25 – Insurance and Performance Security Requirements;

(xii) Schedule 22 – Variation Procedure;

(xiii) Schedule 10 – Review Procedure;

(xiv) Schedule 14 – Commissioning;

(xv) Schedule 11 – Quality Management;

(xvi) Schedule 28 – Refinancing;

(xvii) Schedule 23 – Compensation on Termination;

(xviii) Schedule 26 – Record Provisions;

(xix) Schedule 24 – Expiry Transition Procedure;

(xx) the other Schedules in the order in which they are listed in Section 1.1(b); and

(xxi) Schedule 13 – Project Co Proposal Extracts.

(b) Subject to Section 1.2(a), if the ambiguity, conflict or inconsistency is between a provision of general application and a provision that applies only to a specific part of the Project Scope, the provision that applies to the specific part of the Project Scope shall govern for that specific part of the Project Scope.

(c) To the extent that Schedule 40 – Highway Work contains provisions that apply only to the Highway Work, those provisions that apply only to Highway Work shall govern and take precedence, otherwise the provisions of this Project Agreement and in particular of this Section 1.2 shall prevail.

(d) If any ambiguity, conflict or inconsistency is not readily resolved by the foregoing provisions of this Section 1.2, then Project Co or the City, upon discovery of same, shall immediately give notice to the City Representative. The City Representative shall, within 10 Business Days after such notice, make a determination of which provision governs and give notice of such determination, in writing, to Project Co.

(e) The City and Project Co shall comply with the determination of the City Representative pursuant to this Section 1.2 unless the City or Project Co disputes the decision of the City Representative in which event such Dispute may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

1.3 Conflict of Documents

(a) In the event of ambiguities, conflicts or inconsistencies between or among this Project Agreement and the Lenders' Direct Agreement, the Lenders' Direct Agreement shall prevail. Notwithstanding the foregoing, if there is any right or remedy in favour of the City set out in the Lenders' Direct Agreement or any part thereof which is not set out or provided for in the Project Agreement, such additional right or remedy shall not constitute an ambiguity, conflict or inconsistency.

1.4 Legal Requirements

(a) Whenever standards of Applicable Law differ, the most stringent standards shall govern.

1.5 Impact of Stage 2 Maintenance Services Variation

(a) As of September 16, 2019 this Project Agreement was amended in order to increase the scope of the Maintenance Services. The Parties agree that such amendment was not intended to and does not amend the Design and Construction Works, the Highway Work or the Civic Works or any obligations connected with the Design and Construction Works, the Highway Work and the Civic Works (this principle being referred to as the "**Ring Fencing Principle**").

(b) In order to give effect to the Ring Fencing Principle and to recognize that certain provisions relate to the period prior to the execution of the Stage 2 Maintenance Services Variation, the Parties agree that the following provisions of this Project Agreement shall be read and interpreted as if the Stage 2 Maintenance Services Variation had not been entered into and, in particular, so that all defined terms shall be read as they were defined on October 1, 2017 (provided that, in respect of those provisions marked below with an asterisk (*), the above principle shall only apply for the purpose of interpreting the Parties' respective rights and obligations in respect of the Design and Construction Works):

(i) Sections 5, 6.3(a)(i) 6.5, 9.2(a)(ii)(H)*, 9.2(a)(v), 9.2(a)(vi), 9.4(b)*, 9.4(e), 9.4(f), 9.5(a)(v), 9.5(a)(vi), 9.6(a), 9.6(b), 9.6(c), 9.8, 9.9, 10.4(a), 11, 15.3(e)*, 16.1, 16.1A, 16.2(a), 16.2(b)(ii), 16.5(a), 16.5(d), 16.5(e), 16.5(i), 19(a)*, 19(b)*, 20.1, 20.2, 20.3, 20.4, 20.5, 20.6, 20.7. 20.8. 20.9, 20.11, 20.13, 21.1*, 21.3, 21.5*, 22, 24.4, 24.5, 24.6, 26, 29.5, 29.6, 33.1(a), 34.1, 43.1(a)(viii), 43.2(b), 44.2(b), 45.1(a)(ii), 45.1(a)(iii), 45.1(a)(iv)**,** 45.1(a)(vi), 45.1(a)(xxi), 48.4(a)(i), 48.4(a)(ii), 48.4(a)(iii), 56.1(a)(v), 56.1(a)(vi), 56.1(a)(vii) and 56.2(a)(iv) of this Project Agreement;

(ii) the following defined terms in Schedule 1:

(A) Adjacent Structures;

(B) Advanced Environmental Reports;

(C) After-Acquired Lands;

(D) Archaeological Reports;

(E) As-Built Highway Drawings;

(F) Bus Rapid Transit or BRT;

(G) Checking Team;

(H) City Design Team;

(I) Civic Works;

(J) Commencement of Construction;

(K) Commercial Close;

(L) Construction;

(M) Construction Activities;

(N) Construction Clearing and Grubbing;

(O) Construction Easements;

(P) Contribution Agreements*;

(Q) Correction*;

(R) Cost of the Highway Financing;

(S) Cost of the Highway Work;

(T) Defect*;

(U) Design;

(V) Design and Certification Procedure;

(W) Design and Construction Performance Requirements;

(X) Design and Construction Specifications;

(Y) Design and Construction Works;

(Z) Design Period;

(AA) Design Team;

(BB) EA Approvals;

(CC) Existing Highway Infrastructure;

(DD) Final Completion;

(EE) Final Completion Date;

(FF) Final Completion Notice;

(GG) Highway Minor Deficiencies;

(HH) Integration;

(II) Liquidated Damages;

(JJ) Milestone Acceptance;

(KK) Minor Deficiencies;

(LL) NCC FLUA;

(MM) NCC Stations;

(NN) New System Infrastructure;

(OO) Other Existing Infrastructure;

(PP) Output Specifications*;

(QQ) Permits*;

(RR) Pre-Existing Environmental Site Conditions*;

(SS) Project Co Commissioning;

(TT) Railway Approvals;

(UU) Response or Responses;

(VV) Response Drawings;

(WW) Response Vehicle Drawings;

(XX) Revenue Service Availability;

(YY) Revenue Service Availability Date;

(ZZ) Revenue Service Availability Payment Date;

(AAA) Revenue Service Commencement;

(BBB) Revenue Service Commencement Date;

(CCC) Safety Requirements;

(DDD) Site*;

(EEE) Stage 1 E&M*, provided that for the purpose of interpreting this Section in the context of the Design and Construction Works under this Section 1.5(b), the terms "Project Scope" and "Output Specification" within this definition shall not be taken to include the Belfast MSF Expansion and the Stage 2 Additional Vehicles Variation;

(FFF) Stage 1 Fixed Facilities*, provided that for the purpose of interpreting this Section in the context of the Design and Construction Works under this Section 1.5(b), the terms "Project Scope" and "Output Specification" within this definition shall not be taken to include the Belfast MSF Expansion and the Stage 2 Additional Vehicles Variation;

(GGG) Stage 1 System*, provided that for the purpose of interpreting this Section in the context of the Design and Construction Works under this Section 1.5(b), the term "Output Specification" within this definition shall not be taken to include the Belfast MSF Expansion and the Stage 2 Additional Vehicles Variation;

(HHH) Stakeholders*;

(III) Substantial Completion;

(JJJ) Substantial Completion Date;

(KKK) Substantial Completion of the Vehicle Component;

(LLL) Substantial Completion of the Vehicle Component Date;

(MMM) System Design Functionality;

(NNN) Vehicle Milestone; and

(OOO) Work or Works;

(iii) Section 2.32 of Schedule 1*;

(iv) Schedule 8;

(v) Schedule 10, Part A, and Appendices A, B and C;

(vi) Schedule 13*;

(vii) Schedule 14;

(viii) Schedule 15-2;

(ix) Schedule 15-4*;

(x) Schedule 17, Sections 2.1*, 2.2(f)*, 2.2(g)*, 2.5*, 2.9*, 2.10, 3.1(a)*, 3.1(c)(ii)*, 3.1(c)(viii)*, 3.2(a)*, 3.2(c)(i)*, 3.1(c)(v)*, 3.7(a)*, 3.7(e)(v)*, 3.7(f)*, 3.7(l)*, 3.8(b)(i)*, 3.8(b)(vi)*, 3.8(c)*, 3.9*, 3.10(c)* and 4, Appendix A and Appendix B;

(xi) Schedule 18, Sections 2.2, 3.2 and 6;

(xii) Schedule 19;

(xiii) Schedule 25, Appendix A;

(xiv) Schedule 27, Sections 4.2, 4.3, 4.4 and 10;

(xv) Schedule 29;

(xvi) Schedule 31;

(xvii) Schedule 33;

(xviii) Schedule 34;

(xix) Schedule 35;

(xx) Schedule 37;

(xxi) Schedule 38;

(xxii) Schedule 40;

(xxiii) Schedule 41, in the manner outlined in Section 4.2(b)(i) thereof;

(xxiv) Schedule 43;

(xxv) Schedule 44; and

(xxvi) Schedule 45.

For ease of reading, the provisions listed above have been underlined in this Project Agreement and, where relevant, the original defined terms are shown as the original text in the Stage 2 Maintenances Services Variation Confirmation and are also set out in Appendix 8 to Schedule 1.

In addition, the Parties agree that, between themselves, the provisions of the Construction Contractor's Direct Agreement and the Independent Certifier Agreement will be interpreted in accordance with the Ring Fencing Principle and they will conduct themselves with respect to any other counterparties to those agreements accordingly.

(c) The Parties also acknowledge that the scope of the Maintenance Services shall be increased over time as follows (the "**Timing Principle**"):

(i) until Belfast MSF Expansion Substantial Completion, the Maintenance Services shall apply only to the Stage 1 System;

(ii) subject to Section 1.5(c)(v), from the Belfast MSF Expansion Substantial Completion Date until Stage 2 East Substantial Completion Date, the

Maintenance Services shall apply only to the Stage 1 System and the Belfast MSF Expansion;

(iii) subject to Section 1.5(c)(v), from the Stage 2 East Substantial Completion Date until Stage 2 West Substantial Completion Date, the Maintenance Services shall apply only to the Stage 1 System, the Belfast MSF Expansion and Stage 2 East;

(iv) from the Stage 2 West Substantial Completion Date, the Maintenance Services shall apply to the Expanded System as a whole; and

(v) as regards the Stage 2 Additional Vehicles, the Maintenance Services for each Stage 2 Additional Vehicle shall start on Delivery of such Stage 2 Additional Vehicle.

(d) The Parties acknowledge that, as of the date of the Stage 2 Maintenance Services Variation, it is assumed that the Stage 2 East Substantial Completion Date will occur before Stage 2 West Substantial Completion Date and the Stage 2 East Revenue Service Availability Date will occur before Stage 2 West Revenue Service Availability Date, and accordingly certain provisions of this Agreement have been drafted on the basis of this assumption. In the event that this should not occur, the City shall issue a Variation Enquiry and the relevant provisions of Schedule 22 - Variation Procedure shall apply except that the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree.

(e) This Project Agreement shall be read and interpreted so as to apply the Ring Fencing Principle and the Timing Principle.

2. COMMERCIAL CLOSE AND FINANCIAL CLOSE

2.1 Effective Date

(a) The provisions of Sections 1 to 11, 13, 15 to 25, 28 to 30, 35, 37 to 39 and 51 to 64, and Schedules 1 to 3, 9 to 11, 13, 16, 18, 19, 22, 25 to 27, 29, 34, 35, 36, 38, 39, 40 as to Sections 1.1, 1.2 and 9.4 only, 41 and 42 will come into effect on Commercial Close. All other provisions of this Project Agreement will come into effect only on Financial Close. The provisions of this Project Agreement will terminate on the Termination Date.

2.2 Standby Letter of Credit

(a) On Commercial Close, Project Co shall deliver, or cause to be delivered, to the City an irrevocable standby letter of credit (the "**Standby Letter of Credit**") in the amount of dollars ($) substantially in the form of Schedule 29 – Standby Letter of Credit.

(b) Unless the Standby Letter of Credit is drawn by the City in accordance with the provisions of this Project Agreement, the City shall release and deliver the Standby Letter of Credit to Project Co on Financial Close.

(c) Project Co shall ensure that the Standby Letter of Credit (and any replacement therefor) is renewed prior to its expiry date if, as at such date, Financial Close will not, or may reasonably be expected not to, have occurred.

2.3 Financial Close

(a) No later than 30 days prior to the Financial Close Target Date, Project Co will deliver to the City for the City's approval drafts of all documents referred to in Section 1 of Schedule 2 – Completion Documents.

(b) On or before the Financial Close Target Date:

(i) Project Co shall deliver to the City the documents referred to in Section 1 of Schedule 2 – Completion Documents; and

(ii) The City shall deliver to Project Co the documents referred to in Section 2 of Schedule 2 – Completion Documents.

(c) In the event that any of the City's conditions precedent set out in Section 2.5(a) are not satisfied, or if Project Co fails to deliver to the City any of the documents referred to in Section 1 of Schedule 2 – Completion Documents by the Financial Close Target Date (other than as a direct result of a breach by the City of its obligations under Section 2.3(b)(ii)) and the City does not waive such requirement or such requirement is not deemed to have been satisfied in accordance with Section 2.5 the City will be entitled to draw on the Standby Letter of Credit, in full or in part, to retain the proceeds thereof as liquidated damages and may terminate this Project Agreement in its entirety by written notice having immediate effect. The Parties agree that such liquidated damages are not a penalty but represent a genuine and reasonable pre estimate of the damages that the City will suffer as a result of the happening of the specified event and it would be difficult or impossible to quantify such damages upon the happening of the specified event. Such payment shall constitute full and final settlement of any and all damages that may be claimed by the City as a result of Project Co not achieving Financial Close. The Parties agree that such liquidated damages shall be payable whether or not the City incurs or mitigates its damages, and that the City shall not have any obligation to mitigate any such damages.

(d) As contemplated under Section 10.3.5 of the Request for Proposals, Project Co shall, no later than 10 days following written instructions from the City at Financial Close, pay the Coordination Fee amount plus, for clarity, any applicable HST to each of the eligible unsuccessful Proponents (as that term is defined in the Request for Proposals), as directed by the City. If Project Co is directed to pay the Coordination Fee to fewer than two Proponents, then Project Co shall revise the Financial Model prior to Financial Close to reflect such change.

(e) If the City fails to deliver to Project Co any of the documents referred to in Section 2 of Schedule 2 – Completion Documents by the Financial Close Target Date (other than as a direct result of a breach by Project Co of its obligations under Section 2.3(b)(i)) and Project Co does not waive such requirement, Project Co will be entitled to the return of

the Standby Letter of Credit and to terminate this Project Agreement in its entirety by written notice having immediate effect and neither of the Parties shall have any further obligations or liabilities to each other. In addition, if the Project Agreement is terminated as a result of any of the conditions contained in Section 2.5(b) Project Co will be entitled to the return of the Standby Letter of Credit and to payment of an amount equal to the Design and Bid Fee pursuant to Section 10.3.2 of the Request for Proposals, plus any applicable HST and the parties shall have no further obligations or liabilities to each other.

2.4 Disruption in Financial Markets

(a) If Financial Close cannot be achieved by the Financial Close Target Date by reason solely of a Severe Market Disruption, subject to Project Co's obligation to renew the Standby Letter of Credit pursuant to Section 2.2, the Financial Close Target Date will be extended until the date falling 10 Business Days (or such other period as the Parties agree, acting reasonably) after the date on which such Severe Market Disruption ceases.

(b) If a Severe Market Disruption exists, then, at any time before such Severe Market Disruption ceases and prior to Financial Close, the City may in its Discretion either:

(i) terminate this Project Agreement in its entirety by written notice having immediate effect; or

(ii) direct Project Co to assign to the City and the City will assume:

(A) the Project Agreement, and all of Project Co's right, title and interest in the Project Data, the Intellectual Property Rights and the Project Co Permits, Licences and Approvals; and

(B) those contracts between Project Co and any Project Co Party which the City elects to be assigned.

(c) If the City exercises its rights pursuant to Section 2.4(b), and, provided Project Co has, if directed, delivered the assignments provided for in (ii) (A) and (B) above, Project Co will be entitled to the return of its Standby Letter of Credit and to payment of an amount equal to the Design and Bid Fee pursuant to Section 10.3.2 of the Request for Proposals plus 20% of such fee, plus any applicable HST. The City's obligation to return the Standby Letter of Credit and to pay such fee shall be contingent on the receipt of a waiver, in form and substance satisfactory to the City, that such fee represents full and final satisfaction of any obligation or liability of the City to Project Co and any Project Co Parties in connection with the Project Agreement and the Request for Proposals.

2.5 Conditions to Financial Close

(a) Conditions for the Benefit of the City

The obligation of the City to complete the Financial Close shall be subject to fulfilment of the following conditions on the Financial Close Target Date:

(i) Obligations of Project Co

On Financial Close, all of the covenants and obligations of this Project Agreement to be complied with or performed by Project Co on or before the Financial Close Target Date shall have been complied with or performed in all material respects.

(ii) Representations and Warranties of Project Co

On Financial Close, the representations or warranties of Project Co set out in Section 5.1 shall be true and accurate in all material respects and Project Co shall have delivered to the City a certificate of Project Co signed by a senior officer of Project Co without personal liability, having knowledge of the matters certified therein with respect thereto (the "**Project Co Certificate**").

(iii) Project Co Event of Default

On Financial Close, there shall be no Project Co Event of Default, nor shall there be any breach of this Project Agreement by Project Co or any other matter which has occurred which, if not cured, shall result in a Project Co Event of Default.

(iv) Completion Documents

On Financial Close, the City is satisfied with the forms of the Completion Documents to be delivered by Project Co referred to in Section 1 of Schedule 2 – Completion Documents.

The conditions set forth in this Section 2.5(a) are for the sole benefit of the City and may be waived in whole or in part by the City by notice to Project Co on or before 5:00 p.m. on the Financial Close Target Date. If the City does not notify Project Co on or before 5:00 p.m. on the Financial Close Target Date that a condition set forth in this Section 2.5(a) has not been satisfied, such condition shall be deemed to have been satisfied.

(b) Mutual Conditions

The obligations of the City and Project Co to complete the Financial Close are subject to the fulfillment of the following conditions:

(i) the EA Approvals have been obtained;

(ii) the City has acquired the Real Property Interests in the Lands described in Appendix 2 to Schedule 1 – Definitions and Interpretation, excluding the After-Acquired Lands; and

(iii) no injunction or restraining order or other decision or order of a court or Relevant Authority of competent jurisdiction being in effect on Financial Close which prohibits, restrains, limits or imposes conditions having a material adverse effect

on the obligations or liabilities of either of the Parties, or the transactions contemplated by this Project Agreement.

If any of the foregoing conditions are not performed or fulfilled on or before 5:00 p.m. on the Financial Close Target Date, either the City or Project Co may terminate this Project Agreement, in which event this Project Agreement shall be terminated, the Standby Letter of Credit shall be returned to Project Co without deduction and the Parties shall have no further obligations or liabilities to each other.

3. SCOPE OF AGREEMENT

3.1 Scope of Agreement

(a) Project Co shall undertake the Project and perform the activities within the Project Scope in accordance with and subject to the provisions of this Project Agreement.

(b) Project Co shall exercise its rights and perform its obligations at its own cost and risk without recourse to the City, except as otherwise provided in this Project Agreement.

4. BUSINESS OPPORTUNITIES

4.1 Business Opportunities

(a) Project Co acknowledges that the City (i) may from time to time develop, or permit the development of, commercial and other opportunities (including, for greater certainty, all retail and parking operations and all naming rights) on or associated with the System, in, around and above the stations, in, around and above the Alignment (including, for greater certainty, air rights) and in respect of Highway 417 ("**Business Opportunities**"); (ii) reserves the right to all Business Opportunities; and (iii) may, as set out in this Project Agreement, grant rights in the Business Opportunities to Project Co.

(b) To the extent that the development of a Business Opportunity materially adversely interferes with Project Co's licence rights hereunder or materially adversely interferes with Project Co's ability to perform the activities within the Project Scope, such development shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation.

(c) To encourage the development of Business Opportunities, Project Co may, from time to time, propose Business Opportunities for the City's consideration. All such proposals shall describe the Business Opportunity in full with the expected financial and other advantages to both Parties. The City may accept any such proposal in its Discretion and subject to such terms and conditions as the City may require.

(d) Notwithstanding that Project Co has proposed a Business Opportunity to the City for its consideration, Project Co acknowledges that the City reserves the right to proceed with such Business Opportunity or any similar Business Opportunity with Project Co or with any third party, and may initiate a separate procurement process for the development of any Business Opportunity and Project Co shall not be entitled to receive any payment or

compensation from the City (in any form) on the basis that Project Co proposed such Business Opportunity to the City, even if the City proceeds with such Business Opportunity or any similar Business Opportunity with Project Co or any third party.

5. REPRESENTATIONS AND WARRANTIES

5.1 Project Co Representations and Warranties

(a) Project Co represents and warrants to the City that as of Commercial Close:

(i) Project Co is a general partnership between ACS RTG Partner Inc., SNC RTG Partner Inc. and EllisDon RTG Partner Inc. formed and validly existing under the laws of the Province of Ontario, and has all the requisite power and authority to own its properties and assets, to carry on its business as it is currently being conducted, and to enter into this Project Agreement and to duly observe and perform its obligations hereunder:

(A) ACS RTG Partner Inc. is a duly incorporated and validly existing company under the laws of British Columbia and has all the requisite power and authority to own its properties and assets, to carry on its business as it is currently being conducted and to enter into this Project Agreement and to duly observe and perform its obligations hereunder in its capacity as a partner of Project Co;

(B) SNC RTG Partner Inc. is a duly incorporated and validly existing company under the laws of Canada, and has all the requisite power and authority to own its properties and assets, to carry on its business as it is currently being conducted and to enter into this Project Agreement and to duly observe and perform its obligations hereunder in its capacity as a partner of Project Co;

(C) EllisDon RTG Partner Inc. is a duly incorporated and validly existing company under the laws of Ontario, and has all the requisite power and authority to own its properties and assets, to carry on its business as it is currently being conducted and to enter into this Project Agreement and to duly observe and perform its obligations hereunder in its capacity as a partner of Project Co;

(ii) Project Co is and shall remain a Special Purpose Vehicle during the Project Term;

(iii) all partnership interests in Project Co as of Commercial Close have been disclosed to the City;

(iv) Project Co and the Project Co Parties, collectively, have extensive experience and are knowledgeable in the design, construction and maintenance of light rail transit projects and have extensive experience in the construction of highways and other public roads similar to the Project in scale, scope, type and complexity and have the required ability, experience, skill and capacity to perform the activities within

the Project Scope in a timely and professional manner as set out in this Project Agreement including, without limitation, the services required by the Contract Documents, to review and interpret the Contract Documents and to complete the Highway Work in accordance with the standard of care set out in Section 11.2(a)(viii) of Schedule 40 – Highway Work;

(A) Project Co and certain of the Project Co Parties have conducted an investigation and examination of the Contract Documents, and any other documents made available to Project Co by the City (which include, to the extent made available to Project Co by the City, equipment lists, a legal description of the Highway Site, copies of any registered and unregistered agreements affecting the Highway Site, results of tests, reports of independent testing agencies and surveys and documents indicating the location of Utilities and other structures to the extent obtained by the City, information regarding the critical requirements to maintain the operations of the Existing Highway Infrastructure, including the Highway Site Background Reports and the Contract Documents referred to in Section 11.7(c) of Schedule 40 – Highway Work) so as to ascertain the nature or location of the Highway Work and the Highway Site, the physical conditions of the Highway Site, the interface with the Existing Highway Infrastructure and protocols, rules and regulations if any, possible delays in commencing the Highway Work, conditions relating to the transportation, handling and storage of materials and availability of labour and the character and availability of equipment, materials and facilities needed to perform the Highway Work and to identify any Highway Design Issues. Project Co has delivered to the Consultant requests for information in respect of all questions arising out of the foregoing inspections, investigations and examinations and in respect of each Highway Design Issue identified. Based on this review, Project Co has established a Project Co Design Contingency adequate, in its judgement, to fund any change or delay cost that may arise as a result of any further Highway Design Issue that may be identified and properly characterized as a Project Co Highway Design Issue;

(v) Project Co has solicited bids from and will award Subcontracts for the Approved Highway Subcontractor Highway Work only to the applicable Approved Highway Subcontractors and has not solicited bids from and will not award Subcontracts for the Approved Highway Subcontractor Highway Work except to the applicable Approved Highway Subcontractors;

(vi) Project Co and the Project Co Parties, collectively, have the requisite power, authority and capacity to execute, deliver and perform this Project Agreement, and to do all acts and things, and execute, deliver and perform all other agreements, instruments, undertakings and documents as are required by this Project Agreement to be done, executed, delivered or performed;

(vii) no steps or proceedings have been taken or are pending to supersede or amend the constating documents, articles or by-laws of Project Co in a manner that would impair or limit its ability to perform the obligations of Project Co under this Project Agreement;

(viii) this Project Agreement has been duly authorized, executed, and delivered on behalf of Project Co and constitutes a legal, valid, and binding obligation of Project Co, enforceable against Project Co in accordance with its terms, subject only to:

(A) limitations with respect to the enforcement of remedies by bankruptcy, insolvency, moratorium, winding-up, arrangement, reorganization, fraudulent preference and conveyance and other laws of general application affecting the enforcement of creditors' rights generally; and

(B) general equitable principles and the fact that the availability of equitable remedies is in the discretion of a court and that a court may stay proceedings or the execution of judgments;

(ix) the execution, delivery, and performance by Project Co of this Project Agreement does not and will not violate or conflict with, or constitute a default under:

(A) its constating, formation or organizational documents, including any by-laws;

(B) any Applicable Law; or

(C) any covenant, contract, agreement, or understanding to which it is a party or by which any of its properties or assets are bound or affected;

(x) no Project Co Event of Default has occurred and is continuing;

(xi) the information concerning Project Co set out in Schedule 31 (Project Co Information) is true and accurate, except as disclosed in writing to the City prior to Commercial Close and, there is not outstanding at the date hereof any offer, agreement or other arrangement whereby:

(A) any Person is at the date of this Project Agreement or at any time entitled to or obligated to subscribe for or take by means of transfer or by conversion of any form of investment or security any securities or voting rights in Project Co (including any such entitlement or obligation that may arise in exercise of an option enforceable by or against Project Co or any other Person), but excluding any rights or entitlements of the Lenders pursuant to the Lending Agreements; or

(B) any alteration to the constitution or power of the board of directors of Project Co may take effect;

(xii) there are no actions, suits, proceedings, or investigations pending or threatened against Project Co or, to Project Co's knowledge, any Project Co Party at law or in equity before any Governmental Authority or arbitral body (whether or not covered by insurance) that individually or in the aggregate could result in any material adverse effect on the business, properties, or assets, or the condition, financial or otherwise, of Project Co or in any impairment of Project Co's ability to perform its obligations under this Project Agreement, and Project Co has no knowledge of any violation or default with respect to any order, writ, injunction, or decree of any Governmental Authority or arbitral body that could result in any such material adverse effect or impairment;

(xiii) Project Co has carefully reviewed the whole of this Project Agreement, and all other documents made available to Project Co by or on behalf of the City, and, to Project Co's knowledge, nothing contained herein or therein inhibits or prevents Project Co from completing the Works and the Highway Work or performing the activities within the Project Scope in accordance with this Project Agreement in a good and safe manner so as to achieve and satisfy the requirements of this Project Agreement;

(xiv) Project Co is able to meet its obligations as they generally become due;

(xv) Project Co is registered under Division V of Part IX of the *Excise Tax Act* (Canada) and its registration number is 82972 5449 RT0001;

(xvi) each of the Scheduled Milestone Acceptance Dates, the Highway Scheduled Substantial Completion Date and the Required Revenue Service Availability Date is a realistic date and is achievable by Project Co performing the Design and Construction Works and the Highway Work in accordance with this Project Agreement;

(xvii) Project Co is a Canadian partnership for purposes of the *Income Tax Act* (Canada);

(xviii) except in respect of liabilities that have arisen in the ordinary course of the management of the affairs of Project Co in preparing to enter into this Project Agreement, the Lending Agreements and all other agreements referred to herein, Project Co has no material financial obligations;

(xix) the copy of the constating documents of Project Co certified by appropriate officers of Project Co and delivered to the City immediately prior to entering into this Project Agreement is true and accurate and there are no outstanding proposals to amend such documents;

(A) Project Co has satisfied itself as to the nature and extent of the risks assumed by it in relation to the Project;

(xx) Project Co is and shall be the sole and exclusive owner of the Project Co Intellectual Property and has and shall have the right to provide the Licences granted to the City herein;

(xxi) none of the Project Co Intellectual Property infringes, or is a misappropriation of, any third Person's Intellectual Property Rights, and as of the date of this Project Agreement and Commercial Close, to the extent that Project Co Has Knowledge, no allegations of infringement or notices of misappropriation have been issued by any Person regarding any of the Project Co Intellectual Property;

(xxii) all of the agreements with the Project Co Parties, the Shareholders Agreement and all other agreements and documentation constituting the Project Co Closing Documents are unamended, in good standing and there are no defaults thereunder;

(xxiii) there has been no material change to any of the information including the financial information provided by Project Co to the City as provided in the Response and there has been no Change in Control with respect to Project Co;

(xxiv) there is no misrepresentation or material omission of any nature or kind whatsoever contained in the Response including without limitation that the Canadian Content Certificate submitted with the Response is true and correct in all material respects and that, subject to Section 2.8 of Schedule 35 – Additional Vehicles, the Vehicles are expected to meet the Canadian Content Requirements upon delivery to the City;

(xxv) all of the Contracts together shall be sufficient to create the entire System and accomplish Integration;

(xxvi) no Restricted Person has Direct or Indirect Power or Control over Project Co in relation to the decisions, management, actions or policies of Project Co or in relation to the operation, management and ownership of the Project; and

(xxvii) no Restricted Person has directly or indirectly, an Economic Interest in Project Co or the Project.

(b) The representations and warranties contained in Sections 5.1(a)(i), (ii), (iv) to (ix), (xiii), (xvii), (xviii), (xxiii), and (xxv) to (xxvii) shall survive Financial Close and shall not be deemed to be merged thereon. The remaining representations and warranties contained in Section 5.1(a) shall be deemed to have merged on the Financial Close.

5.2 Representations and Warranties of the City

(a) The City represents and warrants to Project Co that as of Commercial Close:

(i) the execution and delivery of this Project Agreement and all documents, instruments and agreements required to be executed and delivered by the City pursuant to this Project Agreement, and the completion of the transactions contemplated by this Project Agreement, have been duly authorized, and this

Project Agreement has been duly executed and delivered by the City and constitutes a legal, valid and binding obligation of the City enforceable in accordance with its terms, except as may be limited by laws of general application affecting the enforceability of remedies and rights of creditors and except that equitable remedies such as specific performance and injunction are in the discretion of a court and except as may be subject to the special jurisdiction and powers of the Ontario Municipal Board over defaulting municipalities under the *Municipal Affairs Act*, R.S.O. 1990 c. M.46, as amended;

(ii) the City has full power and capacity to enter into and carry out the transactions contemplated by and duly observe and perform all of its obligations contained in this Project Agreement;

(iii) there are no third party consents required for the execution by the City of, and performance of its obligations under this Project Agreement;

(iv) other than any proceeding under the *Expropriations Act*, (Ontario) which could delay the acquisition by the City of the Lands and/or the After-Acquired Lands and/or Real Property Interests, Construction Easements and/or Permanent Easements therein, there are no current and, to the Knowledge of the City, there are no pending or threatened actions, claims, demands, lawsuits, assessments, arbitrations, judgments, awards, decrees, orders, injunctions, prosecutions, or other proceedings of, by, against, or relating to, the City which could have a material adverse effect on the ability of the City to perform its obligations under this Project Agreement and the City does not Have Knowledge of any basis for any such action, claim, demand, lawsuit, assessment, arbitration, judgment, award, decree, order, injunction, prosecution or other proceeding;

(v) all of the agreements and documents constituting the City Closing Documents are unamended, in good standing and there are no defaults by the City thereunder;

(vi) the City has (or, in the case of the After-Acquired Lands, will have) acquired the Real Property Interests in the Lands and After-Acquired Lands sufficient to enable to City to grant or to cause to be granted to Project Co the licence rights contemplated in Section 14.1;

(vii) City has rights of use and access to, on and over the Highway Site and the Highway that are sufficient to enable City to grant to Project Co the licence rights contemplated in Section 9.1 of Schedule 40 – Highway Work; and

(viii) City has obtained all necessary City Permits, Licences and Approvals required to allow for the commencement of the Highway Work.

(b) The representations and warranties contained in Sections 5.2(a)(i), (ii), (iii), and (vi) to (viii) shall survive the Financial Close and shall not be deemed to be merged thereon. The remaining representations and warranties contained in Section 5.2(a) shall be deemed to have merged on the Financial Close.

6. BACKGROUND INFORMATION

6.1 No Liability

(a) Except as expressly provided in Sections 6.4, 6.6, 16.1, 16.1A, 16.1B, 16.2, 16.3, 16.4 and 16.5 neither the City nor any City Party shall be liable to Project Co or any Project Co Party for, and Project Co or any Project Co Party shall not seek to recover from the City or any City Party, any damages, losses, costs, liabilities or expenses which may arise (whether in contract, tort or otherwise) from the adoption, use or application of the Background Information by, or on behalf of, Project Co or any Project Co Party.

(b) Except as expressly provided in Sections 6.4, 6.6, 16.1, 16.1A, 16.1B, 16.2, 16.3, 16.4 and 16.5 or Schedule 43 to this Project Agreement neither the City nor any City Party shall be liable to Project Co or any Project Co Party for, and Project Co or any Project Co Party shall not seek to recover from the City or any City Party, any damages, losses, costs, liabilities or expenses which may arise (whether in contract, tort or otherwise) from the adoption, use or application of the Stage 2 Background Information by, or on behalf of, Project Co or any Project Co Party.

6.2 No Warranty

(a) Except as expressly provided in Sections 6.4, 6.6, 16.1, 16.1A, 16.1B, 16.2, 16.3, 16.4 and 16.5:

(i) neither the City nor any City Party gives any warranty or undertaking of whatever nature in respect of the Background Information and, specifically (but without limitation), neither the City nor any City Party warrants that the Background Information represents all of the information in its possession or power (either during the conduct of the procurement process for the Project or at the time of execution and delivery of this Project Agreement) relevant or material to or in connection with the Project or the obligations of Project Co under this Project Agreement or under any of the Project Documents; and

(ii) neither the City nor any City Party shall be liable to Project Co or any Project Co Party in respect of any failure, whether before, on or after the execution and delivery of this Project Agreement:

(A) to disclose or make available to Project Co or any Project Co Party any information, documents or data;

(B) to review or update the Background Information; or

(C) to inform Project Co or any Project Co Party of any inaccuracy, error, omission, defect or inadequacy in the Background Information.

(b) Except as expressly provided in Sections 6.4, 6.6, 16.1, 16.1A, 16.1B. 16.2, 16.3, 16.4 and 16.5 or Schedule 43 to this Project Agreement:

(i) neither the City nor any City Party gives any warranty or undertaking of whatever nature in respect of the Stage 2 Background Information and, specifically (but without limitation), neither the City nor any City Party warrants that the Stage 2 Background Information represents all of the information in its possession or power relevant or material to or in connection with the Project or the obligations of Project Co under this Project Agreement or under any of the Project Documents; and

(ii) neither the City nor any City Party shall be liable to Project Co or any Project Co Party in respect of any failure, whether before, on or after the execution and delivery of this Project Agreement:

(A) to disclose or make available to Project Co or any Project Co Party any information, documents or data;

(B) to review or update the Stage 2 Background Information; or

(C) to inform Project Co or any Project Co Party of any inaccuracy, error, omission, defect or inadequacy in the Stage 2 Background Information.

6.3 No Claims

(a) Project Co acknowledges and confirms that:

(i) it has conducted its own analysis and review of the Background Information for the purpose of Stage 1 (based on the definitions of Project Scope and Output Specifications as they were defined at the date of this Agreement) only and has, before the execution and delivery of this Project Agreement, satisfied itself as to the accuracy, completeness and fitness for purpose of any such Background Information upon which it places reliance;

(ii) in carrying the Procurement Support Services, it has conducted its own analysis and review of the Stage 2 Background Information provided to it prior to the date of the Stage 2 Maintenance Services Variation for the purposes of carrying out the Procurement Support Services;

(iii) except as expressly provided in Sections 6.4, 6.6, 16.1, 16.1A, 16.1B, 16.2, 16.3, 16.4 and 16.5, it shall not be entitled to and shall not, and shall ensure that no Project Co Party shall, make any claim against the City or any City Party (whether in contract, tort or otherwise), including, without limitation, any claim in damages, for extensions of time or for additional payments under this Project Agreement on the grounds:

(A) of any misunderstanding or misapprehension in respect of the Background Information; or

(B) that the Background Information was incorrect or insufficient; and

(iv) except as expressly provided in Sections 6.4, 6.6, 16.1, 16.1A, 16.1B, 16.2, 16.3, 16.4 and 16.5 or Schedule 43 to this Project Agreement, it shall not be entitled to and shall not, and shall ensure that no Project Co Party shall, make any claim against the City or any City Party (whether in contract, tort or otherwise), including, without limitation, any claim in damages, for extensions of time or for additional payments under this Project Agreement on the grounds:

(A) of any misunderstanding or misapprehension in respect of the Stage 2 Background Information; or

(B) that the Stage 2 Background Information was incorrect or insufficient,

nor shall Project Co be relieved from any of its obligations under this Project Agreement on any such grounds.

6.4 Technical Reports

(a) The City agrees that, if at Commercial Close, except as disclosed in any Background Information or as otherwise disclosed by the City or any City Party, or known by Project Co or any Project Co Party, any of the information in the Technical Reports is, to the Knowledge of the City, incorrect or there is relevant information in the possession or control of the City that would make any of the information in the Technical Reports incorrect, then, to the extent that such incorrect information materially adversely interferes with Project Co's ability to perform the activities within the Project Scope or materially adversely affects Project Co's cost of performing activities within the Project Scope, such incorrect information shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation.

(b) The City agrees that, if at the date of the Stage 2 Maintenance Services Variation, except as disclosed in any Stage 2 Background Information (other than the Stage 2 Technical Reports) or as otherwise disclosed by the City or any City Party, or known by Project Co or any Project Co Party, any of the information in:

(i) the Stage 2 Technical Reports (other than the Geotechnical Reliant Reports (as defined in the DB Co Works Agreement)) is, to the Knowledge of the City, incorrect, or there is relevant information in the possession or control of the City that would make any of the information in such Stage 2 Technical Reports incorrect, or

(ii) the Geotechnical Reliant Reports (as defined in the DB Co Works Agreement) is incorrect,

then, to the extent that such incorrect information materially adversely interferes with Project Co's ability to perform the activities within the Project Scope or materially adversely affects Project Co's cost of performing activities within the Project Scope, such incorrect information shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation.

6.5 Highway Work Document Review

(a) Project Co acknowledges having conducted a thorough review of the Contract Documents and has reported to the Consultant and City any Highway Design Issue found by Project Co in the Contract Documents during its review. If Project Co does discover any Highway Design Issue in the Contract Documents, Project Co shall not proceed with the Highway Work affected until Project Co has first complied with the provisions of Section 11.18 of Schedule 40 – Highway Work. Project Co acknowledges that it is responsible for the risks assumed by Project Co in Sections 11.17 and 11.18 of Schedule 40 – Highway Work and that any additional costs resulting from such risks will form part of the Project Co Design Contingency. It is intended that the review of the Contract Documents conducted by Project Co pursuant to this Section 6.5(a) be carried out by Project Co and the Project Co Parties using their own experiences and expertise in accordance with the standard of care set out in Section 11.2(a)(viii) of Schedule 40 – Highway Work and in accordance with the representations and warranties of Project Co set out in Section 5.1.

(b) Except as may constitute a Highway Design Issue properly characterized as a Project Co Highway Design Issue under Section 11.17 of Schedule 40 – Highway Work, and except in respect of those Contract Documents which, under the terms of this Project Agreement, Project Co is required to prepare or produce, Project Co shall not be responsible for verifying that the Contract Documents are in compliance with Applicable Law.

(c) If the Contract Documents are at variance with Applicable Law, or if, subsequent to the Submission Date, changes are made to Applicable Law which require modification to the Contract Documents, Project Co shall notify the Consultant in writing requesting direction immediately upon such variance or change becoming known. The Consultant will make the changes required to the Contract Documents as provided in Section 38 below and Schedule 22 – Variation Procedure.

(d) If Project Co fails to notify the Consultant in writing, fails to obtain direction as required in Section 6.5(c), and performs Highway Work knowing it to be contrary to any Applicable Law, Project Co shall be responsible for and shall correct the violations thereof, and shall bear the costs, expenses and damages attributable to its failure to comply with the provisions of such Applicable Law.

6.6 DB Co Originated Stage 2 Background Information

Nothing in this Section 6 shall prevent Project Co from (i) making a claim against DB Co under the DB Co Interface Agreement, (ii) pursuing a claim under Section 9.12 for Equivalent Project Relief pursuing a DB Co Direct Claim Entitlement or a DB Co-Derived Claim Entitlement pursuant to Section 9.12 in respect of any Stage 2 Background Information originating from DB Co, or (iii) pursuing any other demand, claim, action or proceeding Project Co may have against DB Co or any DB Co Party.

7. PROJECT DOCUMENTS

7.1 Project Documents

(a) Project Co shall perform its obligations under, and observe all of the provisions of, each of the Project Documents to which it is a party, and shall ensure that each Project Co Party shall perform its obligations under, and observe all of the provisions of, each of the Project Documents to which such Project Co Party is a party, so as to ensure that other parties to such Project Documents shall not be entitled to terminate same. In the event that Project Co receives a notice of default under any of the Project Documents, it shall promptly, and, in any event, no later than 2 Business Days after receipt thereof, deliver a copy of such notice of default to the City.

7.2 Ancillary Documents

(a) Project Co shall not:

(i) terminate or agree to the termination of all or part of any Ancillary Document, except pursuant to Sections 32.3, 45.5, 59.3 and 60.2 or otherwise to prevent or cure a Project Co Event of Default (provided that commercially reasonable alternative measures would not prevent or cure such Project Co Event of Default);

(ii) make or agree to any amendment, restatement or other modification of any Ancillary Document that materially adversely affects Project Co's ability to perform its obligations under this Project Agreement or that has the effect of increasing any liability of the City, whether actual or potential;

(iii) breach its obligations (or waive or allow to lapse any rights it may have) or permit others to breach their obligations (or waive or allow to lapse any rights they may have) under any Ancillary Document, that materially adversely affect Project Co's ability to perform its obligations under this Project Agreement or that have the effect of increasing any liability of the City, whether actual or potential; or

(iv) enter into, or permit the entry by any other person into, any agreement replacing all or part of any Ancillary Document, except in the circumstances referenced in Section 7.2(a)(i),

without the prior written consent of the City, provided that, where consent is requested pursuant to Section 7.2(a)(i) or 7.2(a)(iv), such consent shall not be withheld, and shall be provided within a reasonable time, where the relevant matter referred to in Section 7.2(a)(i) or 7.2(a)(iv) will not materially adversely affect Project Co's ability to perform its obligations under this Project Agreement or have the effect of increasing any liability of the City, whether actual or potential. In the event of termination or agreement to the termination of all or part of any Ancillary Document as described in Section 7.2(a)(i) or any agreement replacing all or part of any Ancillary Document as described in Section 7.2(a)(iv), Project Co shall, to the extent applicable, comply with all provisions herein applicable to changes in Project Co Parties, including Section 59.3.

(b) Upon the written request of City or the Consultant, Project Co will deliver or cause to be delivered to City or the Consultant a copy of any notices delivered or received by Project Co under any of the Ancillary Documents.

7.3 Changes to Lending Agreements and Refinancing

(a) Subject to the terms of the Lenders' Direct Agreement, Project Co shall not terminate, amend or otherwise modify the Lending Agreements, or waive or exercise any of its rights under the Lending Agreements, if, at the time such action is contemplated and effected, it would materially adversely affect Project Co's ability to perform its obligations under this Project Agreement or the Project Documents or have the effect of increasing any liability of the City, whether actual or potential, unless:

(i) such action is a Permitted Borrowing; or

(ii) such action is a Refinancing, other than a Mandatory Refinancing, effected in accordance with the provisions of Schedule 28 – Refinancing.

7.4 Compliance with Lending Agreements

(a) Project Co shall keep the Lending Agreements in good standing to the extent necessary to perform its obligations under this Project Agreement and the Project Documents, and shall ensure that none of the terms and conditions of the Lending Agreements shall prevent Project Co from performing its obligations under this Project Agreement or the Project Documents.

8. CITY RESPONSIBILITIES

8.1 General

(a) The City shall, at its own cost and risk:

(i) perform all of its obligations under, and observe all provisions of, this Project Agreement in compliance with Applicable Law;

(ii) subject to any obligations of Project Co set out in Schedule 40 – Highway Work, cooperate with Project Co in the fulfillment of the purposes and intent of this Project Agreement, provided, however, that the City shall not be under any obligation to perform any of Project Co's obligations under this Project Agreement;

(iii) acquire the Real Property Interests in the After-Acquired Lands described in Appendix 2 to Schedule 1 – Definitions and Interpretation, as amended from time to time, in accordance with the acquisition dates specified in the said Appendix;

(iv) make such payments to Project Co as are specifically provided for in this Project Agreement;

(v) subject to any obligations of Project Co set out in Schedule 40 – Highway Work, cooperate with Project Co in using reasonable efforts to manage the impact of road traffic upon the Construction; however, the City shall have no liability to Project Co in connection therewith;

(vi) perform those additional obligations specifically provided for in this Project Agreement; and

(vii) in accordance with Schedule 15-4 – Regulatory Standards, use commercially reasonable efforts, with the assistance of Project Co, to develop and adopt regulatory standards (the OLRT Regulations) relating to the design, construction, operation, safety, security and maintenance of a light rail transit system, including the System and the Project. For certainty, the City shall be solely responsible for the formal adoption of the OLRT Regulations (by way of by-law or otherwise) after Project Co has developed these for City approval from time to time in accordance with Schedule 15-4 – Regulatory Standards.

(b) Nothing in this Project Agreement shall in any way fetter the right, authority and Discretion of the City or any of the City Party in fulfilling its statutory or other functions under Applicable Law. Project Co agrees that it shall comply, and shall cause all relevant Project Co Parties to comply, subject to Section 39.1(b), with all written directions issued by or on behalf of the City from time to time as a party to this Project Agreement and as a Governmental Authority with regulatory jurisdiction over the Project and the System.

(c) The City shall, and shall cause all City Parties to, take reasonable steps to minimize undue interference with the provision of the Project Scope by Project Co or any Project Co Party.

(d) The City may, without legal obligation to do so and at the expense of Project Co, take such commercially reasonable steps as Project Co may request to facilitate temporary access for Project Co to lands not forming part of the Lands or the After-Acquired Lands to the extent Project Co may reasonably require to perform the activities within the Project Scope, provided that Project Co has demonstrated, to the reasonable satisfaction of the City, that it has not been able to gain such access through the use of its own commercially reasonable efforts.

(e) The City shall provide for the attendance of the requisite number of employees for the employee training to be provided by Project Co in accordance with the requirements of Schedule 15-2 – Design and Construction Requirements.

(f) The City shall provide Drivers and controllers to support the required commissioning activities in accordance with the requirements of this Project Agreement.

8.2 City Permits, Licences and Approvals

(a) The City shall, at its own cost and risk:

(i) obtain on or before Financial Close, except as otherwise provided in Appendix 1 – Permits, Licences and Approvals of Schedule 1 – Definitions and Interpretation, maintain, and, as applicable, renew all City Permits, Licences and Approvals which may be required for the performance of the activities within the Project Scope;

(ii) comply with all Permits, Licences and Approvals in accordance with their terms; and

(iii) execute all documents which, under Applicable Law, only the City as a land owner is entitled to execute and which are required to obtain or maintain any City Permits, Licences and Approvals.

(b) The City shall, at its own cost, provide or cause to be provided such information, documentation, and administrative assistance as Project Co may request and as the City may reasonably be able to provide, and shall execute such applications as are required to be in its name, to enable Project Co to obtain, maintain or renew any Project Co Permits, Licences and Approvals or to demonstrate compliance with any Permits, Licences and Approvals, provided that the City shall not be responsible for obtaining or for any delay in obtaining or for the failure of Project Co to obtain any Project Co Permit, Licence or Approval, unless such delay or failure is caused by any act or omission of the City. For greater certainty, the City shall not be obligated to:

(i) exercise any other of its legal rights in order to avoid or eliminate the requirement to obtain any Permits, Licences and Approvals;

(ii) automatically grant Project Co Permits, Licences and Approvals for which it is the authorizing entity and will apply its usual procedures and criteria in considering applications from Project Co for such Project Co Permits, Licences and Approvals; and

(c) Notwithstanding the provisions of Section 9.4(a)(i), the City shall be responsible for all designations, assumptions, road closures, transfers and any other applicable requirements relating to the System which can only be effected by the City pursuant to the *Municipal Act, 2001* (Ontario), subject to receipt by the City of any required consent(s) from the Crown in right of Canada and subject to Project Co having, at its own cost, providing or causing to be provided such information, documentation, and technical or administrative assistance, as the City may request and as Project Co may reasonably be able to provide to enable the City to effect such requirements.

8.3 Limitation on the City's Obligations

(a) The City shall have no obligations of any nature or kind whatsoever to Project Co except those obligations expressly enumerated as the City obligations specifically referred to in Section 8 or otherwise specifically provided in this Project Agreement.

9. PROJECT CO RESPONSIBILITIES

9.1 Other Business

(a) Project Co shall not engage in any activities which are not specifically related to, required by and conducted for the purpose of the Project without the prior written consent of the City, in its Discretion.

9.2 General

(a) Project Co shall, at its own cost and risk:

(i) observe all provisions of this Project Agreement in compliance with Applicable Law;

(ii) perform all activities within the Project Scope:

(A) in compliance with Applicable Law;

(B) in compliance with all Permits, Licences and Approvals and so as to preserve the existence and continued effectiveness of any such Permits, Licences and Approvals;

(C) so as to satisfy the Output Specifications;

(D) in accordance with Good Industry Practice (Works) and Good Industry Practice (Highway Work);

(E) in a manner consistent with the Quality Plans and the Project Co Proposal Extracts;

(F) in a timely and professional manner;

(G) with due regard to the health and safety of persons and property;

(H) subject to the other provisions of this Project Agreement, in a manner which will not impair the ability of the City or City Party to comply with Applicable Law;

(I) subject to the other provisions of this Project Agreement, in a manner which will not impair the performance of the Governmental Activities;

(J) in accordance with all other terms of this Project Agreement (including, for greater certainty, Schedule 40 – Highway Work);

(iii) cooperate with the City in the fulfillment of the purposes and intent of this Project Agreement, provided however that Project Co shall not be under any obligation to perform any of the City's obligations under this Project Agreement;

(iv) in accordance with Schedule 15-4 – Regulatory Standards, develop and implement regulatory standards relating to the design, construction, operation, safety, security and maintenance of a light rail transit system, including the System and the Project;

(v) Project Co shall be responsible for the Integration of the System and shall cause the System to be constructed and Integrated such that Revenue Service Availability shall have occurred on or before the Required Revenue Service Availability Date; and

(vi) in addition to Project Co having responsibility for Integration, as amongst the Contractors, the Construction Contractor shall assume responsibility for the Integration of the System.

(b) Project Co shall, in performing all activities within the Project Scope, cooperate with the City by, amongst other things, participating in meetings, committees and subcommittees related to the Project in respect of which the City requires Project Co's participation and, in the event that such participation is determined by Project Co and the City to constitute a material expense to Project Co, Project Co's participation shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation.

9.3 Project Co Parties

(a) Project Co shall not be relieved of any liability or obligation under this Project Agreement by the appointment of any Project Co Party, and Project Co shall cause each Project Co Party, to the extent such Project Co Party performs or is specified hereunder to perform the activities within the Project Scope, to comply with the obligations of Project Co hereunder in the same manner and to the same extent as Project Co.

9.4 Project Co Permits, Licences and Approvals

(a) Subject to Sections 9.4(e) and (f) below and Section 17.1(a), Project Co shall, at its own cost and risk:

(i) obtain, maintain, and, as applicable, renew all Project Co Permits, Licences and Approvals which may be required for the performance of the activities within the Project Scope including those Permits, Licences and Approvals in respect of which Project Co has responsibility as provided for in Appendix 1 – Permits, Licences and Approvals of Schedule 1 – Definitions and Interpretation;

(ii) assume the obligations of the City under the City Permits, Licences and Approvals as set out in Appendix 1 – Permits, Licences and Approvals of Schedule 1 – Definitions and Interpretation as at Financial Close or as they become available provided that in the case of NCC FLUA, Project Co shall comply with NCC FLUA requirements at its expense unless a requirement constitutes a Variation in compliance with the criteria provided for in Section 9.4(e)(iii), in which case such NCC FLUA requirement shall be deemed to be a Variation Enquiry and Project Co shall not comply with the requirement without a Variation Confirmation or a Variation Directive in accordance with Schedule 22 – Variation Procedure. For clarity, the obligations of Project Co in Section 9.4(a)(ii) shall not derogate from the obligations of the City contained in Section 9.4(e)(i).

(iii) comply with all Permits, Licences and Approvals in accordance with their terms;

(b) Where Project Co Permits, Licences and Approvals have requirements that may impose any conditions, liabilities or obligations on the City or any City Party, Project Co shall not obtain, amend or renew (other than upon the same terms and conditions) such Project Co Permits, Licences and Approvals without the prior written consent of the City, provided that the City shall not be responsible for obtaining or for the failure of Project Co to obtain any Project Co Permit, Licence or Approval. The City shall comply, or shall require compliance, with any conditions, liabilities or obligations as are imposed on the City or any City Party by the requirements of any Project Co Permit, Licence or Approval obtained with the City's consent under this Section 9.4(b).

(b1) The City agrees that it will not agree with DB Co pursuant to section 11.8(b) of the DB Co Works Agreement to impose on RTG or any RTG Party any conditions, liabilities or obligations in a DB Co Permit, Licence, Approval or Agreement (as defined in the DB Co Works Agreement) without the prior written consent of RTG, not to be unreasonably withheld or delayed.

(c) Project Co shall, at its own cost, provide or cause to be provided such information, documentation, and administrative assistance as the City may request and as Project Co may reasonably be able to provide, and shall execute such applications as are required to be in its name, to enable the City to obtain, maintain or renew any City Permits, Licences and Approvals or to demonstrate compliance with any Permits, Licences and Approvals, provided that Project Co shall not be responsible for obtaining or for any delay in obtaining or for the failure of the City to obtain any City Permit, Licence or Approval, unless such delay or failure is caused by any act or omission of Project Co, any Project Co Party or any other person for whom Project Co is responsible at law.

(d) The City shall use commercially reasonable efforts (subject to any Applicable Law or policy restrictions) to provide Project Co with or cause to be provided to Project Co such information and documentation as Project Co may reasonably require in relation to Permits, Licences and Approvals.

(e) With respect to the NCC FLUA:

(i) the City shall obtain the NCC FLUA, subject to Section 9.4(e)(ii);

(ii) Project Co shall use commercially reasonable efforts to assist the City in obtaining the NCC FLUA as required from time to time including, without limitation:

(A) the preparation and delivery of all Design Data in respect of the NCC FLUA pursuant to Schedule 10 – Review Procedure;

(B) the preparation and delivery of Design Development Submittals and/or Construction Development Submittals pursuant to Section 20.3 that are reasonably necessary or desirable to obtain the NCC FLUA;

(C) the preparation and delivery of such other plans, specifications, agreements, documents and instruments in respect of the Design and Construction Works and/or the Maintenance Services and amendments thereto that are reasonably necessary or desirable to obtain the NCC FLUA; and

(D) Project Co shall make changes to the Design Data as required by NCC to further assist the City in obtaining the NCC FLUA and Project Co shall take such other actions as may be reasonably directed by the City from time to time with respect thereto; and

(iii) if, following Commercial Close:

(A) NCC requires a change to the Design Data or any other additional obligation to be assumed in respect of the NCC FLUA pursuant to Section 9.4(a); and

(B) the City in its Discretion requires Project Co to make such change or to assume such additional obligation,

provided the change or other obligation is not otherwise a responsibility or obligation of Project Co under this Project Agreement, then such change or obligation shall result in a Variation subject to and in accordance with Schedule 22 – Variation Procedure.

(f) Notwithstanding the provisions of Section 9.4(a)(i), in respect of the Highway Work MTO shall be responsible for all authorizations, designations, assumptions, road closures, transfers and any other applicable requirements relating to the Highway which can only be effected by MTO pursuant to the *Public Transportation and Highway Improvement Act* (Ontario) or the *Highway Traffic Act* (Ontario), provided that Project Co shall, at its own cost, provide or cause to be provided such information, documentation, and technical or administrative assistance as MTO may request and as Project Co may reasonably be able to provide to enable MTO to effect such requirements.

9.5 Safety and Security

(a) Project Co shall:

(i) comply with the Safety Management Plan;

(ii) keep the Site in a safe and orderly state, as appropriate in accordance with Good Industry Practice (Works), to avoid danger to persons on the Site and in the immediate vicinity of the Site provided that to the extent Project Co for any reason vacates all or part of the Site on a temporary basis, the abandoned area shall be maintained by Project Co in a state that is safe for public use;

(iii) take such measures as are reasonable in accordance with Good Industry Practice (Works) to maintain and secure the Stage 1 Lands and the Site to prevent access thereto prior to Revenue Service Availability, and to maintain and secure the MSFs in accordance with the Maintenance Services to prevent access thereto during the Maintenance Term, by any persons or creatures not entitled to be there;

(iv) comply, and cause each Project Co Party to comply, with Applicable Law relating to health and safety, including without limitation the *OHSA* and the FCLC, and all regulations thereto;

(v) with respect to the Works, perform, or cause a Project Co Party to perform, all of the obligations of the "**constructor**", and indemnify the City and each other City Party against any and all of the liabilities of the "**constructor**", under the *OHSA* and the FCLC, as applicable, and all regulations thereto; and

(vi) provide the City with a certificate of good standing from WSIB or any successor thereto once every 90 days from Financial Close until Final Completion, and from Final Completion until the Termination Date, at the request of the City Representative from time to time.

9.6 Protest and Trespass

(a) Except as otherwise provided in this Project Agreement, prior to the Revenue Service Commencement Date, the City shall not be responsible for the presence on or around the Site, or any interference affecting the Site or the Design and Construction Works of any persons participating in civil disobedience, demonstration or protest action ("**Protesters**") or any other persons otherwise not entitled to be on or around the Site ("**Trespassers**"). For greater certainty, the presence of, or interference by, any Protesters or Trespassers on or around the Site shall not be a breach of the obligation of the City to grant licence rights of the use and access to Project Co on and over the Lands pursuant to Section 14, nor a breach of any other obligation, representation or warranty under this Project Agreement.

(b) Prior to the Revenue Service Commencement Date, the management of any Protesters or Trespassers shall be the responsibility of Project Co (to the extent same is not otherwise the responsibility of the Police Service). If at any time prior to the Revenue Service Commencement Date, any part of the Site is occupied, or access to the Site is prevented

or interfered with, by Protesters or Trespassers, Project Co shall use all appropriate measures reasonable in the circumstances to manage such Protesters or Trespassers including the pursuit of the remedies referred to in Section 9.6(c)(i) and promptly notify the City Representative of such occurrence and of the action which Project Co proposes to take in respect thereof. Project Co may exercise any legal remedy available to it to remove Protesters or Trespassers from the Site, provided that if Project Co does so elect to exercise any such legal remedy, Project Co shall give the City Representative not less than 24 hours notice prior to commencing any legal proceeding for that purpose (except in a case of Emergency, where, in such circumstances, such notice may be given to the City less than 24 hours prior to the commencement of such legal proceeding) and shall continually update the City Representative as to the status of any such proceeding in reasonable detail and at reasonable intervals, and provided further that:

(i) Project Co shall not give directly or indirectly to any Protester or Trespasser any inducement, monetary or otherwise, with a view to avoiding, limiting or influencing the manner of protest activities by that Protester or Trespasser or by other Protesters or Trespassers; and

(ii) Project Co shall not by virtue of this Section 9.6(b) be prevented from entering into *bona fide* settlements of claims brought against it by Protesters or Trespassers which provide for reasonable payments in satisfaction of such claims or agreeing to any reasonable cost orders in any proceedings.

(c) Prior to the Revenue Service Commencement Date, Project Co may request the assistance of the City (at the cost of Project Co) to remove Protesters or Trespassers where Project Co demonstrates to the City's reasonable satisfaction that:

(i) it is pursuing legal remedies available to it to remove the Protesters or Trespassers (provided that for this purpose Project Co may but shall not be obligated to prosecute injunctive or other judicial remedies beyond the court of first instance); and

(ii) the continued presence of the Protesters or Trespassers is having a material adverse effect on the conduct of the Works that Project Co is unable to mitigate.

Following such request, the City shall notify Project Co whether the City can lawfully provide any assistance in relation to the removal of the Protesters or Trespassers that is not independently available to Project Co and, to the extent that such assistance can be lawfully provided, the City shall provide such assistance (at the cost of Project Co) to the extent it is, in the Discretion of the City, reasonable and appropriate in the circumstances to do so.

(d) On and after the Revenue Service Commencement Date, the City shall be responsible for the management of any Protesters or Trespassers on or around the Lands and the System (to the extent same is not otherwise the responsibility of the Police Service), provided that:

(i) this Section 9.6(d) shall not alter or impair the rights or obligations of the City provided in this Project Agreement, including in Schedule 15-3 – Maintenance and Rehabilitation Requirements;

(ii) this Section 9.6(d) shall not alter or impair the rights or obligations of Project Co provided in this Project Agreement, including in respect of Maintenance Services or otherwise in Schedule 15-3 – Maintenance and Rehabilitation Requirements; and

(iii) Project Co shall do all acts and things which are necessary or desirable to permit complete access to the MSFs (and the remainder of the System) by the City (or a Police Service, if applicable) for the purposes of this Section 9.6(d).

(e) For greater certainty, the presence of, or interference by, any Protesters or Trespassers on or around the Site shall not be a breach of the obligation of the City to grant licence rights of use and access to Project Co on and over the Lands pursuant to Section 14, nor a breach of any other obligation, representation or warranty under this Project Agreement.

9.7 Additional Works/Third Party Works

(a) The City reserves the right to carry out Additional Works and to issue permissions, consents, approvals, certificates, licences, agreements and authorizations, permits in respect of Third Party Works. The City may assign the methods and manner of construction (where applicable) of the Additional Works, the coordination and scheduling of the Additional Works and the Third Party Works and the safety training in respect of the Additional Works and the Third Party Works to Project Co.

(b) In connection with the Additional Works, the City shall:

(i) cause Additional Contractors to comply with the instructions of Project Co relating to matters of health and safety on the Site and the Highway Site, methods and manner of construction (where applicable), and coordination and scheduling of the Additional Works with (A) the Design and Construction Works during the performance of the Design and Construction Works, (B) the Highway Work during the performance of the Highway Work, and (C) at the request of the City, with the Maintenance Services during the performance of the Maintenance Services as the City considers appropriate taking into account the nature of the Additional Works and the potential for impact on the Maintenance Services;

(ii) enter into separate contracts with Additional Contractors under conditions of contract which are compatible with the conditions of this Project Agreement and provide for compliance by Additional Contractors with Section 9.7(d) and all directions of Project Co in respect of any matter regarding health and safety on the Site and the Highway Site, methods and manner of construction (where applicable), and coordination and scheduling of the Additional Works in those cases where the City has requested Project Co to proceed in accordance with Section 9.7(d) during the performance of the Works and the Highway Work and

during the performance of the Maintenance Services only to the extent that such Additional Works materially adversely affect Project Co's ability to provide the Maintenance Services;

(iii) ensure that insurance coverage is provided as would be required by a prudent owner similarly situated and coordinate such insurance with the insurance coverage of Project Co and in any event, such insurance shall provide for liability insurance of not less than $; and

(iv) take all necessary steps to avoid labour disputes or other disputes on the Project arising from the Additional Works.

(c) In connection with the Third Party Works, the City shall:

(i) cause Third Party Contractors to comply with the instructions of Project Co relating to matters of health and safety on the Site and the Highway Site and coordination and scheduling of the Third Party Works with (A) the Design and Construction Works during the performance of the Design and Construction Works, (B) the Highway Work during the performance of the Highway Work; and (C) at the request of the City, with the Maintenance Services during the performance of the Maintenance Services as the City considers appropriate taking into account the nature of the Third Party Works and the potential for impact on the Maintenance Services;

(ii) issue encroachment permits to Third Party Contractors containing conditions which are compatible with the conditions of this Project Agreement and provide for compliance by Third Party Contractors with Section 9.7(d) and all directions of Project Co in respect of any matter regarding health and safety on the Site and the Highway Site and coordination and scheduling of the Third Party Works in those cases where the City has requested Project Co to proceed in accordance with Section 9.7(d) during the performance of the Works and Highway Work and during the performance of the Maintenance Services only to the extent that such Third Party Works materially adversely affect Project Co's ability to provide the Maintenance Services; and

(iii) require (A) that insurance coverage is provided as would be required by a prudent owner similarly situated and (B) that such insurance is coordinated with the insurance coverage of Project Co as it affects the Works or Highway Work and in any event, such insurance shall provide for liability insurance of not less than $.

(d) In connection with the Additional Works and the Third Party Works, Project Co shall, during the performance of the Design and Construction Works and the Highway Work, and at the request of the City, during the performance of the Maintenance Services as the City considers appropriate taking into account the nature of the Additional Works or the Third Party Works, as applicable, and the potential for impact on the Maintenance Services:

(i) where the City has assigned to Project Co the matters referred to in Section 9.7(a) and subject to the performance by the City of its obligations under Sections 9.7(b)(i) and (ii) or Sections 9.7(c)(i) and (ii), as applicable:

(A) provide for the methods and manner of construction (where applicable) of the Additional Works and the coordination and scheduling of the Additional Works and the Third Party Works with the Works and the Highway Work to be performed under this Project Agreement; and

(B) for the Additional Contractors and in respect to such Additional Works and for the Third Party Contractors and in respect to such Third Party Works, assume overall responsibility for compliance with all aspects of Applicable Law relating to health and safety at the Site and the Highway Site, including all the responsibilities of the 'constructor' under the OHSA, prior to Revenue Service Availability and, at the request of the City exercised in a manner consistent with the said Act, at any time that Project Co is acting as a 'constructor' on the Site and the Highway Site following Revenue Service Availability;

(ii) afford Additional Contractors and Third Party Contractors reasonable opportunity to introduce and store their products and use their construction machinery and equipment to execute the Additional Works and the Third Party Works, as applicable;

(iii) participate with the City, Additional Contractors and Third Party Contractors, as applicable, in reviewing their construction schedules when directed to do so by the City; and

(iv) where part of the Works or the Highway Work is affected by or depends upon, for its proper execution, the Additional Works or the Third Party Works, promptly report to the City in writing and prior to proceeding with that part of the Works or the Highway Work any readily apparent deficiencies in the Additional Works or the Third Party Works. Failure by Project Co to so report shall invalidate any claims against the City by reason of such readily apparent deficiencies.

(e) In the case of Additional Works and Third Party Works carried out prior to Revenue Service Availability, if:

(i) any Additional Contractors or Third Party Contractors cause any damage to the Design and Construction Works or the Highway Work;

(ii) Project Co incurs any additional costs or there is any delay in the Works Schedule or the Highway Construction Schedule as a result of any Additional Contractors or Third Party Contractors not complying with the coordination, scheduling and safety instructions of Project Co; or

(iii) subject to the performance by Project Co of its obligations under Section 9.7(d), if Project Co incurs any additional costs or there is any delay in the Works Schedule

or the Highway Construction Schedule as a result of any such Additional Works (other than Additional Work that is required to meet the Output Specifications and provided such Additional Work is performed by such Additional Contractors in accordance with Good Industry Practice (Works) and Good Industry Practice (Highway Work) and in accordance with the terms of their respective contracts or engagements with the City) or any Third Party Works,

then any such delay in the Works Schedule, the Highway Construction Schedule or additional costs in respect of the Design and Construction Works or the Highway Work shall, subject to and in accordance with Section 40, be treated as a Delay Event and, subject to and in accordance with Section 41, be treated as a Compensation Event.

(f) Claims, disputes, and other matters in question between Project Co and Additional Contractors or Third Party Contractors shall be dealt with in substantially the same manner as contemplated in Schedule 27 – Dispute Resolution Procedure, provided the Additional Contractors and Third Party Contractors have reciprocal obligations and the City has made commercially reasonable efforts to ensure that such provisions are included in the contracts with the Additional Contractors and the encroachment permits with the Third Party Contractors, as applicable. Project Co shall be deemed to have consented to arbitration of any dispute with any Other Contractor whose contract with the City or encroachment permit, as applicable, contains a similar agreement to arbitrate.

(g) In connection with the Additional Works, Project Co may request a Variation as follows:

(i) Project Co shall have a period of 10 Business Days following notice from the City of the City's intention to carry out such Additional Works including a reasonable description of such Additional Works to request a Variation if such Additional Works are (A) reasonably expected to make a warranty made in favour of Project Co from a Project Co Party or equipment supplier and given in accordance with Good Industry Practice (Works) or Good Industry Practice (Highway Work), void or (B) reasonably expected to have a material negative consequence on Project Co's ability to perform any of the activities within the Project Scope or (C) reasonably expected to make a warranty provided by DB Co, any DB Co Party or any supplier to any of them void;

(ii) if Project Co has made a request for a Variation in accordance with Section 9.7(g)(i), the City shall, within 10 Business Days of such request, either issue a Variation Enquiry or give notice to Project Co that it does not agree that a Variation is required;

(iii) either Party may refer the question of whether a Variation is required as the result of a warranty risk or risk in the performance of the activities within the Project Scope for resolution in accordance with Schedule 27 – Dispute Resolution Procedure; and

(iv) where the City has, under Section 9.7(g)(ii), given notice to Project Co that it does not agree that a Variation is required, the City shall, within 10 Business Days of a

subsequent agreement or of a determination that a Variation is required, issue a Variation Enquiry and the relevant provisions of Schedule 22 – Variation Procedure shall apply except that:

(A) the City shall not be entitled to withdraw any such Variation Enquiry unless the City determines not to proceed with the Additional Works or to proceed only in a manner that the Additional Works will not result in a warranty becoming void (as contemplated in Section 9.7(g)(i)) or will not result in any material negative consequence on Project Co's ability to perform any activities within the Project Scope and Project Co has agreed with such conclusion, or the Parties otherwise agree; and

(B) the Parties shall, without prejudice to their respective general obligations to comply with the terms of this Project Agreement, use commercially reasonable efforts to mitigate the adverse effects with respect to any void or voidable warranty and take commercially reasonable steps to minimize any increase in costs arising from any void warranty.

(h) Placing, installing, applying or connecting the Additional Works performed by Additional Contractors and the Third Party Works performed by Third Party Contractors on and to the Works or the Highway Work performed by Project Co will not relieve Project Co from its obligations under the Project Agreement with respect to the Works or the Highway Work, except to the extent expressly described in any Variation Confirmation.

(i) Without prejudice to the terms of the Belfast MSF Expansion Variation, and in so far as such matters may impact on the performance of the Maintenance Services:

(i) if any Additional Belfast MSF Expansion Works (as such term is defined in Schedule 45) are carried out, such works shall be treated as being Additional Works performed by Additional Contractors (and not work carried out by Project Co or any Project Co Party) for the purposes of Sections 9.7(f) and 9.7(g); and

(ii) if any Belfast MSF Expansion Third Party Works (as such term is defined in Schedule 45) are carried out, such works shall be treated as being Third Party Works performed by Third Party Contractors (and not work carried out by Project Co or any Project Co Party) for the purposes of Sections 9.7(f) and 9.7(g).

(j) In so far as such matters may impact on the performance of the Maintenance Services:

(i) if any Additional Works (as such term is defined in the DB Co Works Agreement) are carried out, such works shall be treated as being Additional Works performed by Additional Contractors for the purposes of Sections 9.7(f) and 9.7(g); and

(ii) if any Third Party Works (as such term is defined in the DB Co Works Agreement) are carried out, such works shall be treated as being Third Party Works performed by Third Party Contractors for the purposes of Sections 9.7(f) and 9.7(g).

The City shall notify Project Co of its intent to carry out Additional Works or Third Party Works (as each such term is defined in the DB Co Works Agreement).

9.8 Algonquins of Pikwakanangan

(a) Project Co acknowledges that the nature of the Design and Construction Works and the Maintenance Services has been discussed with the Algonquins of Pikwakanangan. This First Nation group has notified the City that personnel, equipment and resources are available to Project Co, if required. Project Co shall contact the Algonquins of Pikwakanangan in writing, copying the City, and invite them to a meeting to discuss the availability of personnel, equipment and materials for the Design and Construction Works and the Maintenance Services.

9.9 Meeting with the National Arts Centre

(a) The City may, in its Discretion, at any time during the Design Period and upon 30 days written notice to Project Co, convene a one (1) day meeting between Project Co and the National Arts Centre to discuss the feasibility and potential of adding a connection from the Downtown East Station to the existing parking garage tunnel of the National Arts Centre, located under Queen Street west of Elgin Street in which case Project Co shall attend the one (1) day meeting.

(b) If directed by the City to attend the one (1) day meeting Project Co shall provide the following to the City at least 5 days prior to the meeting for review, comment and, if acceptable to the City, use, at such meeting:

(i) schematic design drawings in plan and cross section of a recommended design for the pedestrian tunnel;

(ii) schematic design drawings showing how this tunnel would integrate into the Downtown East Station concourse;

(iii) order of magnitude cost estimate; and

(iv) preparation for discussions on constructability, schedule and other impacts.

9.10 DB Co Interface Agreement

(a) Concurrently with, or promptly after, the City executing the DB Co Works Agreement with DB Co, the parties shall, and the City shall cause DB Co to, enter into the DB Co Interface Agreement.

(b) If the DB Co Works Agreement is terminated prior to the occurrence of both of the East Final Completion Date (as defined in the DB Co Works Agreement) and the West Final Completion Date (as defined in the DB Co Works Agreement), the City shall issue a Variation Enquiry to amend or supplement this Project Agreement, including the Stage 2 Variation Schedules, either: (i) with a view to the City procuring a replacement contractor

to complete the remaining scope of the work under the DB Co Works Agreement; or (ii) to reflect any alternative course of action that the City may decide to take, and in each case for Project Co's obligations under this Project Agreement, including the Stage 2 Variation Schedules, to be adjusted accordingly to accommodate this in a manner that is consistent with the Stage 2 MOU and Project Co's assumption of risk thereunder. The relevant provisions of Schedule 22 - Variation Procedure shall apply except that the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree.

(c) Upon the City entering into a contract with any such replacement contractor for the purposes of completing the remaining scope of work under the DB Co Works Agreement, the parties shall, and the City shall cause such replacement contractor to, enter into a form of interface agreement which shall be consistent with the terms of the DB Co Interface Agreement.

9.11 Enforcement of DB Co Works Agreement and Related Agreements

(a) Subject to Section 9.13, the City and Project Co agree that, for the purposes of this Agreement:

(i) subject to Section 9.14(b), the consequences of any delay caused to the Stage 2 East Substantial Completion Date and/or the Stage 2 East Revenue Service Commencement Date, or to the Stage 2 West Substantial Completion Date and/or the Stage 2 West Revenue Service Commencement Date (including in each case as a result of any delay in the DB Co Works) shall be governed by Section 5.3 of Part B of Schedule 20;

(ii) without prejudice to paragraph (iv) below, the consequences of any non-compliance by DB Co with the terms of the DB Co Works Agreement that is discovered by Project Co prior to the Stage 2 East Substantial Completion Date or (as the case may be) to the Stage 2 West Substantial Completion Date shall be governed by:

(A) the terms of the Stage 2 Interface and Design Management Variation; and

(B) the obligations in the DB Co Interface Agreement, to the extent applicable;

(iii) without prejudice to paragraph (iv) below, the consequences of any DBF Defect that is discovered by Project Co after the Stage 2 East Substantial Completion Date or (as the case may be) the Stage 2 West Substantial Completion Date shall be governed by:

(A) the obligations in the DB Co Interface Agreement, including Appendix 5 – Warranty Protocol, in relation to DB Co's obligation to rectify DBF Defects and in relation to Project Co's entitlement to costs and other Direct Losses from DB Co;

(B) the provisions of Section 42.1(a)(xix) and Section 42.1(a)(xx), in relation to Project Co's entitlement to relief from its obligations under this Project Agreement as result of such non-compliance by DB Co; and

(iv) the consequences of any interference by DB Co with the performance by Project Co of its obligations or other loss or damage caused by DB Co or any DB Co Party shall be governed by the remaining provisions of this Agreement, subject, where applicable, to the application of Section 9.12 [Equivalent Project Relief].

9.12 Equivalent Project Relief

(a) The City shall:

(i) perform all of its obligations under the DB Co Works Agreement to the extent failure to do so would adversely affect Project Co or its rights under the DB Co Interface Agreement or this Project Agreement;

(ii) enforce its rights under the DB Co Works Agreement in accordance with this Section 9.12; and

(iii) not make or agree to make any amendment to or variation of the DB Co Works Agreement without complying with the provisions of Schedule 43 to this Project Agreement, *mutatis mutandis*.

(b) The Parties agree that:

(i) certain entitlements of the City under the DB Co Works Agreement are related to the Project Scope or the rights and entitlements of Project Co under this Project Agreement (including the Stage 2 Variations) or the DB Co Interface Agreement on the basis that Project Co is performing the Project Scope on behalf of the City and should have access to such entitlement on the same basis as if the City were performing the Project Scope on its own behalf (such entitlements being "**DB Co Direct Claim Entitlements**");

(ii) without prejudice to the right to claim DB Co Direct Claim Entitlements, certain entitlements of Project Co under this Project Agreement are triggered by the determination of breaches, acts or omissions of DB Co under the DB Co Works Agreement (or by parties for which DB Co is responsible under the DB Co Works Agreement) and that such entitlements shall be deemed to be subject to the operation of this Section 9.12, to the extent applicable (and subject in particular to Section 9.12(c)) (such entitlements being "**DB Co-Derived Project Co Entitlements**");

(iii) Project Co shall be entitled to receive the benefit of DB Co Direct Claim Entitlements and DB Co-Derived Project Co Entitlements (to the extent available to the City from DB Co, and in a such a way that avoids double counting) in accordance with and subject to the provisions of this Section 9.12, including, in the case of DB Co Direct Claim Entitlements, the benefit of any indemnification,

compensation, damages or other additional payment of any kind to the extent the City is entitled to indemnification, compensation, damages or other additional payment of any kind under the DB Co Works Agreement; and

(iv) Project Co shall be entitled to make a claim under this Section 9.12 in addition to or instead of making a claim against DB Co under the DB Co Interface Agreement.

The City's entitlement under the DB Co Works Agreement in respect of the matters referred to in this Section 9.12 is referred to as "**Equivalent Project Relief**".

(c) Notwithstanding Section 9.12(b) above, the Parties agree that:

(i) the relief and other rights provided to Project Co under Section 5.3 of Schedule 20 – Payment Mechanism shall not be subject to this Section 9.12, notwithstanding that the circumstances that gave rise to the delay in the occurrence of the Stage 2 East Revenue Service Commencement Date or Stage 2 West Revenue Service Commencement Date were caused or contributed to by DB Co, and such relief shall not be considered a DB Co-Derived Project Co Entitlement for the purposes of this Section 9.12;

(ii) the relief provided to Project Co under Section 42.1(a)(xix) shall not be subject to this Section 9.12;

(iii) to the extent any DB Co-Derived Project Co Entitlement under this Agreement does not consist of monetary compensation but relates to relief from the performance of obligations, Deductions or Failure Points under this Agreement that might flow from a breach, act or omission of DB Co or any DB Co Party:

(A) the existence and extent of such breach, act or omission shall be subject to provisions of this Section 9.12 (to the extent disputed by DB Co);

(B) to the extent such non-compliance, act or omission has been agreed by DB Co or determined against DB Co, the extent of the relief due to Project Co as a result of such agreed or determined matters shall not be dependent on any equivalent liability being established against DB Co and shall not be considered a DB Co-Derived Project Co Entitlement for the purposes of this Section 9.12; and

(C) Project Co's relief shall be applied retroactively to the date of the relevant breach, act or omission of DB Co or the DB Co Party and, to the extent this requires the City to reimburse Project Co for Deductions, Section 56.2(c) shall apply to such reimbursement on the basis that the payment was due at the time the relevant Deduction was incurred;

(iv) to the extent any DB Co-Derived Project Co Entitlement under this Agreement (not excluded by paragraphs (i) or (ii) above) consists of monetary compensation (whether expressed by way of Direct Losses, Direct Costs, indemnity,

reimbursement or otherwise), Project Co's entitlement to such compensation shall be subject to an agreement being reached with DB Co or a determination made in relation to DB Co which entitles the City to compensation in respect of the same facts or circumstances and shall be subject to the provisions of this Section 9.12.

(d) If an event or circumstance occurs which gives rise to an entitlement on the part of Project Co to claim or receive the benefit of any Equivalent Project Relief, Project Co may upon the occurrence of such event or circumstance give notice (an "**EPR Claim Notice**") of the same to the City. Such EPR Claim Notice shall include full details of the relevant event or circumstance, having regard to the formal requirements set out in this Project Agreement and the DB Co Works Agreement, and such supporting documentation and information as the City may reasonably require.

(e) Project Co shall give the relevant EPR Claim Notice to the City as soon as reasonably practicable after it becomes aware of the fact that an event or circumstance gives rise to a claim for Equivalent Project Relief (an **"EPR Claim"**) (having regard to the extent possible to any time limit for submission of such EPR Claim by the City to DB Co under the DB Co Works Agreement).

(f) If Project Co gives a EPR Claim Notice to the City, then, subject always to the provisions of Section 9.12(p):

(i) unless the City elects to inform Project Co under Section 9.12(f)(iii)(B) below, the City shall, promptly (having regard to the timeframe required for the determination under Section 9.12(f)(iii)(B) and the time limitations set out in the DB Co Works Agreement) following receipt of such notice, submit to DB Co an EPR Claim reflecting Project Co's EPR Claim Notice;

(ii) Project Co shall provide such additional details and/or information as may be reasonably requested by the City or by DB Co through the City in relation to the EPR Claim;

(iii) the City shall, at its option, either:

(A) use its reasonable commercial efforts to pursue the EPR Claim with DB Co, including taking all actions necessary to comply with any time limitations set out in the DB Co Works Agreement or applied by law, provided that Project Co shall: (i) provide all assistance which the City, acting reasonably, considers necessary to substantiate any EPR Claim, including the collection of information and details relating to the relevant EPR Claim and the making available of personnel as reasonably necessary to assist the City in the pursuit of the EPR Claim; and (ii) keep the City informed at all times (including providing copies of any relevant documentation reasonably requested) of any matter relevant to the pursuit of the EPR Claim of which Project Co becomes aware; or

(B) inform Project Co that the City does not wish to pursue such EPR Claim, but that the Project Co shall be entitled to recover from the City the full

benefit of the Equivalent Project Relief pursuant to the provisions of Section 9.12(p).

(iv) if the City pursues the EPR Claim pursuant to Section 9.12(f)(iii)(A):

(A) Project Co and relevant Project Co Parties shall be entitled, and may be required by the City, to attend any meetings between the City and DB Co at which the EPR Claim is to be discussed and Project Co may, at its sole cost and expense, appoint counsel for such purpose;

(B) the City shall consult with and use reasonable efforts to agree with Project Co with respect to the appointment of counsel (other than counsel appointed by Project Co pursuant to Section 9.12(f)(iv)(A)) and other third party advisors, provided that (subject to paragraph (C) below) the City shall have sole discretion in such appointments after reasonable consultation and reasonable efforts to agree with Project Co;

(C) if such EPR Claim is solely for the benefit of Project Co or Project Co Parties, the City shall not be entitled to settle any EPR Claim, or waive any contractual right to an EPR Claim without the prior written consent of Project Co, and for such EPR Claims, Project Co's consent shall be required before the City shall appoint counsel pursuant to paragraph (B) above;

(D) in all other cases, the City shall not be entitled to settle any EPR Claim, or waive any contractual right to an EPR Claim if such settlement or waiver would adversely affect any right of Project Co, without the prior written consent of Project Co, such consent not to be unreasonably withheld or delayed; and if Project Co withholds its consent to settlement of a EPR Claim or waiver of a contractual right to a EPR Claim, so that the City is required to continue to pursue such EPR Claim, then, Project Co shall be liable for and shall indemnify and hold harmless the City from and against the value to the City of any lost settlement or agreement previously available to the City should the pursuit of such EPR Claim prove unsuccessful, provided always that the City shall not be entitled to double recovery; and

(E) if such EPR Claim is solely for the benefit of Project Co or Project Co Parties, the City shall be entitled reimbursement by Project Co of the City's reasonable costs and expenses properly incurred in pursuing such EPR Claim within 21 days of a written request from the City detailing such costs and expenses; or, if such EPR Claim is for the joint benefit of the City and Project Co or Project Co Parties, the City shall be entitled to reimbursement of a fair and reasonable proportion of the City's reasonable costs and expenses incurred in pursuing such EPR Claim, it being acknowledged between the City and Project Co that the party(ies) bearing the risks and costs associated with an entitlement shall be responsible for a

proportionate amount of the costs and expenses related to pursuing such entitlement. If the Parties are unable to agree on what is a fair and reasonable proportion of the City's reasonable costs and expenses within 21 days of a written request by the City, either Party may refer the matter to the Dispute Resolution Procedure.

(g) Project Co shall be entitled to the benefit of any Equivalent Project Relief in relation to a DB Co-Derived Project Co Entitlement immediately following:

(i) an agreement between the City and DB Co effected in accordance with Section 9.12(f)(iv)(C) or 9.12(f)(iv)(D) and subject to the provisions of Section 9.12(i); or

(ii) a determination made pursuant to the dispute resolution procedure under the DB Co Works Agreement which is binding upon the City and DB Co.

(h) Project Co shall be entitled to the benefit of any Equivalent Project Relief in relation to a DB Co Direct Claim Entitlement to the extent that the City is or becomes entitled under the DB Co Works Agreement as provided in Section 9.12(b) and 9.12(i), but in any event to no greater extent than the City's entitlement under the DB Co Works Agreement determined pursuant to either:

(i) an agreement between the City and DB Co effected in accordance with Section 9.12(f)(iv)(C) or 9.12(f)(iv)(D) and subject to the provisions of Section 9.12(i); or

(ii) a determination made pursuant to the dispute resolution procedure under the DB Co Works Agreement which is binding upon the City and DB Co.

(i) Project Co's entitlement to the benefit of any Equivalent Project Relief in relation to a DB Co Direct Claim Entitlement shall:

(i) where the agreement or determination referred to in Section 9.12(g)(i) expressly separately identifies the amount, nature or extent of the City's entitlement attributable to Project Co or the Project Scope or Stage 2 Variations, be the amount, nature or extent so identified; or

(ii) where the agreement or determination referred to in Section 9.12(g)(i) does not separately identify the amount, nature or extent of the City's entitlement attributable to Project Co or the Project Scope or Stage 2 Variations, be a fair and reasonable proportion of the City's entitlement, it being acknowledged between the City and Project Co that the party(ies) bearing the risks and costs associated with an entitlement shall be entitled to a proportionate amount of the benefit arising therefrom.

(j) If the Parties are unable to agree, pursuant to Section 9.12(i)(ii) on what is a fair and reasonable proportion of such entitlement within 21 days of a written request by either

Party to agree on the same, either Party may refer the matter to the Dispute Resolution Procedure.

(k) Without prejudice to the provisions of Section 9.13, following agreement or determination of the entitlement of Project Co under Sections 9.12(i) or 9.12(j), as the case may be, the City shall pay to Project Co the amount of such entitlement promptly, and in any event no later than three Business Days, after receipt of the corresponding amount (and in accordance with the provisions of Section 9.12(i)).

(l) Without prejudice to the arrangements for interim relief under Section 42, pending the determination, agreement or resolution of Project Co's entitlement to Equivalent Project Relief, the Project Co shall continue to perform its obligations under this Project Agreement and shall take no steps to enforce any right under this Project Agreement whether by set-off against sums otherwise payable to the City, by commencing proceedings of any kind, by counterclaiming in any proceedings or otherwise howsoever, to the extent that, pursuant to the terms of this Project Agreement, such right depends upon or is related to the relevant agreement or determination of Equivalent Project Relief. Notwithstanding the foregoing, the Parties agree that nothing contained in this Section 9.12(l) will preclude Project Co from commencing legal proceedings in the Courts of Ontario if such proceedings are necessary to preserve any applicable limitation period.

(m) Following the determination, agreement or resolution of Project Co's entitlement to the benefit of any Equivalent Project Relief, Project Co shall be conclusively deemed to have waived any rights under or in connection with this Project Agreement in excess of those arising from such determination, agreement or resolution, except insofar as such rights arise from or as a result of any failure on the part of the City to comply with its obligations to Project Co under this Project Agreement. Accordingly, except as provided in the preceding sentence, Project Co shall not take any steps, under the Dispute Resolution Procedure or otherwise, to argue that any entitlement of Project Co under Section 9.12(c) should be resolved other than by reference to the resolution of Project Co's entitlement to the benefit of any Equivalent Project Relief and Project Co hereby waives any right to do so.

(n) If, in relation to any Equivalent Project Relief (for this purpose including any claim referred to in Section 9.12(c)(iii) or 9.12(c)(iv)) , the City fails to comply with its obligations under this Project Agreement, including, without limitation, failure to comply with Sections 9.12(a) or 9.12(o), and as a consequence of such failure the entitlement of Project Co is likely to be reduced or lost, then, unless such failure was caused by any act or omission by Project Co or any Project Co Party, Project Co may give notice to the City specifying the failure and the likely reduction in or loss of the entitlement of Project Co and requiring the City to remedy the relevant failure.

(o) If the City fails:

(i) to remedy such failure within 15 Business Days of the date of receipt of notice pursuant to Section 9.12(n);

(ii) to provide Project Co with proposals for remedying such failure which are acceptable to Project Co, acting reasonably, within 15 Business Days of the date of receipt of notice pursuant to Section 9.12(n); or

(iii) to fulfil the terms of an acceptable proposal provided to Project Co in accordance with Section 9.12(o)(ii),

Project Co may serve a further notice upon the City that Project Co is no longer bound by the provisions of Sections 9.12(f) to 9.12(m) in relation to the entitlement concerned.

(p) If:

(i) the provisions of Sections 9.12(f) to 9.12(m) are disapplied in accordance with Section 9.12(o); or

(ii) the City has elected not to proceed with a EPR Claim pursuant to Section 9.12(f)(iii)(B),

then Project Co shall be entitled to recover from the City the full benefit of the Equivalent Project Relief it would have been entitled to claim as if the City had complied in full with its obligations under this Section 9.12 and as if the City had succeeded in obtaining the full entitlement from DB Co under the DB Co Works Agreement.

(q) The provisions of Sections 9.12(b) to 9.12(p), inclusive, are without prejudice to any other express rights and remedies available to Project Co under this Project Agreement that are not subject to Equivalent Project Relief.

(r) The Parties agree that EPR Claims made by Project Co under this Project Agreement:

(i) shall not, unless there is no other route of claim therefor, be made by the City as indemnity claims under section 46 of the DB Co Works Agreement (with a view to avoiding such claims counting towards the limit of liability of DB Co under section 47.4 of the DB Co Works Agreement) and the Parties shall consult in good faith on this matter prior to an EPR Claim being pursued with DB Co pursuant to this Section 9.12; and

(ii) shall not count towards or reduce the City's limit of liability to Project Co under Section 57.4.

9.13 Enforcement by City of DB Co claims

(a) In the event that any amount is agreed or determined to be payable by DB Co:

(i) directly to Project Co under the DB Co Interface Agreement; or

(ii) to the City under the DB Co Works Agreement but which is payable to Project Co pursuant to the provisions of Section 9.12,

and which is not paid by DB Co within 30 days of the due date for payment in such agreement or determination, Project Co shall be entitled to request that the City shall, on its behalf, seek to recover such amounts from DB Co by way of set-off or through any performance security provided to the City under the DB Co Works Agreement.

(b) Following a valid request by Project Co under Section 9.13(a), the City shall pay to Project Co (or procure that Project Co is paid) all such amounts:

(i) where the City has a right of set off or liquid security from DB Co, within 10 days of such request; and

(ii) in all other circumstances, within 60 days of such request,

regardless in each case of whether the City has recovered the same from DB Co, provided that if the City receives any such sums from DB Co earlier than such date, it shall pass them over to Project Co within three Business Days of receipt. Following a request by Project Co, the method of recovery of such amounts shall be at the City's sole discretion.

(c) The City's liability to Project Co under Section 9.13(b) shall not require it to compensate Project Co for any liability which is unrecoverable due to the application of the limit of liability referred to in Section 2.1(b)(ii) of the Performance Guarantee of Construction Guarantor (as defined in the DB Co Works Agreement).

(d) In the event any determination referred to in Section 9.13(a) is overturned or varied pursuant to the DB Co Works Agreement or the DB Co Interface Agreement, and such amount is required to be repaid by the City to DB Co, the City shall immediately notify Project Co of such requirement and Project Co shall repay such amount directly to DB Co by the due date of such payment.

9.14 DB Co-derived Claims

(a) If, in the performance of the Project Scope (and excluding, for the avoidance of doubt, for these purposes, the performance of activities under the Stage 2 Variation Schedules):

(i) Project Co or any Project Co Party causes damage to the DB Co Works which entitles DB Co to additional compensation as a DB Co Compensation Event; or

(ii) Project Co's breach of this Project Agreement or the negligence or wilful misconduct of Project Co or any Project Co Party, entitles DB Co to additional compensation as a DB Co Compensation Event,

then Project Co shall be liable for, and indemnify the City from, any DB Co claim for additional compensation payable to DB Co as a result of such DB Co Compensation Event, provided that such liability shall count towards, and be subject to the availability of any capacity under, the limitation of liability under Section 2.4(a) of the DB Co Interface Agreement.

(b) If, in the performance of the Project Scope (and excluding, for the avoidance of doubt, for these purposes, the performance of activities under the Stage 2 Variation Schedules):

(i) Project Co or any Project Co Party causes damage to the DB Co Works which entitles DB Co to additional time as a DB Co Delay Event; or

(ii) Project Co's breach of this Project Agreement or the negligence or wilful misconduct of Project Co or any Project Co Party, entitles DB Co to additional time as a DB Co Delay Event,

then, notwithstanding anything herein to the contrary, Project Co shall not be entitled to a claim for Excusing Cause, Variation or other relief hereunder on account of the delay resulting from such DB Co Delay Event.

(c) The provisions of Sections 9.14(a) and 9.14(b) shall not apply to the extent caused, or contributed to, by any of the matters set out in Sections 56.1(a)(A), (C) or (D).

10. REPRESENTATIVES

10.1 The City Representative

(a) Subject to the limitations set out in Section 10.1(d), the City Representative shall exercise the functions and powers identified in this Project Agreement as functions or powers to be performed by the City Representative and such other functions and powers of the City under this Project Agreement as the City may notify Project Co from time to time.

(b) The City may, from time to time by written notice to Project Co, change the City Representative. Such change shall have effect on the later of the date of delivery of such notice and the date specified in such notice.

(c) During any period when no City Representative has been appointed, or when the City Representative is unable, through illness, incapacity or any other reason whatsoever, to perform the City Representative's functions under this Project Agreement, the City shall perform or may, by written notice to Project Co, promptly appoint an alternative City Representative to perform the functions which would otherwise be performed by the City Representative. Upon receipt of such written notice, Project Co and the Project Co Representative shall be entitled to treat any act of such alternative City Representative which is permitted by this Project Agreement as being authorized by the City, and Project Co and the Project Co Representative shall not be required to determine whether authority has in fact been given.

(d) The City Representative shall not, except as otherwise provided in this Project Agreement, be entitled to modify or waive any provision of this Project Agreement or to authorize a Variation.

(e) Subject to the limitations set out in Sections 10.1(a) and 10.1(d), unless otherwise notified in writing, Project Co and the Project Co Representative shall be entitled to treat any act of the City Representative which is authorized by this Project Agreement as being

authorized by the City, and Project Co and the Project Co Representative shall not be required to determine whether authority has in fact been given.

10.2 The Project Co Representative

(a) Subject to the limitations set out in Section 10.2(d), the Project Co Representative shall have full authority to act on behalf of Project Co for all purposes of this Project Agreement.

(b) Project Co may change the Project Co Representative with the prior written consent of the City.

(c) During any period when the Project Co Representative is unable, through illness, incapacity or any other reason whatsoever, to perform the Project Co Representative's functions under this Project Agreement, Project Co shall perform or may, by written notice to the City, promptly appoint an alternative Project Co Representative to perform the functions which would otherwise be performed by the Project Co Representative, provided that, Project Co must seek the City's consent in accordance with Section 10.2(b) if such alternative Project Co Representative is in place for more than 180 days. Upon receipt of such written notice, the City and the City Representative shall be entitled to treat any act of such alternative Project Co Representative which is permitted by this Project Agreement as being authorized by Project Co, and the City and the City Representative shall not be required to determine whether authority has in fact been given.

(d) The Project Co Representative shall not, except as otherwise provided in this Project Agreement, be entitled to modify or waive any provision of this Project Agreement.

(e) Subject to the limitations set out in Section 10.2(d), unless otherwise notified in writing, the City and the City Representative shall be entitled to treat any act of the Project Co Representative which is authorized by this Project Agreement as being authorized by Project Co, and the City and the City Representative shall not be required to determine whether authority has in fact been given.

10.3 Communications to Representatives

(a) At the time that a Party appoints or changes the appointment of the City Representative or the Project Co Representative, as applicable, that Party shall also provide the other Party with contact information for delivery of communications to such representative. Communications to such representative shall not constitute notices to the Party appointing such representative.

10.4 Key Individuals

(a) The individuals who are critical to the performance of the Design and Construction Works and the Highway Work are identified in Schedule 9 – Key Individuals. Project Co shall use commercially reasonable efforts to ensure that such persons remain involved in the Design and Construction Works and the Highway Work in the capacity set out in

Schedule 9 – Key Individuals and, in particular, will not, for the duration of the Design and Construction Works or the Highway Work, require or request any such person to be involved in any other project on behalf of Project Co or any Project Co Party if, in the reasonable opinion of the City such involvement would have a material adverse effect on the Design and Construction Works or the Highway Work.

(b) The individuals who are critical to the performance of the Maintenance Services are identified in Schedule 9 – Key Individuals. Project Co shall use commercially reasonable efforts to ensure that such persons remain involved in the Maintenance Services in the capacity set out in Schedule 9 – Key Individuals and, in particular, will not, for the duration of the Maintenance Services, require or request any such person to be involved in any other project on behalf of Project Co or any Project Co Party if, in the reasonable opinion of the City, such involvement would have a material adverse effect on the Maintenance Services.

(c) If Project Co considers it necessary to replace any individual identified in Schedule 9 – Key Individuals, Project Co shall provide the City with relevant information on the proposed replacement and shall consult with the City before finalizing the appointment of such replacement. Project Co shall not replace any of the individuals identified in Schedule 9 – Key Individuals without the prior written consent of the City, which consent shall not be withheld or delayed where the proposed replacement is suitably qualified and experienced.

(d) If the City determines, acting reasonably, that it is in the best interests of the City that any individual identified in Schedule 9 – Key Individuals be replaced, the City shall notify Project Co (including a detailed explanation of the reasons for such determination), and, within 30 days of receipt by Project Co of such notice, Project Co shall provide the City with relevant information on the proposed replacement and shall consult with the City before finalizing the appointment of such replacement.

11. WORKS COMMITTEE

11.1 Establishment

(a) The Parties shall, within 30 days following the Design and Construction Works Commencement Date, establish a committee (the "**Works Committee**") consisting of:

(i) the City Representative;

(ii) the City's Project Manager;

(iii) 3 representatives appointed by the City from time to time;

(iv) the following 4 representatives appointed by Project Co:

(A) the Project Co Representative;

(B) 3 representatives of the Construction Contractor; and

(v) 1 representative of IO appointed by the City.

(b) The Independent Certifier and the Consultant shall be entitled, but not required, to attend meetings as a non voting member of the Works Committee. Members of the Works Committee may invite, on prior notice to all members, such advisors and consultants as they require from time to time to attend meetings and provide briefings to the Works Committee.

(c) 1 of the representatives of the City shall be the chairperson of the Works Committee.

11.2 Function and Role

(a) The Works Committee shall assist the Parties by promoting cooperative and effective communication with respect to matters related to the Design and Construction Works and the Highway Work. The Works Committee shall interface with the Maintenance Committee as and when required.

(b) The Works Committee shall be responsible for receiving and reviewing all matters related to the Design and Construction Works and the Highway Work, including:

(i) any design, construction and commissioning issues;

(ii) the Works Schedule and the Highway Construction Schedule;

(iii) any issues arising from reports or documents provided by Project Co or the Independent Certifier or the Consultant;

(iv) any quality assurance and safety and security issues, including any design, configuration control, interfacing, training, testing, operational impact and other matters creating or giving rise to a safety or security issue or otherwise requiring attention and oversight;

(v) the Works Reports;

(vi) any special matters referred to the Works Committee by the City or Project Co;

(vii) any community and media relations issues in accordance with Schedule 18 – Communications and Public Consultation Protocol;

(viii) considering and making recommendations to the City to proceed or not to proceed with a Variation pursuant to Schedule 22 – Variation Procedure to address safety or security issues relating to, arising from, or having implications to the planning, implementation or performance of the Project Scope or the Operations, or any part; and

(ix) any other issues or matters pertaining to the Design and Construction Works and the Highway Work.

(c) Subject to Section 11.2(d) any unanimous decision of the Works Committee shall be final and binding on the Parties. If the Works Committee is unable to reach a unanimous decision, either Party may refer the matter for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

(d) The Works Committee shall not have authority to make decisions with respect to or approve:

(i) any amendment to or waiver of any provision of this Project Agreement;

(ii) any change to a Scheduled Milestone Acceptance Date, the Highway Scheduled Substantial Completion Date, Highway Scheduled Final Completion Date, the Required Revenue Service Availability Date or the Scheduled Final Completion Date;

(iii) any Variation;

(iv) any change that may materially adversely affect Project Co's ability to achieve any Milestone Acceptance by the applicable Scheduled Milestone Acceptance Date, Substantial Completion of the Highway Work by the Highway Scheduled Substantial Completion Date, Highway Final Completion Date by the Highway Scheduled Final Completion Date, the Revenue Service Availability by the Required Revenue Service Availability Date or Final Completion by the Scheduled Final Completion Date; and

(v) any matter with respect to which the City has a right of consent or in respect of which the City may exercise discretion pursuant to this Project Agreement.

11.3 Term of Works Committee

(a) Unless otherwise agreed, the Works Committee shall operate only until the Final Completion Date.

11.4 Replacement of Committee Members

(a) The City shall be entitled to replace any of its representatives on the Works Committee by written notice to Project Co. The City will use commercially reasonable efforts to deliver prior written notice of any such replacements to Project Co. Project Co may replace any of its representatives on the Works Committee with the prior written consent of the City.

11.5 Procedures and Practices

(a) The members of the Works Committee may:

(i) adopt such procedures and practices for the conduct of the activities of the Works Committee as they consider appropriate from time to time;

(ii) invite to any meeting of the Works Committee such other persons as the members of the Works Committee may agree;

(iii) exclude from any meeting of the Works Committee (other than members of the Works Committee) such persons as the members of the Works Committee may agree; and

(iv) receive and review reports from any person or organization agreed to by the members of the Works Committee.

(b) Once established, the Works Committee shall meet at least once each month from the Design and Construction Works Commencement Date until the Final Completion Date, unless otherwise agreed by the members of the Works Committee or the Parties.

(c) Any one of the Project Co Representative and any of the City's representatives on the Works Committee may convene a special meeting of the Works Committee at any time. Special meetings of the Works Committee may be convened on not less than 5 Business Days notice to all members of the Works Committee identifying the agenda items to be discussed at the special meeting, provided that, in an Emergency, a meeting may be called at any time on such notice as may be reasonable in the circumstances.

(d) Unless otherwise agreed by the members of the Works Committee, the Works Committee shall meet at the Site, the System, elsewhere in the City of Ottawa, Ontario or in any other location in Ontario. Meetings of the Works Committee may be held by means of such telephonic, electronic or other communication facilities as permit all persons participating in the meeting to communicate with each other simultaneously and instantaneously. A person participating in a meeting by such means will be deemed to be present at such meeting, provided that each member of the Works Committee must attend in person at least once each calendar quarter.

(e) 2 representatives of the City, the City Representative and the Project Co Representative shall constitute a quorum at any meeting of the Works Committee. A quorum of members may exercise all the powers of the Works Committee. The members shall not transact business at a meeting of the Works Committee unless a quorum is present.

(f) Minutes of all meetings, recommendations and decisions of the Works Committee, including those made by telephone or other form of communication, shall be recorded and maintained by Project Co. Project Co shall circulate copies of such minutes within 5 Business Days of the holding of the meeting or the making of the recommendation or decision. Unless the City notifies Project Co within 5 Business Days of receipt of the minutes that the City disagrees with the contents of the minutes, the City and Project Co shall be deemed to have approved such minutes. Project Co shall maintain a complete set of all minutes of the meetings of the Works Committee and shall make such minutes available for inspection by the City during regular business hours.

12. MAINTENANCE COMMITTEE

12.1 Establishment

(a) The Parties shall, not later than 18 months prior to the Required Revenue Service Availability Date, establish a committee (the "**Maintenance Committee**") to serve from the Revenue Service Commencement Date until the Termination Date consisting of:

(i) the City Representative;

(ii) the City's Project Manager;

(iii) 3 representatives appointed by the City from time to time; and

(iv) 2 senior representatives of Project Co, one of whom shall be the Project Co Representative and the other shall be appointed by Project Co from time to time provided 1 of the 2 senior representatives shall be a representative of the Maintenance Contractor.

(b) Members of the Maintenance Committee may invite, on prior notice to all members, such advisors and consultants as they require from time to time to attend meetings and provide briefings to the Maintenance Committee.

(c) 1 of the representatives of the City shall be the chairperson of the Maintenance Committee.

12.2 Function and Role

(a) The Maintenance Committee shall assist the Parties by promoting cooperative and effective communication with respect to matters related to the Project Scope, both prior to and during the Maintenance Term. The Maintenance Committee shall interface with the Works Committee as and when required.

(b) The Maintenance Committee shall be responsible for receiving and reviewing all matters related to the Project Scope (excluding the Design and Construction Works, the Highway Work and the Stage 2 Project Co Delivery Scope), both prior to and during the Maintenance Term, including:

(i) any joint review of the Maintenance Services and the Expanded Output Specifications;

(ii) any performance, quality assurance, safety, and security issues, including any design, configuration control, interfacing, training, testing, operational impact and other matters creating or giving rise to a safety or security issue or otherwise requiring attention and oversight;

(iii) any special matter referred to the Maintenance Committee by the City or Project Co;

(iv) any community and media relations issues in accordance with Schedule 18 – Communications and Public Consultation Protocol;

(v) considering and making recommendations to the City to proceed or not to proceed with a Variation pursuant to Schedule 22 – Variation Procedure to address safety or security issues relating to or arising from the Maintenance Services, including those that may arise from, be identified with, have implications to, or otherwise by having regard to, the Project Scope or the Operations; and

(vi) any other issues pertaining to the Project Scope (excluding the Design and Construction Works, the Highway Work and the Stage 2 Project Co Delivery Scope).

(c) Subject to Section 12.2(d), any unanimous decision of the Maintenance Committee shall be final and binding on the Parties. If the Maintenance Committee is unable to reach a unanimous decision, either Party may refer the matter for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

(d) The Maintenance Committee shall not have authority to make decisions with respect to or approve:

(i) any amendment to or waiver of any provision of this Project Agreement;

(ii) any Variation;

(iii) any change that may materially adversely affect Project Co's ability to perform the Maintenance Services or the performance by the relevant parties of any City Activities; or

(iv) any matter with respect to which the City has a right of consent or in respect of which the City may have discretion pursuant to this Project Agreement.

12.3 Replacement of Committee Members

(a) The City shall be entitled to replace any of its representatives on the Maintenance Committee by written notice to Project Co. The City will use commercially reasonable efforts to deliver prior written notice of any such replacement to Project Co. Project Co may replace any of its representatives on the Maintenance Committee with the prior written consent of the City.

12.4 Procedures and Practices

(a) The members of the Maintenance Committee may:

(i) adopt such procedures and practices for the conduct of the activities of the Maintenance Committee as they consider appropriate from time to time;

(ii) invite to any meeting of the Maintenance Committee such other persons as the members of the Maintenance Committee may agree;

(iii) exclude from any meeting of the Maintenance Committee (other than members of the Maintenance Committee) such persons as the members of the Maintenance Committee may agree; and

(iv) receive and review reports from any person or organization agreed to by the members of the Maintenance Committee.

(b) Once established, the Maintenance Committee shall meet at least once each month during the Maintenance Term, unless otherwise agreed by the members of the Maintenance Committee or the Parties.

(c) Any member of the Maintenance Committee may convene a special meeting of the Maintenance Committee at any time. Special meetings of the Maintenance Committee may be convened on not less than 5 Business Days notice to all members of the Maintenance Committee identifying the agenda items to be discussed at the special meeting, provided that, in an Emergency, a meeting may be called at any time on such notice as may be reasonable in the circumstances.

(d) Unless otherwise agreed by the members of the Maintenance Committee, the Maintenance Committee shall meet at the Site, the System, elsewhere in the City of Ottawa, Ontario or in any other location in Ontario. Meetings of the Maintenance Committee may be held by means of such telephonic, electronic or other communication facilities as permit all persons participating in the meeting to communicate with each other simultaneously and instantaneously. A person participating in a meeting by such means will be deemed to be present at such meeting, provided that each member of the Maintenance Committee must attend in person at least once each calendar quarter.

(e) 2 representatives of the City and 1 representative of Project Co shall constitute a quorum at any meeting of the Maintenance Committee. A quorum of members may exercise all the powers of the Maintenance Committee. The members shall not transact business at a meeting of the Maintenance Committee unless a quorum is present.

(f) Minutes of all meetings, recommendations and decisions of the Maintenance Committee, including those made by telephone or other form of communication, shall be recorded and maintained by Project Co. Project Co shall circulate copies of such minutes within 5 Business Days of the holding of the meeting or the making of the recommendation or decision. Unless the City notifies Project Co within 5 Business Days of receipt of the minutes that the City disagrees with the contents of the minutes, Project Co and the City shall be deemed to have approved such minutes. Project Co shall maintain a complete set of all minutes of the meetings of the Maintenance Committee and shall make such minutes available for inspection by the City during regular business hours.

13. QUALITY ASSURANCE

(a) Project Co shall comply with the provisions of Schedule 11 – Quality Management.

14. LICENCE

14.1 Licence to Lands

(a) Subject to this Section 14 and Section 4, and subject to the limits on the Real Property Interests, including commencement dates and durations of Temporary Construction Easements, described in the Real Property Schedule, effective from Commercial Close until the Termination Date, the City hereby grants or has caused to be granted and shall continuously from and after such grants until the Termination Date grant or cause to be granted, to Project Co and all Project Co Parties such non-exclusive licence, rights of use and access to, on and within the Lands and the System as are required by Project Co and Project Co Parties to allow Project Co and the Project Co Parties to perform the activities within the Project Scope, including Project Co's obligations pursuant to Sections 9.5 and 9.6. To the extent Project Co or any Project Co Party requires access to any part of the Lands or the System for the purposes of performing the Project Scope where that part of the Lands or the System would not otherwise fall within the definition of Lands or System due to the Timing Principle, the licence, rights of use and access granted under this Section 14.1 shall extend to those areas of the Lands and the System, subject to any restrictions set out in this Section 14 and/or in the DB Co Interface Agreement.

(b) The City shall acquire the Real Property Interests in the After-Acquired Lands described in the Real Property Schedule on or prior to the possession dates set out in the said Schedule. The City shall provide written Notice of the possession of Real Property Interests in After-Acquired Lands to Project Co at which time such Real Property Interests shall be deemed to form part of the Lands and shall automatically be included in the Licence described in Section 14.1(a) above.

(c) Subject to Project Co's obligation to comply with the other terms and conditions set forth in this Project Agreement and the other Project Documents, Project Co shall ensure that each Project Co Party shall at all times, when entering the Lands or accessing the System, act in a manner consistent with the obligations of Project Co under the Project Agreement.

(d) In consideration for the licences granted pursuant to Sections 14.1(a) and 14.1(b) and Section 9.1 of Schedule 40 – Highway Work, Project Co shall perform the Project Scope subject to and in accordance with this Project Agreement.

(e) Without derogating from any of the City's rights hereunder, the City acknowledges that, in respect of the Project Scope, Project Co and the Project Co Parties require, and the City shall provide access to the Lands and the After-Acquired Lands without material interference by the City or any City Party from the dates set forth in Sections 14.1(a) and 14.1(b) respectively, and subject to any limitation on any Real Property Interest in the Lands described in Appendix 2 to Schedule 1 – Definitions and Interpretation, until the Termination Date.

(f) None of the rights granted pursuant to this Section 14.1 shall extend beyond the boundaries of the Lands or exceed any limits on the Real Property Interests in the Lands

as more particularly described in Appendix 2 to Schedule 1 – Definitions and Interpretation, or to any lands other than the Lands, other than easements and similar interests of the City which benefit the Lands, obtained after Commercial Close, to the extent the same are necessary for carrying out the Project Scope.

(g) The licence provided in this Section 14.1 shall automatically terminate as of the Termination Date.

(h) For greater certainty, the licence provided in this Section 14.1 shall not entitle Project Co or any Project Co Party to extract any mineral or other materials from the Lands for sale. Extracted materials, including minerals that can be sold remain property of the City. Subject to the City's rights in respect of extracted materials that can be sold, Project Co can use materials extracted from the Lands in carrying out the Project Scope.

(i) Notwithstanding any other provisions of this Project Agreement, Project Co's obligations under this Project Agreement which require rights of use and access to the Lands in order to be carried out do not become effective until such rights of use and access have been granted by the City to Project Co pursuant to this Section 14.1. For greater certainty, Project Co shall have no obligation or authorization to commence the Design and Construction Works on the Site until the Design and Construction Works Commencement Date.

14.2 Non-exclusive Licence/Development of Lands

(a) Project Co acknowledges and agrees that the rights granted to Project Co and the Project Co Parties hereunder shall be non-exclusive and that the City and any person authorized by the City may occupy and possess the Lands and the System without the prior consent of Project Co, including for the purposes of carrying out the Governmental Activities and the Other Works and including any occupation and possession contemplated by the DB Co Interface Agreement. In exercising such rights Project Co shall not, and shall require that the Project Co Parties shall not, except as permitted under this Project Agreement, disrupt the performance of the Governmental Activities or the Other Works.

(b) Without limiting Section 14.2(a), Project Co acknowledges that the City may from time to time use or develop (including by way of subdivision), or permit the use or development of, or dispose of, portions of the Lands (including carrying out the Business Opportunities) other than that portion of the Lands contained within the footprint of the Alignment and those other portions of the Lands necessary for the performance of the activities within the Project Scope. To the extent that such use, development or disposition materially adversely interferes with Project Co's licence rights hereunder or materially adversely interferes with Project Co's ability to perform the activities within the Project Scope, such use, development or disposition shall, subject to and in accordance with Schedule 22 – Variation Procedure, subject to the provisions relating thereto in Section 4, result in a Variation.

14.3 Naming and Signage

(a) Project Co acknowledges that the City reserves and retains (i) all rights to designate the name for the System and any part of the System; (ii) all rights to signage in relation to the Lands and the System; and (iii) all rights, Trade-Marks, naming or branding regarding the System or any part of the System. It is agreed, however, that, with the prior written consent of the City in its Discretion, which may take into consideration any applicable governmental guidelines, including guidelines set out in Schedule 18 – Communications and Public Consultation Protocol, Project Co, the Project Co Parties and the Senior Lenders may, for the period prior to Revenue Service Availability, erect and maintain signage at or on the Lands or System (which may include such parties' logos and trade names) identifying their respective roles in connection with the development and construction of the Project in a number and location and having a size and quality previously approved by the City.

(b) Project Co acknowledges and agrees that the City may, in its Discretion, require the prompt removal of signage, including, for clarity, signage which has been approved in accordance with Section 14.3(a), at any time whatsoever. For greater clarity, Project Co acknowledges and agrees that the City may, in its Discretion, require prompt removal of any logo or trade name on any signage erected in relation to the Lands and the System that is contrary to any signage or sponsorship rights granted to third parties.

(c) Project Co shall not use or display the logos of the City or IO or create any association therewith without the prior written consent of the City or IO, as the case may be, which consents will be in the Discretion of the City or IO, as the case may be.

14.4 No Interest in Land

(a) Subject to Section 55.1, Project Co agrees that it acquires no estate, right, title or ownership interest in the Lands or the System or any other interest in land pursuant to this Project Agreement or otherwise, provided, that solely for the purposes of the obligation of Project Co to comply with the CLA, the licence granted to Project Co of use and access to, on and over the Lands and the System pursuant to Section 14.1 shall, for the duration of the performance of the Works, be an interest in the premises, and Project Co acknowledges and agrees that no disposition of an interest in the Lands and the System arises as a result of the aforesaid grant.

14.5 Non-Disturbance Agreement

(a) If the City encumbers the Lands, the City shall notify Project Co and, at the request of Project Co, provide Project Co with an agreement, in form satisfactory to Project Co, acting reasonably, executed by the encumbrancer of the Lands permitting Project Co and the Lender's Agent to access and use the Lands under the licence granted pursuant to this Section 14 and the Lenders' Direct Agreement, respectively, free from interference from the encumbrancer or any person claiming by or through the encumbrancer so long as Project Co continues to abide by the terms and conditions of this Agreement. This Section 14.5 shall not apply in respect of any portion of the Lands used or developed

pursuant to Section 14.2(b) if neither the licence granted pursuant to this Section 14 nor the Project Scope pertain to such portion of the Lands.

14.6 References to Project Scope

(a) Any reference to Project Scope in this Section 14 shall not apply to the Highway Work.

15. TITLE ENCUMBRANCES

15.1 Title Encumbrances

(a) Project Co shall perform all obligations under all Encumbrances and Title Encumbrances for or on behalf of the City, other than:

(i) obligations which Project Co is not legally capable of performing for or on behalf of the City;

(ii) obligations under any Encumbrance (which is not a Title Encumbrance) added after the date of this Project Agreement (or, in the case of the Stage 2 Lands, after the date of the DB Co Works Agreement) unless:

(A) such obligations are provided in the Output Specifications as obligations of Project Co; or

(B) the Parties agree, both acting reasonably, that such obligations are obligations of Project Co; or

(C) such Encumbrances are necessary or desirable for the City's purposes and do not materially interfere with the use of the Lands for purposes of the Project Scope.

(b) All activities within the Project Scope performed by or on behalf of Project Co, whether before, during or after the completion of the Design and Construction Works, shall be performed in a manner which does not breach the Encumbrances, Title Encumbrances or any Development Approval.

(c) Subject to Encumbrances that Project Co shall remove pursuant to Section 15.2, no act or omission by Project Co or any Project Co Party shall give rise to a right for any person to obtain title to or any interest in the Site or any part of it, except in accordance with the terms of this Project Agreement.

15.2 No Site Encumbrances

(a) Project Co shall not create, incur, permit or suffer to exist any Encumbrance to be filed, issued or registered upon or against the Lands or any part thereof or any interest therein due to an act or omission of Project Co or any Project Co Party.

(b) Project Co shall promptly notify the City of any Encumbrance which is not a Title Encumbrance as soon as it becomes aware thereof.

(c) In the event that the Lands or any part thereof or any interest therein becomes subject to any Encumbrance due to an act or omission of Project Co or any Project Co Party which has not been consented to in writing by the City, Project Co shall immediately take all steps necessary to remove, vacate or discharge such Encumbrance. If such Encumbrance is not removed, vacated or discharged within 10 Business Days of the filing, issuance or registration of such Encumbrance then, without prejudice to any other rights or remedies it may have, the City will be at liberty to take whatever steps it deems necessary and appropriate to remove, vacate or discharge the Encumbrance, including payment of any amount owing or claimed thereunder, and seek immediate recovery from Project Co of the amount of any such payment and any associated costs, including legal costs (on a full indemnity basis), all of which shall be payable on demand.

(d) In the event that the Lands or any part thereof or any interest therein is or becomes subject to any Encumbrance which is not a Title Encumbrance and which is not due to an act or omission of Project Co or any Project Co Party, prior to performing obligations under any such Encumbrance, Project Co shall notify the City of any such Encumbrance and the City shall:

(i) cause the Encumbrance to be removed, vacated or discharged;

(ii) perform the required obligations thereunder; or

(iii) instruct Project Co to perform the required obligations thereunder.

(e) If Section 15.2(d) requires Project Co to perform obligations under an Encumbrance which performance imposes costs or delays on performance of the activities within the Project Scope, such performance:

(i) prior to Revenue Service Availability shall, subject to and in accordance with Section 40, be treated as a Delay Event and, subject to and in accordance with Section 41, be treated as a Compensation Event; and

(ii) following Revenue Service Availability shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation.

15.3 *Construction Lien Act* (Ontario)

(a) The Parties acknowledge that the foregoing provisions of Section 15.2 shall apply to claims for lien made upon or against the Lands and the Highway Site pursuant to the CLA and shall also apply to claims made against the City or the holdback under the CLA as though such a claim were an Encumbrance against the Lands or the Highway Site as referred to therein.

(b) Project Co shall withhold from each Subcontractor the holdbacks required under the CLA and shall deal with such holdbacks in accordance with the CLA and for the purposes of

the CLA, the contracts entered into by and between Project Co and any Subcontractor in relation to the performance of the Design and Construction Works and the Highway Work shall be considered a "contract" as defined in the CLA.

(c) In furtherance of Section 15.3(b), Project Co shall, as a condition of final payment under any Subcontract for which lien rights or rights in respect of the holdback may be claimed under the CLA, require that a certificate of completion under Section 33(1) of the CLA for such Subcontract be issued and the relevant Subcontractor provide statutory declarations or other assurances confirming that all those engaged by the Subcontractor have been paid in accordance with Applicable Law. For greater certainty, if a Subcontract has been certified complete in accordance with the requirements of the CLA, and if all liens in respect of that completed Subcontract have expired under the CLA or have been satisfied, discharged or provided for in accordance with the CLA, and all requirements of this Project Agreement have been complied with, then, the payer upon such Subcontract may make payment reducing holdbacks required by the CLA to the extent of the amount of holdback the payer has retained in respect of the completed Subcontract. Nothing in this Section 15.3(c) obligates the City to make any payment in respect of the completed Subcontract prior to the schedule for payments (including, but not limited to, any Milestone Payment, the Highway Milestone Payment and the Highway Final Payment) set out in this Project Agreement.

(d) Project Co shall follow the requirements of the CLA and Good Industry Practice (Works) and Good Industry Practice (Highway Work) for posting and advertising certificates of completion when issued.

(e) The parties acknowledge and agree that Section 20(2) of the CLA applies and that all liens shall arise and expire on a lot-by-lot basis, which, in the context of this Project Agreement, shall mean on the System and Highway basis.

(f) Project Co shall promptly provide the City with a copy of any materials which are provided to the Lenders to evidence compliance with the CLA.

(g) Upon request by the City, Project Co shall perform and deliver to the City a subsearch of title on the Lands, the Highway Site or any part thereof. The City shall pay the reasonable costs of any such search except (i) a search that reveals Encumbrances that are not permitted by this Project Agreement, (ii) a search requested based on a reasonable suspicion that an Encumbrance that is not permitted by this Project Agreement has been registered on title to the Lands or the Highway Site, and (iii) a search requested for the purpose of confirming that an Encumbrance that is not permitted by this Project Agreement has been discharged from the Lands or the Highway Site.

16. SITE CONDITION

16.1 Acceptance of Site Condition

(a) Subject to Sections 6.4, 16.2, 16.3, 16.4 and 16.5 Project Co acknowledges and agrees that it has investigated the Lands, the Other Existing Infrastructure and the Site Conditions, including the Background Information, prior to executing this Project Agreement and

agrees to accept the Lands, the Other Existing Infrastructure and the Site Conditions on an "as is, where is" basis. Without limiting the generality of the foregoing, but subject to Sections 6.4, 16.2, 16.3, 16.4 and 16.5, Project Co shall not be entitled to make any claim of any nature whatsoever against the City or any City Party on any grounds relating to the Lands, the Other Existing Infrastructure or the Site Conditions, including the fact that incorrect or insufficient information on any matter relating to the Lands, the Other Existing Infrastructure or the Site Conditions was given to it by any person, whether or not a City Party, unless the relevant person has given Project Co an express written entitlement to rely on information relating to the Lands, the Other Existing Infrastructure or the Site Conditions provided by such person to Project Co.

(b) Subject to Sections 6.4, 16.2, 16.3, 16.4 and 16.5, Project Co acknowledges and agrees that it has and shall be deemed to have:

(i) received all design data, warranties and all other applicable information in relation to the Stage 1 System, (to the extent such information is available as of Commercial Close);

(ii) satisfied itself prior to executing this Project Agreement as to the structural, environmental and general condition of the Other Existing Infrastructure;

(iii) satisfied itself as to the presence of any Contamination on, in or under the Lands or migrating to or from the Lands;

(iv) satisfied itself as to the adequacy of the rights of access to, from and through the Lands and any accommodation it may require for the purposes of fulfilling its obligations under this Project Agreement;

(v) satisfied itself as to the possibility of interference by persons of any description whatsoever with access to or use of, or rights in respect of, the Lands;

(vi) satisfied itself as to the precautions, times and methods of working necessary to prevent any nuisance or interference, whether public or private, being caused to third parties and will comply and will ensure compliance by all Project Co Parties with all communication and record keeping obligations in respect thereof in accordance with Schedule 18 – Communications and Public Consultation Protocol and Schedule 26 – Record Provisions; and

(vii) satisfied itself as to the nature of the Site Conditions, the ground and the subsoil, the level and quantity of groundwater, the form and nature of the Lands, the loadbearing and other relevant properties of the Lands, the risk of injury or damage to property affecting the Lands, the nature of the materials (whether natural or otherwise) to be excavated and the nature of the design, work and materials necessary for the execution and delivery of the Works.

(c) Project Co further acknowledges and agrees that, other than as referred to or contained in this Project Agreement, no representations or warranties have been made, nor documentation delivered to Project Co or any Project Co Party, which would indicate

that Project Co would be unable to perform the activities within the Project Scope in a lawful manner.

16.1A Highway Site Investigation - Concealed or Unknown Conditions

(a) Project Co acknowledges that it has been provided with the Highway Site Background Reports and has reviewed and is familiar with the Highway Site Background Reports. If Project Co encounters conditions at the Highway Site which are not described in or are not properly inferable, readily apparent or readily discoverable from the documentation included in the Highway Site Information (including the Highway Site Background Reports), Project Co will promptly notify the Consultant who will promptly investigate such conditions and who will then report to City and Project Co with a finding as to whether such conditions were or were not described in or were or were not properly inferable, readily apparent or readily discoverable from the documentation included in the Highway Site Information.

(b) If the conditions were described in or were properly inferable, readily apparent or readily discoverable from the documentation included in the Highway Site Information, then Project Co shall not be entitled to any adjustment in the Highway Milestone Payment and the Highway Final Payment or an extension of the Highway Contract Time.

(c) If the conditions were not described in or were not properly inferable, readily apparent or readily discoverable from the documentation included in the Highway Site Information, and the conditions justify an increase in the Highway Milestone Payment and the Highway Final Payment or an extension of the Highway Contract Time, or both, the Consultant shall issue appropriate instructions for a Variation in the Scope of the Highway Work as provided in Schedule 22 – Variation Procedure.

(d) Additional obligations and responsibilities of Project Co with respect to Contamination on the Highway Site are set out in Schedule 40 – Highway Work.

16.1B Acceptance of Stage 2 Site Condition

(a) Subject to Sections 6.4, 6.6, 16.2, 16.3, 16.4 and 16.5 and Schedule 43 to this Project Agreement, Project Co acknowledges and agrees that it is deemed to have investigated the Stage 2 Lands and the Stage 2 Site Conditions, including the Stage 2 Background Information, prior to executing the Stage 2 Maintenance Services Variation and agrees to accept the Stage 2 Lands and the Stage 2 Site Conditions on an "as is, where is" basis. Without limiting the generality of the foregoing, but subject to Sections 6.4, 6.6, 16.2, 16.3, 16.4 and 16.5 and Schedule 43 to this Project Agreement, Project Co shall not be entitled to make any claim of any nature whatsoever against the City or any City Party on any grounds relating to the Stage 2 Lands or the Stage 2 Site Conditions, including the fact that incorrect or insufficient information on any matter relating to the Stage 2 Lands or the Stage 2 Site Conditions was given to it by any person, whether or not a City Party, unless the relevant person has given Project Co an express written entitlement to rely on information relating to the Stage 2 Lands or the Stage 2 Site Conditions provided by such person to Project Co, provided that this Section 16.1B(a) shall not prevent Project Co from making a claim

against DB Co under the DB Co Interface Agreement or otherwise nor from pursuing a claim under Section 9.12 for Equivalent Project Relief.

(b) Subject to Sections 6.4, 6.6, 16.2, 16.3, 16.4 and 16.5 and Schedule 43 to this Project Agreement, Project Co acknowledges and agrees that it has and shall be deemed to have:

(i) received all design data, warranties and all other applicable information in relation to the Stage 2 System, to the extent such information is available at the date of the Stage 2 Maintenance Services Variation;

(ii) satisfied itself as to the presence of any Contamination on, in or under the Stage 2 Lands, in accordance with Good Industry Practice, taking into account all matters relating to the Stage 2 Lands, including any Stage 2 Existing Infrastructure, and any other buildings, structures and works, on, over and under the Stage 2 Lands existing on the date of the DB Co Works Agreement;

(iii) satisfied itself as to the adequacy of the rights of access to, from and through the Stage 2 Lands and any accommodation it may require for the purposes of fulfilling its obligations under this Project Agreement;

(iv) satisfied itself as to the possibility of interference by persons of any description whatsoever with access to or use of, or rights in respect of, the Stage 2 Lands; and

(v) in respect of the Stage 2 Lands and/or the Stage 2 System, satisfied itself as to the precautions, times and methods of working necessary to prevent any nuisance or interference, whether public or private, being caused to third parties and will comply and will ensure compliance by all Project Co Parties with all communication and record keeping obligations in respect thereof in accordance with Schedule 18 – Communications and Public Consultation Protocol and Schedule 26 – Record Provisions.

(c) Project Co further acknowledges and agrees that, other than as referred to or contained in this Project Agreement, no representations or warranties have been made, nor documentation delivered to Project Co or any Project Co Party, which would indicate that Project Co would be unable to perform the activities within the Project Scope in respect of the Stage 2 System in a lawful manner.

16.2 Contamination

(a) At all times throughout the Project Term, Project Co shall be responsible for managing, remediating and/or removing, in accordance with Section 5.5(a) of Schedule 17 – Environmental Obligations, any Contamination located on, in or under, the Stage 1 Lands, at any time during the Project Term, which was described in, or was properly inferable, readily apparent or readily discoverable from, the Advanced Environmental Reports or the Geotechnical Data Reports ("**Existing Contamination**").

(a1) At all times throughout the Maintenance Term, taking into account the Timing Principle, Project Co shall be responsible for managing, remediating and/or removing, in

accordance with Section 5.5(a) of Schedule 17 – Environmental Obligations, any Contamination located on, in or under, the Stage 2 Lands, at any time during the Maintenance Term, which was described in, or was properly inferable, readily apparent or readily discoverable from, the Environmental Reports or the Geotechnical Reports (as those terms are defined in each of the DB Co Works Agreement and the Belfast MSF Expansion Variation) and which has not been managed, remediated or removed as part of the DB Co Works or the Belfast MSF Expansion Works ("**Stage 2 Existing Contamination**").

Notwithstanding the foregoing or anything else to the contrary contained in this Agreement, and in particular so that Project Co is only responsible during the Maintenance Term, taking into account the Timing Principle:

(A) Project Co shall have no responsibility or liability for any Contamination migrating to or from the Stage 2 Lands, other than:

(i) where DB Co was responsible for such migrating Contamination pursuant to the DB Co Works Agreement and then only to the extent that DB Co was so responsible; or

(ii) to the extent that Project Co or any Project Co Party Released such Contamination in a manner which does not comply with Applicable Law; or

(iii) to the extent that Project Co or any Project Co Party is causing the migration of Stage 2 Existing Contamination; and

(B) Project Co shall have no responsibility for any Contamination which is or was located on, in or under the Stage 2 Lands at any time prior to the start of the Maintenance Term for the Stage 2 System, other than:

(i) any Contamination which DB Co was responsible for dealing with pursuant to the DB Co Works Agreement and then only to the extent that DB Co was so responsible; and

(ii) (without prejudice to paragraph (i) above) any Stage 2 Existing Contamination to which Section 16.2(b)(iii) applies.

(b) Project Co shall be responsible for removing or remediating, in accordance with Section 5.5(b) of Schedule 17 – Environmental Obligations:

(i) any Contamination which Project Co or any Project Co Party causes or permits to be Released in a manner which does not comply with Applicable Law or which causes a Risk to Human Health or the Environment;

(ii) <u>any Existing Contamination which was harmless or stored, contained or otherwise dealt with in accordance with Applicable Law which Project Co or any Project Co Party causes or permits to be Released in a manner which does not comply with Applicable Law or which causes a Risk to Human Health or the Environment; or</u>

(iii) during the Maintenance Term for the Stage 2 System (taking into account the Timing Principle), any Stage 2 Existing Contamination which was harmless or stored, contained or otherwise dealt with in accordance with Applicable Law which Project Co or any Project Co Party causes or permits to be Released in a manner which does not comply with Applicable Law or which causes a Risk to Human Health or the Environment.

In addition, and without limiting any other obligation of Project Co under the Project Agreement, Project Co shall be responsible for all Direct Losses associated with the Releases of Contamination, Existing Contamination or Stage 2 Existing Contamination described in Sections 16.2(b)(i), 16.2(b)(ii) or 16.2(b)(iii) above. For greater certainty, it is understood and agreed that Project Co shall be responsible for managing, remediating and/or removing, in accordance with Section 5.5 (a) of Schedule 17 – Environmental Obligations, any Contamination in the Scotiabank Building and if Project Co or any Project Co Party causes or permits any such Contamination to be Released in a manner that does not comply with Applicable Law or which causes a Risk to Human Health or the Environment, in addition to any other obligation of Project Co under the Project Agreement, Project Co shall be responsible for all Direct Losses associated with such Release.

(c) Contamination which is not the responsibility of Project Co pursuant to Section 16.2(a), 16.2(a1) or Section 16.2(b) shall be the responsibility of the City.

(d) Upon the discovery of any Contamination, Project Co shall immediately inform the City Representative and shall comply, and ensure compliance by all Project Co Parties, with all Applicable Law and Schedule 17 – Environmental Obligations, as applicable, in respect thereof:

(i) at the City's cost pursuant to Section 16.2(g), in respect of Contamination for which the City is responsible pursuant to Section 16.2(c); and,

(ii) at its own cost in respect of Contamination for which it is responsible pursuant to Section 16.2(a), 16.2(a1) or 16.2(b).

(e) Except to the extent required to prevent or mitigate an Emergency or to comply with Applicable Law, Project Co shall not undertake any significant work pursuant to Section 16.2(d) in respect of Contamination for which the City is responsible pursuant to Section 16.2(c) until the City Representative has been given a reasonable opportunity to review the nature and extent of the Contamination and has instructed Project Co to proceed with such work.

(f) In the event that the City wishes Project Co to perform actions in respect of any Contamination which are in addition to any required pursuant to Section 16.2(d), then the City shall issue an instruction to Project Co specifying what action the City requires Project Co to take and Project Co shall promptly and diligently comply with all such instructions at the City's cost pursuant to Section 16.2(g).

(g) If Sections 16.2(d), 16.2(e) or 16.2(f) require Project Co to perform any alteration, addition, demolition, extension or variation in the Project Scope as a result of Contamination for which the City is responsible pursuant to Section 16.2(c) or as a result of any instructions given by the City pursuant to Section 16.2(f) and which would not otherwise be required under this Project Agreement, then any such alteration, addition, demolition, extension or variation:

(i) prior to Revenue Service Availability shall, subject to and in accordance with Section 40 be treated as a Delay Event and, subject to and in accordance with Section 41, be treated as a Compensation Event; and

(ii) following Revenue Service Availability shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation.

(h) In the event that the City and Project Co do not agree as to the nature or extent of Contamination, or in the event of a disagreement as to whether Project Co is responsible for Contamination pursuant to either Sections 16.2(a), 16.2(a1) or 16.2(b), or the actions to be performed by Project Co pursuant to Section 16.2(d) or Schedule 17 – Environmental Obligations, such disagreement shall be referred for determination to an independent and suitably qualified and experienced person, acceptable to Project Co and the City, each acting reasonably (and the costs and expenses of retaining such person shall be borne by the unsuccessful Party). Such person's decision shall be final and binding on the Parties, except to the extent that either Party alleges that such decision would result in non compliance with Applicable Law or this Project Agreement, in which event either Party may refer the disagreement for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

16.3 Items of Geological, Historical or Archaeological Interest or Value

(a) As between the Parties, all fossils, artifacts and other objects having artistic, historic, archaeological or monetary value, including human remains and burial sites, which may be found on or at the Lands or Highway Site are or shall be the sole and absolute property of the City.

(b) The City shall be responsible for items referred to in Section 16.3(a) except for any such items that were described in, or were properly inferable, readily apparent or readily discernable from the Background Information and any such items on the Stage 2 Lands that were described in, or were properly inferable, readily apparent or readily discernable from the Stage 2 Background Information, provided that the City shall be responsible for any such items which are notified to the City by DB Co or Project Co during the course of the DB Co Works (whether such items are the responsibility of the City or not) and where the City does not require their resolution prior to the completion of the DB Co Works.

(c) Upon the discovery of any item referred to in Section 16.3(a) during the performance of the Project Scope, Project Co shall:

(i) immediately inform the City Representative of such discovery;

(ii) take all steps not to disturb the item and, if necessary, cease any activities within the Project Scope in so far as performing such Project Scope would endanger the item or prevent or impede its excavation, take all necessary steps to preserve and ensure the preservation of the item in the same position and condition in which it was found, and comply, and ensure compliance by all Project Co Parties, with Applicable Law and all requirements of Governmental Authorities with respect to such discovery, including Schedule 17 – Environmental Obligations, Part 7:

(A) at the City's cost pursuant to Section 16.3(e), in respect of any such discovery for which the City is responsible pursuant to Section 16.3(b) and

(B) at its own cost in respect of such discovery for which it is responsible pursuant to Section 16.3(b).

(d) In the event that the City wishes Project Co to perform actions in respect of any discovery of any item referred to in Section 16.3(a) which are in addition to any required pursuant to Section 16.3(c), then the City shall issue an instruction to Project Co specifying what action the City requires Project Co to take and Project Co shall promptly and diligently comply with all such instructions at the City's cost pursuant to Section 16.3(e).

(e) If Section 16.3(c) or 16.3(d) require Project Co to perform any alteration, addition, demolition, extension or variation in the activities within the Project Scope as a result of any such discovery for which the City is responsible pursuant to Section 16.3(b) or as a result of any instructions given by the City pursuant to Section 16.3(d) and which would not otherwise be required under this Project Agreement, then any such alteration, addition, demolition, extension or variation (but only to the extent it directly results in the interruption of the performance of the Project Scope or the Highway Work during a continuous period of 5 Business Days or more with respect to each such discovery) shall subject to and in accordance with Section 40, be treated as a Delay Event and, subject to and in accordance with Section 41, be treated as a Compensation Event.

(f) In the event that the City and Project Co do not agree as to the nature or extent of the actions required to be performed by Project Co pursuant to Section 16.3(c)(ii), such disagreement shall be referred for determination to an independent and suitably qualified and experienced person, acceptable to Project Co and the City, each acting reasonably (and the costs and expenses of retaining such person shall be borne by the unsuccessful Party). Such person's decision shall be final and binding on the Parties except to the extent that either Party alleges that such decision would result in non-compliance with Applicable Law or this Project Agreement, in which event either Party may refer the disagreement for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

16.4 Species-at-Risk

(a) The City shall be responsible for any Species-at-Risk which may be found on, in or at the Lands or the Highway Site, except for any Species-at-Risk the occurrence of which, in the location in which it is found, was described in the Environmental Assessments.

(a1) The City shall be responsible for any Species-at-Risk which may be found on, in or at the Stage 2 Lands, except for any Species-at-Risk the occurrence of which, in the location in which it is found, was described in the Stage 2 Environmental Assessments.

(b) In respect of Species-at-Risk for which Project Co is responsible pursuant to Sections 16.4(a) or 16.4(a1), Project Co shall, at its own cost, comply, and ensure compliance by all Project Co Parties, with all Applicable Law and the provisions of Schedule 17 – Environmental Obligations. Upon the discovery of any Species-at-Risk for which the City is responsible pursuant to Sections 16.4(a) or 16.4(a1), Project Co shall:

(i) immediately inform the City Representative of such discovery; and

(ii) comply, and ensure compliance by all Project Co Parties, with all Applicable Law and the provisions of Schedule 17 – Environmental Obligations in respect thereof, including taking all necessary steps to preserve the respective habitat and relocate the Species-at-Risk at the City's cost pursuant to Section 16.4(d).

(c) In the event that the City wishes Project Co to perform actions which are in addition to any required pursuant to Section 16.4(b), then the City shall issue an instruction to Project Co specifying what action the City requires Project Co to take and Project Co shall promptly and diligently comply with all such instructions at the City's cost pursuant to Section 16.4(d).

(d) If Section 16.4(b) or 16.4(c) require Project Co to perform any alteration, addition, demolition, extension or variation in the Project Scope as a result of the discovery of any Species-at-Risk for which the City is responsible pursuant to Sections 16.4(a) or 16.4(a1)or as a result of any instructions given by the City pursuant to Section 16.4(c) and which would not otherwise be required under this Project Agreement, then any such alteration, addition, demolition, extension or variation:

(i) prior to Revenue Service Availability shall, subject to and in accordance with Section 40, be treated as a Delay Event and, subject to and in accordance with Section 41, be treated as a Compensation Event; and

(ii) following Revenue Service Availability shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation.

16.5 Latent Defects

(a) With respect to Other Existing Infrastructure to be included in the Design and Construction Works and the Highway Work, the City shall be responsible for Latent Defects, except for any such Latent Defects:

(i) that were described in or were properly inferable, apparent or discoverable from the Background Information;

(ii) that are attributable to the failure by Project Co to perform the Project Scope in accordance with the Project Agreement;

(iii) that are caused by Project Co or any Project Co Party; or

(iv) that are attributable to Project Co's design or construction means and methods but only to the extent that Section 16.5(a)(i) also applies.

(a1) The City shall be responsible for defects in the Stage 2 Major Existing Third Party Infrastructure ("**Stage 2 Latent Defects**") provided that the defect,

(i) was not within the actual knowledge of Project Co or a Project Co Party as of the date of the DB Co Works Agreement;

(ii) was not referenced or described in, or was not properly inferable, readily apparent or readily discoverable from, the Stage 2 Background Information;

(iii) was not properly attributable to the result of the aging of the Stage 2 Major Existing Third Party Infrastructure; or

(iv) was not caused or contributed to by Project Co or a Project Co Party.

(b) Upon the discovery of a Latent Defect affecting the System or the Highway Site or a Stage 2 Latent Defect affecting the System, Project Co shall immediately inform the City Representative and shall proceed to remedy the Latent Defect or Stage 2 Latent Defect promptly and diligently in compliance with such instructions as the City may issue in the circumstances.

(c) The costs to remedy any Latent Defect or Stage 2 Latent Defect which is agreed or determined to be the responsibility of Project Co shall be borne by Project Co.

(d) In the event that Project Co claims the discovery of a Latent Defect is a Delay Event, any dispute as to whether the Latent Defect is the responsibility of the City or Project Co shall be deemed to be a dispute as to whether a Delay Event has occurred and shall be resolved, together with any other matters requiring determination in connection with such Delay Event, in accordance with the provisions of Section 40.2(i).

(e) In the event that a Latent Defect is discovered prior to or at Revenue Service Availability, and Project Co does not claim that the discovery constitutes a Delay Event, but there is

none the less a dispute as to whether the Latent Defect is the responsibility of the City or Project Co, then the dispute as to responsibility for the Latent Defect shall be referred to the Independent Certifier for a determination as to whether the Latent Defect is the responsibility of the City or the responsibility of Project Co on the basis set out in Section 16.5(a). A Party may dispute the determination of the Independent Certifier by delivery of a Notice of Dispute and such Dispute may be resolved in accordance with the provisions of Schedule 27 – Dispute Resolution Procedure.

(f) In the event that a Latent Defect or Stage 2 Latent Defect is discovered after Revenue Service Availability, any dispute as to whether the Latent Defect or Stage 2 Latent Defect is the responsibility of the City or Project Co shall be resolved in accordance with Schedule 27 – Dispute Resolution Procedure.

(g) If Section 16.5(b) requires Project Co to undertake any action in accordance with the instructions of the City to remedy a Latent Defect or Stage 2 Latent Defect for which the City is responsible, then any such additional work:

(i) shall, subject to and in accordance with Section 40, be treated as a Delay Event and, subject to and in accordance with Section 41, be treated as a Compensation Event; and

(ii) which occurs following Revenue Service Availability shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation.

(h) In the event any Insurance Proceeds under Insurance Policies as referred to in Schedule 30 – Insurance Trust Agreement are available to remedy the Latent Defect, Stage 2 Latent Defect or any resultant damage therefrom, such Insurance Proceeds shall be paid into the Insurance Trust Account and shall be dispersed in accordance with the provisions of the Insurance Trust Agreement to remedy the Latent Defect or Stage 2 Latent Defect.

(i) The City shall, on Financial Close, assign to Project Co all warranties remaining in existence and all other rights under the contracts relating to the Other Existing Infrastructure to the extent that they are assignable.

17. GOVERNMENTAL AND THIRD PARTY FINANCIAL OBLIGATIONS

17.1 Governmental, Railway and Utility Company Fees

(a) Project Co shall be responsible for all Financial Obligations under or in respect of all Project Co Permits, Licences and Approvals and the City shall be responsible for all Financial Obligations under or in respect of all City Permits, Licences and Approvals, including, any Utility Company, any Railway Company, any Governmental Authority or any third party in respect of the Project Scope, including:

(i) any development charges relating to the Works, the Highway Work, the System, the Highway, the Site or the Highway Site;

(ii) any engineering administration and inspection fees required in respect of works or services required to be performed;

(iii) any security deposits required under any Permits, Licences and Approvals; and

(iv) any other amounts payable under any Permits, Licences and Approvals.

(b) The Parties agree that any refund, partial rebate or credit granted by any applicable Utility Company, any applicable Railway Company, any applicable Governmental Authority or any other third party relating to the Financial Obligations referred to in Section 17.1(a) shall be for the benefit of the City to the extent such Financial Obligations were paid by the City and shall be for the benefit of Project Co to the extent such Financial Obligations were paid by Project Co.

18. CHANGE IN STANDARDS

(a) Where this Project Agreement requires Project Co to comply with a technical standard in respect of the design and construction aspects of the Project Scope, and that standard has changed between Commercial Close and the date that such compliance is required, then Project Co shall give notice to the City of such change. If, after such notice, the City requires compliance with the changed standard (rather than the standard applicable as of the date of Commercial Close), then, to the extent such change impacts the design and construction aspects of the Project Scope and would not have otherwise been taken into account by compliance with Good Industry Practice (Works) or Good Industry Practice (Highway Work), such changed standard shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation. If the City does not require compliance with the changed standard, then Project Co shall continue to comply with the standard applicable as of the date of Commercial Close, without a Variation therefor. This Section 18 shall not apply where a change in a technical standard is also a Change in Law.

19. COORDINATION AND NO DISRUPTION

(a) Project Co shall carry out the Project Scope so as to coordinate with:

(i) subject to and in accordance with Section 9.7 (to the extent applicable), the operations of the City, any City Party (and in the context of DB Co and any DB Co Party, this obligation shall be subject to any specific coordination arrangements agreed between Project Co and DB Co under the DB Co Interface Agreement), any Governmental Authority or Other Contractor engaged in activities on or about the Lands; and

(ii) the construction, operation, maintenance and expansion and additional phases of the existing transit system, namely, the DB Co Works (subject to, and in accordance with, the DB Co Interface Agreement), OC Transpo operations, the Societé de transport de l'Outaouais operations and in accordance with Schedule 38 – Extension and Additional Phases; and comply with the City of Ottawa's Transportation Master Plan generally.

(b) Project Co shall use commercially reasonable efforts to minimize:

(i) any interference with the operations of the City, any City Party (and in the context of DB Co and any DB Co Party, this obligation shall be subject to any specific obligations agreed between Project Co and DB Co under the DB Co Interface Agreement to minimize such interference), any Governmental Authority or any Other Contractor, including the performance of the Governmental Activities and the Other Works;

(ii) any interference with the construction, operation, maintenance and rehabilitation of the transit system and the Highway; and

(iii) any lane closures, traffic diversions or restrictions or other impairment of the public's use and enjoyment of the System and the Highway.

20. DESIGN AND CONSTRUCTION OBLIGATIONS

20.1 Overall Responsibility

(a) Project Co shall perform and complete the Design and Construction Works:

(i) so as to satisfy the Output Specifications;

(ii) in accordance with the Project Co Proposal Extracts;

(iii) in accordance with the Design Data;

(iv) in accordance with the Works Schedule; and

(v) in accordance with the other terms and conditions of this Project Agreement.

(b) Without prejudice to Section 20.1(a), but subject to Section 16.5 and to the provisions of the Maintenance and Rehabilitation Requirements, Schedule 20 – Payment Mechanism and Schedule 24 – Expiry Transition Procedure, if, at any time during the Project Term, any of the Design and Construction Works, the System or any parts thereof do not fully satisfy the Output Specifications and/or any other term or condition of this Project Agreement (other than the Project Co Proposal Extracts), Project Co shall, at its own cost and expense, rectify the Design and Construction Works, the System and any part thereof so that:

(i) the Design and Construction Works, the System and all parts thereof shall, at all times, comply with and satisfy in full the Output Specifications and the other terms and conditions of this Project Agreement (other than the Project Co Proposal Extracts); and

(ii) the Design and Construction Works, the System and all parts thereof will, at all times, be able to meet all safety and performance standards and other

requirements set out in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

20.2 Completion of the System

(a) Project Co shall design, engineer, construct and commission the System so as to provide to the City a complete and operational System in accordance with the Output Specifications and the Project Co Proposal Extracts, and that will allow Project Co to perform the Maintenance Services, all in accordance with and subject to the terms of this Project Agreement and allow the City to perform the Operations.

(b) All of the Contracts collectively shall be sufficient to create the entire System and accomplish Integration on or before the Revenue Service Availability Date.

(c) Project Co shall cause 2017 Readiness to occur on or before the 2017 Readiness Date.

20.3 Development of Design

(a) Project Co shall, at its own cost, develop and complete the design of the System and all Design Data in accordance with the requirements of this Project Agreement, including Schedule 10 – Review Procedure and this Section 20.3.

(b) The further development of the design and the process by which it is progressed must fully comply with the requirements of this Project Agreement.

(c) In order to develop the detailed design of the System, Project Co shall consult with the Stakeholders (which consultation requirements pursuant to the Environmental Assessments are further described in Schedule 17 – Environmental Obligations) and the City Representative and the City Design Team in an interactive process. If the result of any consultation with Stakeholders, is a change to the scope, configuration or size of any New System Infrastructure or a change in the Construction Activities, or a change in the Maintenance Services, which change has been approved by the City in its Discretion, then such change shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation.

(d) The Parties agree that Appendix A to Schedule 10 – Review Procedure is an initial list of Design Data and other items that will require design review, which Design Data and other items shall include (to a scale required by the City Representative):

(i) design development drawings, reports, schedules and specifications progressed from Commercial Close with extensive user group input, showing all architectural, engineering and landscape design information sufficient to allow for the development of working drawing documentation, submitted at 60% completion (the "**Pre-final Design Development Submittals**") and at 100% completion (the "**Final Design Development Submittals**") of the development of the working drawings (collectively, the "**Design Development Submittals**");

(ii) working drawing documentation, being construction drawings, reports, schedules and specifications progressed from the Design Development Submittals, showing all architectural, engineering and landscape design information in accordance with the requirements of this Project Agreement, submitted at 60% completion (the "**Pre-final Construction Document Submittals**") and 100% completion (the "**Final Construction Document Submittals**") of the construction drawings (collectively, the "**Construction Document Submittals**"); and

(iii) all other documentation required pursuant to Schedule 10 – Review Procedure.

(e) The Final Design Development Submittals and the final Construction Document Submittals shall each be accompanied by a Technical Appraisal Form.

(f) Project Co shall submit to the City Representative for review in accordance with Schedule 10 – Review Procedure all Design Data and other items listed in Sections 20.3(c) and 20.3(e).

(g) The Parties agree that, with respect to the Design Development Submittals and the Construction Document Submittals, the period for review shall be 15 Business Days rather than the 10 Business Days prescribed in Section 2.2 of Schedule 10 – Review Procedure.

(h) The Design Data and other items listed in Section 20.3(c) must contain, at a minimum, the following additional information:

(i) identification of the stage of design or construction to which the documentation relates;

(ii) all design or construction drawings and specifications necessary to enable the City Representative to make an informed decision as to whether Project Co is permitted to proceed pursuant to Schedule 10 – Review Procedure;

(iii) for each stage of the design or construction documentation, a schedule identifying all changes to the relevant documentation that has occurred from the previous stage of design or construction documentation; and

(iv) where changes have been submitted, an indication of how the changes meet the requirements of this Project Agreement.

(i) If Project Co commences or permits the commencement of the next level of design or construction of any part or parts of the System prior to being entitled to proceed in accordance with Schedule 10 – Review Procedure and it is subsequently determined in accordance with Schedule 10 – Review Procedure or Schedule 27 – Dispute Resolution Procedure that the design or construction does not comply with this Project Agreement, then Project Co shall forthwith, at its own cost and risk, undo, remove from the Site, replace and restore, as applicable, any parts of the design or construction that do not comply with this Project Agreement.

(j) Neither the City nor any City Party will have any liability:

(i) if a document submitted by Project Co and reviewed by the City, the City Representative or the City Design Team results in non-compliance with this Project Agreement by Project Co or a breach by Project Co of Applicable Law; or

(ii) for any loss or claim arising due to any defect in any documents, drawings, specifications or certificates submitted by Project Co.

(k) Project Co and the City will cooperate with each other in the design review process. Notwithstanding such cooperation by the City, such review shall not constitute acceptance of the Design and Construction Works, and Project Co shall remain solely responsible for compliance in full with all requirements of this Project Agreement.

(l) Project Co shall allow the City Representative and the City Design Team, at any time, a reasonable opportunity to view any items of Design Data, which shall be made available to the City Representative and/or City Design Team, as applicable, as soon as practicable following receipt of a written request from the City Representative.

20.4 Start-Up Meeting

(a) Within 10 Business Days after Financial Close, Project Co and the Design Team shall attend a start up meeting (the "**Start-Up Meeting**") with the City to set out the design development process in greater detail.

(b) The agenda for the Start-Up Meeting shall include the following:

(i) Project Co's plan to develop a successful long-term partnership with the City for the purpose of supporting the City in achieving its vision, mission and core values;

(ii) Project Co's plan to ensure that the Design and Construction Works are completed in accordance with the requirements set forth in this Project Agreement;

(iii) Project Co's process to ensure optimum design quality;

(iv) Project Co's approach to ensure that all Project Co Parties perform the Design and Construction Works, as applicable, as a fully integrated team;

(v) a proposed schedule of Works Submittals which is consistent with the Works Schedule and which provides for a progressive and orderly flow of Works Submittals from Project Co to the City Representative to allow sufficient time for review of each Works Submittal by the City Representative, and taking into account both the resources available to the City Representative to conduct such review and whether delay in the review of the subject matter of the Works Submittal will have a material impact on Project Co's ability to progress future

anticipated Works Submittals and the Design and Construction Works in accordance with the Works Schedule;

(vi) Project Co's plan to successfully integrate feedback from consultations with Stakeholders and the City Design Team;

(vii) Project Co's approach to timing, construction, and adjustment; and

(viii) a communication process that includes an electronic data room and the use of a computerized document tracking system that has the capacity to report, on request, the status of all design and construction documentation.

20.5 Design Review Meetings

(a) In order to obtain input in the preparation of, and prior to submitting, the Design Development Submittals and the Construction Document Submittals, Project Co and the Design Team shall hold design review meetings (the "**Design Review Meetings**") with the City and the City Design Team upon the following terms:

(i) the Project Co Representative shall arrange the Design Review Meetings in consultation with the City Representative;

(ii) all Design Review Meetings shall be held in Ottawa, Ontario unless the City agrees otherwise in writing;

(iii) the Parties shall cooperate to develop a reasonable schedule for the Design Review Meetings and shall incorporate such schedule into the Works Schedule;

(iv) Project Co shall circulate to the City and the City Design Team an agenda for each of the Design Review Meetings no later than 5 Business Days prior to the relevant Design Review Meeting;

(v) in advance of a Design Review Meeting, Project Co may submit to the City Design Team for comment any interim drafts of any designs or plans required under this Project Agreement, which submissions shall be used to inform the City on the development of System design and provide an opportunity for dialog on compliance with the requirements of the Project Agreement. For greater certainty, interim submissions shall be informal and shall not be reviewed in accordance with Schedule 10 – Review Procedure;

(vi) the Design Review Meetings shall be held in person, except where otherwise agreed by the Parties, acting reasonably;

(vii) Project Co shall maintain minutes of the Design Review Meetings, including possible design solutions and changes in design, and, within 5 Business Days after each Design Review Meeting, Project Co shall provide to the City and the City Design Team a copy of the minutes, together with a copy of any notes, comments,

sketches, drawings, tracings, lay-outs, plans or diagrams prepared at the Design Review Meeting; and

(viii) the City and Project Co agree that the subject matter of the Design Review Meetings shall not be regarded as Submittals to which Schedule 10 – Review Procedure applies, and that the City shall not be bound by the input provided in connection with the Design Review Meetings.

(b) The Parties shall, together with the City Design Team, hold Design Review Meetings prior to:

(i) each of the Design Development Submittals; and

(ii) each of the Construction Document Submittals.

(c) The purpose of the Design Review Meetings is to facilitate the incorporation of the City input, involvement and feedback into the Design Data prior to submission of such Design Data in accordance with Schedule 10 – Review Procedure.

20.6 Testing

(a) To the extent and in the manner provided by the Quality Documentation and other terms of this Project Agreement, including satisfaction of all requirements of Revenue Service Availability, all testing shall be carried out by a duly accredited and certified testing facility and organization. Any self-certification/testing carried out by Project Co, and any subsequent test results, shall be reviewed by the Independent Certifier as defined in Schedule 6 – Independent Certifier Agreement. The City Representative shall be given timely advance notice (being not less than 2 Business Days) of the date of such tests, except for categories of tests (if any) in respect of which the City Representative gives written notice to Project Co that it does not require such notice. The City Representative and any other City Party at the City's option shall be entitled to attend at any test. Any materials or plant which fail such tests shall be rejected.

(b) Project Co shall develop a test recording system which shall permit ready retrieval of all test readings and shall provide information relating to tests proposed, test methodology and test readings to the City Representative on request.

(c) With respect to continuous testing operations (such as concrete quality, structural concrete strengths, aggregate quality, compaction tests and bituminous material quality), Project Co shall provide to the City Representative at regular intervals (not to exceed weekly unless otherwise agreed) test summary sheets and statistical analyses indicating strength and quality trends.

20.7 System Design Functionality

(a) The City confirms that it has reviewed the Design Data submitted to the City by Project Co for review as at the date of this Project Agreement and that, subject to any qualifications or comments noted thereon, the City has not identified any deficiencies that

would preclude Project Co from satisfying the Output Specifications in respect of System Design Functionality, so far as can reasonably be determined given the level of detail in the submittals.

(b) With each of the Design Development Submittals, Project Co shall submit to the City, for its review pursuant to Schedule 10 – Review Procedure, a draft report (each a "**System Design Functionality Report**") to specifically identify, with reference to the Output Specifications, such matters of System Design Functionality that Project Co wishes the City Design Team to review and consider as part of the Design Development Submittals. Each System Design Functionality Report shall demonstrate how the Output Specifications are satisfied in respect of System Design Functionality.

(c) With the Construction Document Submittals, Project Co shall submit to the City for review by the City, pursuant to Schedule 10 – Review Procedure, a final System Design Functionality Report, and the City shall confirm that, subject to any qualifications or comments noted thereon, the City has not identified any deficiencies that would preclude Project Co from satisfying the Output Specifications in respect of System Design Functionality, so far as can reasonably be determined given the level of detail in the Construction Document Submittals.

(d) Each System Design Functionality Report must be prepared in accordance with the technical submission requirements to be provided by the City to Project Co and must address the way in which the Design Data meets the requirements of System Design Functionality.

(e) System Design Functionality is a salient factor of importance to the City at all stages of development of the System and shall be taken into account in the review of all Submittals submitted in accordance with the Review Procedure.

(f) Notwithstanding anything contained in this Section 20.7 to the contrary, the review by the City or the City Representative of any Design Data and any future review by the City or the City Representative of any Design Data, including Design Development Submittals or Construction Document Submittals shall not relieve Project Co of the risk and responsibility for satisfying System Design Functionality and the Output Specifications and for meeting all of its obligations under and the requirements of this Project Agreement, and shall not create any new or additional obligations or liabilities for the City. Without limiting the generality of the foregoing, any and all errors or omissions in the review and comment or confirmation by the City or the City Representative shall not create any obligations or liabilities for the City nor exclude or limit Project Co's obligations or liabilities with respect to System Design Functionality and satisfaction of the Output Specifications or exclude or limit the City's rights with respect thereto or with respect to the Design and Construction Works under this Project Agreement.

20.8 Performance of Design Obligations

(a) In the design and engineering of the System, Project Co, its consultants and the Project Co Parties shall, at a minimum, exercise the standard of care normally exercised

by licensed or registered professional engineering and architectural personnel and other licensed or registered professionals, as applicable, having specialized knowledge and experience in performing design activities of a similar nature, scope and complexity.

(b) Project Co shall ensure that all parts of the Design and Construction Works shall, as required by Applicable Law, be performed or reviewed by licensed or registered professional engineers and architects registered to practice in the Province of Ontario. Such architects and engineers shall certify and, if required by Applicable Law, sign and seal, all designs, drawings and technical reports confirming that they comply with all prevailing design standards and design practices for such work in the Province of Ontario, all other applicable standards, specifications and codes, and as otherwise required by Applicable Law.

20.9 General Construction Obligations

(a) Project Co is responsible for all construction means, methods and techniques used to undertake the Design and Construction Works and must provide everything (including labour, equipment and materials and electricity and other utilities) necessary for the construction and commissioning of the System, and other performance of the Design and Construction Works.

(b) Project Co shall in a timely and professional manner and in accordance with the requirements of this Project Agreement:

(i) construct the Design and Construction Works diligently, expeditiously and in a thorough and workman-like manner consistent with Schedule 11 – Quality Management;

(ii) ensure that no works other than the Works under this Project Agreement are constructed on the Lands by Project Co or any person for whom Project Co is responsible at law;

(iii) protect the Design and Construction Works from all of the elements, casualty and damage;

(iv) in respect of plant, equipment and materials incorporated in the Design and Construction Works, use plant, equipment and materials that:

(A) are of a kind that are consistent with the Output Specifications;

(B) are new, of good quality and are used, handled, stored and installed in accordance with Applicable Law and Good Industry Practice (Works) with respect to health and safety so as not to be hazardous or dangerous; and

(C) where they differ from the Output Specifications, have been substituted with the City's prior written consent in accordance with Section 20.10.

(c) Without limiting Project Co's obligations pursuant to Section 9.5 or 9.6 or Project Co's indemnity pursuant to Section 56.1, Project Co shall, at all times throughout the progress of the Design and Construction Works, be responsible for maintaining and securing the Site to prevent access onto the Site of any persons not entitled to be there, as determined by Project Co acting reasonably, and the licence granted to Project Co pursuant to Section 14.1 shall include rights for Project Co to do so.

20.10 Substitutions

(a) Whenever equipment, components, materials, supplies, tools, and other items are specified or otherwise described in this Project Agreement by using the name or catalogue or model number of a particular manufacturer, fabricator, vendor or distributor, or any other material name or description, the naming or identification of the item is intended to establish the type and the minimum function and quality required, and equipment, components, materials, supplies, tools, and other items of other manufacturers, fabricators, vendors or distributors shall not be substituted without the prior written consent of the City, in its Discretion.

20.11 Works Submittals

(a) Any and all items, documents and anything else required or specified by this Project Agreement in respect of the Design and Construction Works to be submitted to, reviewed or otherwise processed by the City prior to Revenue Service Availability, including any and all subsequent revisions, amendments and changes thereto, shall be subject to review by the City pursuant to Schedule 10 – Review Procedure. The first document to be submitted by Project Co for review by the City pursuant to Schedule 10 – Review Procedure shall be the draft document control and security protocol described in Section 52.5(f).

20.12 Construction Period and Maintenance Term

(a) Commencing on the Revenue Service Commencement Date, Project Co shall provide the maintenance services described in Sections 1.1(a)(ii) and 1.1(b) of Schedule 15-3 – Maintenance and Rehabilitation Requirements.

20.13 Cash Allowance – Civic Works

(a) Project Co shall perform and complete the Civic Works:

(i) so as to satisfy the Output Specifications;

(ii) so as to satisfy the Civic Works Specifications;

(iii) in accordance with the Works Schedule; and

(iv) in accordance with the other terms and conditions of this Project Agreement.

(b) Subject to Section 20.13(c), the City shall provide the following final Civic Works Specifications to Project Co by the following dates:

(i) Queen Street Work by 120 days following Financial Close;

(ii) Albert Street Work by 180 days following Financial Close;

(iii) Rock Stabilization Work by 90 days following Financial Close;

(iv) Coventry Bridge Work by 90 days following Financial Close; and

(v) CSST Work by 90 days following Financial Close.

(c) The City reserves the right at its Discretion to reduce some or all of the scope of the Civic Works Specifications upon: (i) delivery of the applicable Civic Works Specifications pursuant to Section 20.13(b) or (ii) upon 60 days prior written notice to Project Co; and in either case the applicable Civic Works shall be deemed herein to have been so reduced in scope.

(d) Project Co shall complete each of the Civic Works by the Required Revenue Service Availability Date or the New Required Revenue Service Availability Date, as applicable, except for the Coventry Bridge Work which shall be completed by March 31, 2014.

(e) Project Co shall be solely responsible for coordinating the Civic Works with its activities in respect of the Project Scope and shall not be entitled to an extension of time or additional compensation in respect of the remainder of the Project Scope as a result of the Civic Works or any matter relating thereto except as provided for in this Section 20.13.

(f) Notwithstanding any other provision in this Project Agreement, Project Co's sole compensation in respect of the Civic Works shall be made in accordance with this Section 20.13 and Project Co shall only be entitled to compensation for:

(i) the Direct Costs incurred by Project Co or any Subcontractor, as applicable in respect of the Civic Works, where "Direct Costs" as defined in Schedule 22 – Variation Procedure are deemed for purposes of this Section 20.13 to refer to "Civic Works" and not "Variation";

(ii) Project Co and any Subcontractors shall charge only the margins for overhead and profit as set out in Appendix B to Schedule 22 – Variation Procedure (such margins each calculated on the basis of the applicable Direct Costs so that no margin of Project Co or any Subcontractor is calculated on any other margin of Project Co or any Subcontractor), and no other margins or mark ups; and

(iii) subject to the above, the margins for overhead and profit as set out in Appendix B to Schedule 22 – Variation Procedure shall only be chargeable on Direct Costs of Project Co, such that Project Co shall not charge any margins on any amounts charged by any Subcontractor.

(g) Project Co will (and will oblige any Subcontractor to) use commercially reasonable efforts to obtain the best value for money when procuring (including the use of competitive quotes or tenders) any work, services, supplies, materials or equipment required by the Civic Works and will comply with all Good Industry Practice (Works) in relation to any such procurement, to a standard no less than Project Co would apply if all costs incurred were to its own account without recourse to the City, including using commercially reasonable efforts to mitigate such costs. If the City would be required by Applicable Law or any policy applicable to the City to competitively tender any contract in relation to the Civic Works, the City may require Project Co to seek and evaluate competitive tenders for the Civic Works in accordance with such Applicable Law or policy.

(h) Project Co shall not be required to obtain financing for the Civic Works.

(i) The City shall pay for the Civic Works, plus applicable HST and in accordance with Applicable Law, on a monthly progress basis out of the Cash Allowance Account which shall be established and administered by Project Co in accordance with this Section 20.13.

(j) The cash flow process applicable to the Cash Allowance Account will be as follows:

(i) the City shall deposit from time to time into the Cash Allowance Account such monies to satisfy any approved Request for Civic Works Payment Approvals up to the Cash Allowance Amount (or upon such different terms or dates as the Parties may mutually agree in writing);

(ii) Project Co will hold and manage all monies in the Cash Allowance Account in trust, pending payment in accordance with this Project Agreement, and shall ensure that such monies earn a rate of interest that is no less than the rate of interest that is quoted or published by Schedule I Banks in Canada as payable on interest bearing Canadian dollar demand deposit accounts;

(iii) interest earned on the Cash Allowance Account will accrue in the Cash Allowance Account;

(iv) the City shall make deposits into the Cash Allowance Account in the event that the payment requirements, including applicable HST, for Request for Civic Works Payment Approvals approved by the City for completed Civic Works exceed the then balance of the Cash Allowance Account (for clarity, determined on an aggregate basis across all remaining Civic Works) prior to approving any such Request for Civic Works Payment Approvals. Notwithstanding the foregoing, Project Co shall not perform any Civic Works that would cause the total amount paid by the City in respect of the Civic Works to exceed the Cash Allowance Amount without the prior written approval of the City;

(v) if, on the earlier of (i) the final applicable Civic Works Completion Date and (ii) the Termination Date, there exists a positive balance in the Cash Allowance Account, such balance will be paid by Project Co to the City or as the City directs;

(vi) the Parties agree to mutually review the operation of the Cash Allowance Account on a regular basis and make any appropriate modifications to ensure its efficient operation; and

(vii) within the Cash Allowance Account, the Cash Allowance Amount shall be allocated among the Civic Works such that no more than the maximum dollar amount below set out beside such specified Civic Works shall be committed to or spent in respect of such work:

(A) $ in respect of the Queen Street Work;

(B) $ in respect of the Albert Street Work;

(C) $ in respect of the Rock Stabilization Work;

(D) $ in respect of the Coventry Bridge Work;

(E) $ in respect of the Utilities Work; and

(F) $ in respect of the CSST Work.

(k) Project Co shall provide a reconciliation of the Cash Allowance Account to the City each month including the following information:

(i) itemized and aggregate amounts committed to date for each of the Civic Works;

(ii) itemized and aggregate amounts spent and/or committed to date for each of the Civic Works; and

(iii) the projected cost of each remaining Civic Works and the projected effect of such costs on the Cash Allowance Account and the Cash Allowance Amount.

(l) Project Co shall include with each Request for Civic Works Payment Approval the certification of (i) the Independent Certifier (including for greater certainty as provided for pursuant to the Independent Certifier Agreement) in respect of the Queen Street Work, the Albert Street Work, the Rock Stabilization Work and/or the Utilities Work or (ii) the Consultant in respect of the Coventry Bridge Work, that the relevant Civic Works described in such Request for Payment Approval is complete in accordance with this Section 20.13.

(m) In addition to the monthly reconciliation described in Section 20.13(k), Project Co shall, on a monthly basis, provide to the City and the Independent Certifier a request for payment approval (each, a "**Request for Civic Works Payment Approval**") that includes an itemized breakdown of the applicable Civic Works completed in the month by Project Co and any Subcontractors and the Direct Costs (as defined in this Section 20.13) incurred in respect thereof. Project Co shall include with each Request for Civic Works Payment Approval such supporting documentation as City may reasonably require in connection with the claimed base progress payments, including the Direct

Costs incurred in the relevant month, the cost to complete the Civic Works, any cumulative projected variance from the Cash Allowance Amount and any discounts, rebates, refunds, chargebacks, credits, price adjustments and other allowances available to Project Co or any Subcontractor in connection with the Civic Works. Each Request for Civic Works Payment Approval submitted to City shall be in a form stipulated by the City, acting reasonably, and shall include either at the time of submittal or be provided by the end of the next quarter as may be necessary to confirm the achievement of the claimed base progress payments: (i) such true copies of invoices (with originals to be provided within two (2) months of Substantial Completion of the Civic Works), purchase orders or other documentation in each case marked paid so as to support an "open-book" pricing approach and (ii) the details of the applicable Project Co margins for overhead and profit in respect thereof.

(n) Within 10 Business Days of receipt of a Request for Civic Works Payment Approval, the City shall, in consultation with the Independent Certifier and/or the Consultant, advise Project Co, in writing, whether or not it agrees with the particulars set out in the Request for Civic Works Payment Approval. The City shall only be permitted to withhold its approval if either the City, the Independent Certifier or the Consultant determine that the Request for Civic Works Payment Approval does not contain the information that the City, the Independent Certifier or the Consultant require, acting reasonably, to discharge their obligations under this Section 20.13. If the City withholds its approval pursuant to this Section 20.13(n) and subsequently receives the information that the City requires, acting reasonably, to discharge its obligations under this Section 20.13, it shall, within 10 Business Days of its receipt of such information, provide to Project Co, in writing, the City's approval for the payment of the amount set out in the aforementioned Request for Civic Works Payment Approval. Any Disputes with respect to determinations made under this Section 20.13 shall be resolved in accordance with the Dispute Resolution Procedure.

(o) If the City approves in writing the payment of the amount set out in a Request for Civic Works Payment Approval, Project Co shall be entitled to withdraw the approved payment from the Cash Allowance Account for its own benefit or make payment to the relevant vendors or Subcontractors in accordance with this Section 20.13.

(p) Project Co acknowledges and agrees that:

(i) all costs and expenses related to the administration of the Cash Allowance Account, including, without limitation, the preparation of Requests for Civic Works Payment Approval and any required reporting, shall be borne by Project Co and shall not be charged to the Cash Allowance Account;

(ii) all discounts, rebates, refunds, chargebacks, credits, price adjustments and other allowances available to Project Co or any Subcontractor in connection with the Civic Works shall be attributed solely to and shall benefit the pricing of the Civic Works and shall be credited to the Cash Allowance Account; and

(iii) after such portions of the Cash Allowance Amount are deposited into the Cash Allowance Account from time to time, such Cash Allowance Amount and the Cash Allowance Account will be managed in accordance with the Works Schedule and any costs, expenses or delays related to managing the Cash Allowance Account are the responsibility of Project Co.

21. ACCESS AND MONITORING

21.1 Access for City Parties

(a) Subject to Section 21.1(b), but without limiting any of the City's rights in respect of the Site, the Highway Site, the System or the Highway, Project Co:

(i) acknowledges and agrees that throughout the Project Term, without any prejudice to any access rights of any such person as a member of the general public or pursuant to Applicable Law, the City, the City Parties (provided that for the purposes of this section, access rights for DB Co or any DB Co Party shall be as set out in the DB Co Interface Agreement), the Consultant, a Police Service and their respective representatives shall have unrestricted access to the Site, the Highway Site, the System and the Highway (including without limitation, the MSFs) and any workshop where materials, or equipment are being manufactured, prepared or stored at all reasonable times during normal working hours, including for the purposes of general inspection or audit, or of attending any test or study being carried out in respect of the Works and the Highway Work, or to fulfill any statutory, public or other duties or functions.

(b) In exercising their access rights under Section 21.1(a), the City, the City Parties, a Police Service and the Consultant and their respective representatives shall:

(i) provide reasonable prior notice appropriate to the circumstances (other than for any offices or other facilities provided at the Site and the Highway Site for the use of the City and/or City Parties and the Consultant); and

(ii) comply with all relevant safety procedures and any reasonable directions with regard to site safety that may be issued by or on behalf of the Project Co Representative from time to time.

(c) If the Highway Work is designated for tests, inspections, or approvals in the Contract Documents, or by the Consultant's instructions, or pursuant to Applicable Law, Project Co shall give the Consultant reasonable notice of when the Highway Work will be ready for review and inspection. Project Co shall arrange for and shall give the Consultant reasonable notice of the date and time of inspections by other authorities.

(d) Project Co shall furnish promptly to the Consultant 2 copies of certificates and inspection reports relating to the Highway Work.

21.2 Increased Monitoring

(a) Subject to Section 16.5, at any time during the Project Term, if the City is of the opinion, acting reasonably, that there are defects in the Works or that Project Co has failed to comply, in any material respect, with the requirements of this Project Agreement (including the Output Specifications and the Project Co Proposal Extracts), the City may, without prejudice to any other right or remedy available to it, by notice to Project Co, increase the level of monitoring of Project Co from that set out in this Project Agreement to such level as the City considers reasonable taking into account the nature of the relevant defect or failure until such time as Project Co shall have demonstrated, to the City's satisfaction, that it is capable of performing and will perform, in all material respects, its obligations under this Project Agreement. Project Co will compensate the City for any reasonable costs incurred as a result of such increased monitoring.

21.3 Right to Uncover

(a) Subject to Section 16.5, Project Co shall ensure that the City is afforded advance notice of, and that the City is afforded a full opportunity to witness, all inspection and test activity in accordance with the Inspection and Test Plan. If Project Co does not provide such notice and opportunity, Project Co shall at the request of the City uncover any relevant part of the Civic Works, the Works and Highway Work which have been covered up or otherwise put out of view or remove any relevant part of the Civic Works, the Works and the Highway Work that have been proceeded with in order to permit the City to witness the relevant inspection or test activity. Project Co shall bear all costs of any such uncovering or removal, regardless of whether or not any defect is discovered in the relevant Civic Works, the Works and Highway Work.

(b) The City, or the Consultant in respect of the Highway Work only, shall have the right, (i) in respect of the Civic Works and the Works at any time during the Project Term and (ii) in respect of the Highway Work at any time prior to the Highway Final Completion Date, to request Project Co to uncover and inspect (or allow the City to inspect) any part or parts of the Civic Works, the Works and the Highway Work, or to require testing of any part or parts of the Civic Works, the Works and the Highway Work, where the City, or the Consultant, as applicable, reasonably believes that such part or parts of the Civic Works, the Works or Highway Work is or are defective or that Project Co has failed to comply with the requirements of this Project Agreement (including the Output Specifications, the Project Co Proposal Extracts and the Design Data) relevant to such part or parts of the Civic Works, the Works or the Highway Work, and Project Co shall comply with such request. When the City makes such a request, the City shall include reasonably detailed reasons with such request.

(c) If an inspection shows that the relevant part or parts of the Civic Works, the Works or the Highway Work is or are defective or that Project Co has failed to comply with the requirements of this Project Agreement (including the Output Specifications, the Project Co Proposal Extracts and the Design Data) relevant to such part or parts of the Civic Works, the Works or the Highway Work, Project Co shall rectify all such defects

and non-compliance diligently and at no cost to the City and Project Co shall not be entitled to any additional compensation or extension of time in relation thereto.

(d) If an inspection shows that the relevant part or parts of the Civic Works, the Works or the Highway Work is or are not defective and that Project Co has complied with the requirements of this Project Agreement (including the Output Specifications, the Project Co Proposal Extracts and the Design Data) relevant to such part or parts of the Civic Works, the Works or the Highway Work, the exercise by the City or the Consultant of its rights pursuant to this Section 21.3:

(i) (A) prior to Revenue Service Availability in respect of the Civic Works or the Works or (B) prior to the Highway Final Completion Date in respect of the Highway Work shall, in either case, subject to and in accordance with Section 40, be treated as a Delay Event and, subject to and in accordance with Section 41, be treated as a Compensation Event; and

(ii) following Revenue Service Availability in respect of the Civic Works or the Works shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation.

21.4 No Relief from Obligations

(a) The Parties acknowledge that the exercise by the City, the Consultant or the City Representative of the rights under this Section 21 shall in no way affect the obligations of Project Co under this Project Agreement except as set out in this Section 21.

21.5 Access by Others

(a) Subject to Section 21.5(b) and Section 14.1 of Schedule 40 – Highway Work, in respect of the Highway Work only, and subject to and in accordance with Section 9.7 (to the extent applicable), Project Co shall ensure that throughout the Project Term (taking into account the Timing Principle), without prejudice to any access rights of any such person as a member of the general public or pursuant to Applicable Law:

(i) any contractors, consultants or other persons authorized by the City Representative or the City, including the Other Contractors, have access to those parts of the Site, the Highway Site, the System and the Highway and as is necessary for the purpose of carrying out the Other Works;

(ii) the Independent Certifier has access to the Site and the System to the extent required to perform its obligations pursuant to Schedule 6 – Independent Certifier Agreement;

(iii) the inspectors and other persons authorized to act on behalf of the City have access to the Site and the Highway Site for inspection and acceptance purposes;

(iv) all Other Contractors, including the owners or operators of any Third Party Facilities and their agents, have access to the Site, the Highway Site, the System

and the Highway at all reasonable times to perform Third Party Works and where applicable, in accordance with or to exercise any right or power or perform any duty or obligation under any Applicable Law or the Utility Agreements, Railway Orders or encroachment permits, provided that, wherever consistent with the requirements of Applicable Law and the requirements of this Project Agreement, Project Co may limit such access so as to not unnecessarily impede or restrict traffic flows or any activities within the Project Scope;

(v) all Governmental Authorities and Emergency Service Providers have access to the Site, the Highway Site, the System and the Highway in order to carry out any work (including surveys and inspections) in accordance with or to exercise any right or power or perform any duty or obligation under any Applicable Law and provided that, whenever consistent with the applicable requirements of such Governmental Authority, Emergency Service Providers or Applicable Law and the requirements of this Project Agreement (as the case may be), Project Co may limit such access so as to not unnecessarily impede or restrict traffic flows or any Project Scope;

(vi) any City Party (provided that for the purposes of this section, access rights for DB Co or any DB Co Party shall be as set out in the DB Co Interface Agreement), Other Contractors, owners or operators of Third Party Facilities, Governmental Authorities, Emergency Service Providers, Utility Companies, and Railway Companies are permitted to enter upon the Site, the Highway Site, the System and the Highway for the purposes of access to and from any other lands and/or facilities adjacent to or in proximity to the Site, the Highway Site, the System and the Highway owned or operated by such person or in which such person has any interest, provided that, whenever consistent with the requirements of Applicable Law and the requirements of this Project Agreement, Project Co may limit such access so as to not unnecessarily impede or restrict traffic flows or any Project Scope; and

(vii) with the prior authorization of the City, any of the Contribution Agreement Parties have access to the Site and/or the System.

(b) In exercising their access rights under Section 21.5(a), each person referred to therein (except for Other Contractors, who shall instead comply with any instructions or procedures made by Project Co pursuant to Section 9.7) shall (except in the case of access rights described in Section 21.5(a) for the purpose of responding to an Emergency (for the purposes of this clause (b), references in the definition of "Emergency" to the City or the City Representative shall be deemed to be references to the applicable Governmental Authority or Emergency Service Provider) and except to the extent inconsistent with the applicable requirements of such Governmental Authority or Emergency Service Provider):

(i) provide reasonable prior notice appropriate to the circumstances;

(ii) comply with all relevant health and safety procedures and any reasonable directions with regard to health and safety that may be issued by or on behalf of the Project Co Representative from time to time; and

(iii) if reasonably required by Project Co, be accompanied by a representative of Project Co or a Project Co Party.

21.6 Public Use

(a) It is the City and not Project Co that grants to the general public the right to use the System. Project Co shall use commercially reasonable efforts to keep open for public use the existing transit system at all times during the Construction Period in accordance with the requirements provided for in Schedule 15-2 – Output Specifications – Design and Construction Requirements, except for lane closures or diversions of traffic flow:

(i) by Project Co in accordance with the provisions of the Traffic and Transit Management Plan; or as otherwise permitted under this Project Agreement or the DB Co Interface Agreement; or

(ii) of a type contemplated by Schedule 37 – Mobility Matters,

and, except as otherwise expressly provided in this Project Agreement, Project Co shall not have any claim whatsoever against the City, any City Party, Emergency Service Providers or any other Governmental Authority for or in respect of any lane closure or diversion, including any lane closure or diversion referred to in this Section or as a result of the exercise of any other rights or powers or the discharge of any other duties or functions by any such authority affecting all or any part of the Site or the System at any time.

(b) Subject to closures or diversions of traffic flow with respect to the System permitted by Section 21.6(a)(i) to Section 21.6(a)(ii), Project Co shall cause all Design and Construction Works and Maintenance Services to be carried on so as not to interfere unnecessarily with, and so as to minimize any necessary interference with, the convenience of the public in respect of, and the access of the public to and use of, any public or private roads or highways or other transportation infrastructure other than the System, whether under the control or in the possession of the City or any other person.

22. WORKS SCHEDULE AND WORKS REPORT

22.1 Completion of Design and Construction Works

(a) Project Co shall complete the Design and Construction Works in accordance with this Project Agreement and achieve:

(i) each Milestone Acceptance by the applicable Scheduled Milestone Acceptance Date;

(ii) Substantial Completion by the Scheduled Substantial Completion Date;

(iii) Revenue Service Availability by the Required Revenue Service Availability Date; and

(iv) Final Completion by the Scheduled Final Completion Date.

22.2 The Works Schedule

(a) Project Co shall prepare and submit to the City and the Independent Certifier:

(i) within 30 days after Financial Close, a detailed 6-Month Works Schedule;

(ii) within 120 days after Financial Close, a detailed draft of the Works Schedule; and

(iii) every month in accordance with Schedule 33, an updated, and progressed, Works Schedule, each using Oracle Primavera P6 Project Management software, that supports the completion of the Design and Construction Works in accordance with Section 22.1.

(b) Project Co shall develop its Works Schedule in close co-ordination with the City to ensure City related input into the design, as well as City obligations under the Project Agreement are included in the Works Schedule with sufficient detail and understanding by both Project Co and the City such that both parties have a clear expectation of their respective obligations and input and the timing required for such.

(c) The City shall provide Project Co with comments on the 6-Month Works Schedule and the draft of the Works Schedule in accordance with Schedule 10 – Review Procedure, provided that the period for review of the draft of the 6-Month Works Schedule and the Works Schedule shall be 20 Business Days rather than the 10 Business Days prescribed in Section 2.2 of Schedule 10 – Review Procedure. Project Co shall revise the 6-Month Works Schedule and the draft of the Works Schedule to the extent required by Schedule 10 – Review Procedure within 15 days of receipt of any comments from the City.

(d) When agreed by the Parties, the draft of the Works Schedule shall become the Works Schedule.

(e) The 6-Month Works Schedule and the Works Schedule shall be prepared in accordance with Good Industry Practice (Works) for a light rail transit project of similar scale, scope, type and complexity and shall be in sufficient detail so as to enable the City and the Independent Certifier, to monitor the progress of the Design and Construction Works, including all commissioning activities, and the likely future progress of the Design and Construction Works. For purposes of these schedules, Good Industry Practice (Works) includes, but is not limited to, the following Project Management Institute (PMI) publications:

(i) *A Guide to the Project Management Body of Knowledge* (PMBOK® Guide);

(ii) *Construction Extension to the PMBOK® Guide 3rd Edition*;

(iii) *The Practice Standard for Scheduling*;

(iv) *The Practice Standard for Work Breakdown Structures*; and

(v) *The Practice Standard for Earned Value Management*.

(f) Without limiting the generality of Section 22.2(e), the 6-Month Works Schedule shall include the requirements below, at a minimum, in respect of the 6-month period beginning at Financial Close:

(i) all elements in the Works Schedule pursuant to Schedule 3, Part 1 of the Request for Proposals;

(ii) information based upon a detailed Work Breakdown Structure (WBS). The WBS and associate dictionary shall be provided to the City;

(iii) information structured with valid network logic and in sufficient detail so as to enable the City to analyze the schedule model using statistical techniques such as Monte Carlo schedule risk analysis;

(iv) three-point duration estimates (optimistic, most likely, and pessimistic) for all activities. These estimates shall identify the uncertainty inherent with executing each activity;

(v) major milestone events;

(vi) constraints;

(vii) the dates that key decisions must be made by the City, or key meetings where the City is to be present, to support the progress of the Design and Construction Works;

(viii) the proposed dates for all plans, all Work Submittals and all Maintenance Submittals required to be submitted under this Project Agreement and any Schedule by Project Co pursuant to the Review Procedure;

(ix) all activities related to the environmental process, proposed Stakeholder consultations, and Environmental Approvals, including review periods by Governmental Authorities and third parties pursuant to Project Co Permits, Licences and Approvals showing in sufficient detail how these dates affect the critical path of the Schedule, as well as how these dates affect the commencement date of Construction Clearing and Grubbing;

(x) all design related activities;

(xi) all field and construction activities, including construction staging, subcontract work and cash allowance work, both on and off the Site;

(xii) all activities leading up to Construction Clearing and Grubbing;

(xiii) projected Construction Contract cash flows; and

(xiv) a narrative that describes, in sufficient detail, the rationale behind the items identified in this Section 22.2(f).

(g) Without limiting the generality of Section 22.2(e), the Works Schedule shall include, at a minimum, in respect of the period from 6 months following Financial Close until the Revenue Service Availability Date:

(i) subject to Section 22.2(g)(ii), all elements to be included in the 6-Month Works Schedule pursuant to Section 22.2(f);

(ii) the proposed dates for all plans, all Works Submittals and all Maintenance Submittals, except for the proposed dates for plans under Subsection (viii) of Section 22.2(f);

(iii) the process and schedule of Facility Acceptance Tests, Reliability Acceptance Tests and System Acceptance Tests;

(iv) all Project Co Commissioning activities;

(v) the manpower requirements for each activity, including subcontract work;

(vi) a manpower histogram, with descriptions of overall manpower as well as by trade and manpower sourced locally (including both direct engagement and subcontract work); and

(vii) a cumulative "S" curve showing planned percent completion for each month from the commencement of the Works until the Scheduled Final Completion Date.

(h) Works Budget and Cost Control System

(i) The project budget and cost control system implemented by Project Co shall include the following parameters:

(A) A detailed WBS based cost structure that is the overall project budget baseline;

(B) Tracking of cost issues and factors that create changes to the budget baseline;

(C) Managing the actual cost changes when and as they occur;

(D) Managing cost estimates to ensure they do not exceed budgets available;

(E) Monitoring cost performance trends to detect cost variances and track budget-cost variances;

(F) Risk management including contingencies, allowances and uncertainty funds;

(G) Scope/Cost Change Control System;

(H) Scope changes and associated cost estimates against the budget baseline; and

(I) Reporting to the City regarding all pending and approved scope changes.

(ii) Project Co shall use an Earned Value Management (EVM) methodology to track performance of the work using the following key performance factors:

(A) Schedule Performance Index (SPI);

(B) Cost Performance Index (CPI);

(C) Schedule Variance (SV);

(D) Cost Variance (CV);

(E) Planned Value (PV);

(F) Earned Value (EV);

(G) Actual Cost (AC);

(H) Estimate to Complete (ETC); and

(I) Estimate at Completion (EAC).

(iii) EVM budget, and cost performance, shall be reported monthly in accordance with Section 22.5 Works Report.

22.3 Failure to Maintain Schedule

(a) Without limiting any other provision of this Project Agreement but subject to Section 40, if, at any time:

(i) the actual progress of the Design and Construction Works, including, without limitation, the Milestones, the 2017 Readiness Work or the Highway Work has significantly fallen behind the Works Schedule or Highway Construction Schedule, respectively; or

(ii) the City is of the opinion that:

(A) the actual progress of the Design and Construction Works, including, without limitation, the 2017 Readiness Work has significantly fallen behind the Works Schedule; or

(B) Project Co will not achieve 2017 Readiness by the 2017 Readiness Date, Substantial Completion of the Highway Work by the Highway Scheduled Substantial Completion Date, Revenue Service Availability by the Required Revenue Service Availability Date or Revenue Service Availability by the Longstop Date;

Project Co shall be required:

(iii) within 5 Business Days of receipt of notice from the City, to produce and deliver to each of the City Representative and the Independent Certifier:

(A) a report identifying the reasons for the delay; and

(B) a plan showing the steps that are to be taken by Project Co to eliminate or reduce the delay to:

(I) achieve 2017 Readiness by the 2017 Readiness Date, Substantial Completion of the Highway Work by the Highway Scheduled Substantial Completion Date or Revenue Service Availability by the Required Revenue Service Availability Date, as applicable; or

(II) if Revenue Service Availability will not be achieved by the Required Revenue Service Availability Date, achieve Revenue Service Availability by the Longstop Date; and

(iv) to bring the progress of the Design and Construction Works, including, without limitation, the 2017 Readiness Work or the Highway Work, as applicable, back on schedule in accordance with the plan delivered under Section 22.3(a)(iii)(B) and approved by the City Representative.

(b) Project Co shall notify the City Representative if, at any time, the actual progress of the Design and Construction Works, including, without limitation, the 2017 Readiness Work or the Highway Work is significantly ahead of the Works Schedule or the Highway Construction Schedule, respectively.

(c) Provided that Project Co has complied with this Section 22.3 and is not in default under Section 45.1(a)(iii), for greater certainty, the failure to achieve: (i) 2017 Readiness by the 2017 Readiness Date; (ii) Substantial Completion of the Highway Work by the Highway Scheduled Substantial Completion Date; (iii) Revenue Service Availability by the Required Revenue Service Availability Date; (iv) Milestone Acceptance by the relevant Scheduled Milestone Acceptance Date; (v) Substantial Completion by the Scheduled Substantial Completion Date; or (vi) Final Completion by the Scheduled Final Completion Date shall not be a Project Co Event of Default for the purposes of Section 45.1(a)(v).

(d) Without limiting the generality of the foregoing, the City shall be entitled to make inspections 1 year, 9 months, 6 months, 3 months and 1 month prior to the 2017

Readiness Date to determine the actual progress of Project Co in respect of the completion of the 2017 Readiness Work.

22.3A Acceleration of the 2017 Readiness Work

(a) If it has been determined by the Independent Certifier that completion of the 2017 Readiness work will not occur by the 2017 Readiness Date, Project Co agrees that it shall comply, and shall cause all relevant Project Co Parties to comply with all directions issued by the City from time to time in respect of the 2017 Readiness Work requiring acceleration and/or execution of a mitigation strategy approved by the City at Project Co's expense if it is determined by the Independent Certifier that an act or acts and/or an omission or omissions of Project Co caused the delay in achieving completion of the 2017 Readiness Work by the 2017 Readiness Date, notwithstanding Section 39.1(b). Otherwise, Project Co's expenses incurred in complying with directions issued by the City from time to time shall be dealt with as a Variation, subject to and in accordance with Schedule 22 – Variation Procedure. The City may, at its Discretion, waive any requirement of Project Co in respect of the 2017 Readiness Work.

(b) Any dispute in relation to the Independent Certifier's decision that completion of the 2017 Readiness Work will or will not occur by the 2017 Readiness Date may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

(c) Project Co shall work collaboratively with the City to identify, develop and implement opportunities for the public to appreciate elements of the System and the Highway Work by the 2017 Readiness Date that include:

(i) ground breaking ceremonies in respect of the Tunnel, the MSF and the Highway Work and the provision of a Vehicle "mock-up" for public inspection;

(ii) ground breaking ceremonies, ribbon cutting ceremonies, artwork unveiling and a Vehicle at the platform for public inspection at the Rideau station, the St-Laurent station and the LeBreton station;

(iii) events in respect of the delivery of the first Vehicle;

(iv) a guided train ride between the St-Laurent station and the Cyrville station; and

(v) a ribbon cutting ceremony at completion and an open house at the MSF.

Project Co and the City shall cooperate and Project Co shall take commercially reasonable steps to seek to arrange for such other opportunities as may be mutually agreed on with the City for the public to appreciate elements of the System and the Highway Work by the 2017 Readiness Date.

22.4 Notification of Early Milestone Acceptance, Highway Substantial Completion or Revenue Service Availability

(a) Unless Project Co obtains the prior written consent of the City, in its Discretion, Project Co shall not be entitled to:

(i) a Milestone Acceptance Certificate prior to, a Milestone Acceptance Date and a Milestone Payment Date shall not be earlier than, the relevant Scheduled Milestone Acceptance Date;

(ii) the Highway Substantial Completion Certificate prior to, the Highway Substantial Completion Date and the Highway Milestone Payment shall not be earlier than, the Highway Scheduled Substantial Completion Date; or

(iii) the Revenue Service Availability Certificate prior to, the Revenue Service Availability Date and the Revenue Service Availability Payment Date shall not be earlier than, the Required Revenue Service Availability Date.

(b) If Project Co advises the City that it expects to be able to achieve a Milestone Acceptance, Revenue Service Availability, or Substantial Completion of the Highway Work prior to the relevant Scheduled Milestone Acceptance Date, the Required Revenue Service Availability Date or the Highway Scheduled Substantial Completion Date, as applicable, the City Representative shall be entitled to require Project Co to produce and submit to the City Representative a revised Works Schedule or Highway Construction Schedule as applicable showing the manner and the periods in which the Design and Construction Works or the Highway Work, as applicable, shall be performed and what the revised date for that Milestone Acceptance, Revenue Service Availability or Substantial Completion of the Highway Work would be so as to enable the City to consider at its Discretion:

(i) whether to agree to an earlier Milestone Acceptance Date, Required Revenue Service Availability Date or Highway Substantial Completion Date, as applicable; and

(ii) what modifications, if any, shall be required to this Project Agreement in order to accommodate such earlier Milestone Acceptance Date, Required Revenue Service Availability Date or Highway Substantial Completion Date.

22.5 Works Report

(a) Project Co shall continuously monitor the progress of the Design and Construction Works, including, without limitation, the 2017 Readiness Work and the Highway Work in relation to the Works Schedule and, within 10 Business Days following the end of each calendar month from Financial Close until the Final Completion Date, Project Co shall provide to the City Representative and the Independent Certifier and the Consultant a works report (each, a "**Works Report**"), which will include:

(i) an executive summary describing the general status of the Design and Construction Works, including, without limitation, the 2017 Readiness Work and the Highway Work and progress made over the relevant month;

(ii) an updated Works Schedule, printed in both summary and detailed formats (PDF), and in native P6 format (XER);

(iii) a narrative description of any Disputes related to the Design and Construction Works, including, without limitation, the 2017 Readiness Work and the Highway Work, including any action that has taken place over the relevant month to resolve such Disputes;

(iv) an update on those matters set out in Schedule 33 – Works Report Requirements; and

(v) a progress report comparing Project Co's actual Construction Activities and procurement activities relating to the System with LEED rating requirements,

all in form and substance satisfactory to the City, acting reasonably. For greater certainty, for all updates and revisions to the Works Schedule, Project Co must provide a revised critical path reflecting the updated/revised Works Schedule.

(b) Project Co shall use, and shall ensure that the Construction Contractor uses, the project management software system specified by the City.

23. OPERATIONS MATTERS

23.1 Operations Provision

(a) Project Co and the City shall comply with the provisions of Schedule 39 – Operations Matters. In respect of the Stage 2 System, the City shall issue a Variation Enquiry in good time prior to each of the Stage 2 East Substantial Completion Date and the Stage 2 West Substantial Completion Date to clarify (i) whether the City intends to extend the scope of Schedule 39 – Operations Matters to the Stage 2 System, and if so, on what terms, or to delete Schedule 39 – Operations Matters in its entirety; and (ii) any consequential changes the City's decision (either way) will have on Project Co's existing obligations under this Project Agreement. The relevant provisions of Schedule 22 - Variation Procedure shall apply except that the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree The City acknowledges that the ability of Project Co to manage any such obligations in respect of the Stage 2 System shall be contingent on Project Co having access to an appropriate remedy in respect of the design and construction of the Stage 2 System through an amendment to this Agreement, the DB Co Works Agreement and/or the DB Co Interface Agreement.

24. ENERGY AND ENVIRONMENTAL REQUIREMENTS

24.1 Environmental Management / Contamination and Hazardous Substances

(a) Project Co shall comply with the provisions of Schedule 17 – Environmental Obligations.

24.2 Greenhouse Gas Credits

(a) Any carbon or other greenhouse gas credits (including but not limited to allowances, offset credits and any other credits that may be recognized in any provincial, regional, national, international or other emissions trading system from time to time) which may be contracted for or otherwise guaranteed as a result of the Project shall be owned by the City and Project Co shall have no entitlement to any of such credits whatsoever.

24.3 Energy Matters

(a) Each of Project Co and the City shall comply with the provisions of Schedule 8 – Energy Matters. In respect of the Stage 2 System, the City shall issue a Variation Enquiry in good time prior to each of the Stage 2 East Substantial Completion Date and the Stage 2 West Substantial Completion Date to clarify (i) how the City intends to extend the scope of Schedule 8 – Energy Matters to the Stage 2 System and on what terms; and (ii) any consequential changes the City's decision will have on Project Co's existing obligations under Schedule 8 – Energy Matters. The relevant provisions of Schedule 22 - Variation Procedure shall apply except that the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree. The City acknowledges that the ability of Project Co to manage any such obligations in respect of the Stage 2 System shall be contingent on Project Co having access to an appropriate remedy in respect of the design and construction of the Stage 2 System through an amendment to this Agreement, the DB Co Works Agreement and/or the DB Co Interface Agreement.

24.4 LEED Design and Construction Obligations

(a) Subject to Section 24.7 below, Project Co shall perform the Works so as to achieve the prerequisites, credits and points required to achieve LEED Certification for the MSF administration building and the MSF maintenance building and, may, in its discretion, determine which prerequisites, credits and points to pursue.

24.5 LEED Rating System

(a) Project Co shall:

(i) register the Project with CaGBC within 60 days following Financial Close; and

(ii) prepare and submit to CaGBC the Project documentation required to apply for a rating assessment for the Project under the LEED Rating System as soon as Project Co has completed the relevant Works or parts thereof required to facilitate preparation of the applicable Project documentation.

(b) If, after application for registration of the Project is made in accordance with Section 24.5(a)(i), there is a change in the requirements for achievement of LEED Certification under the LEED Rating System, and Project Co is required by CaGBC to comply with such change, then Project Co shall notify the City of such change and such change shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation.

(c) If Project Co fails to obtain LEED Certification, or deliver a LEED Compliance Certificate in accordance with Section 24.5(d) within 24 months after the Revenue Service Availability Date, other than as a direct result of any act or omission of the City the amount payable by Project Co to the City as liquidated damages shall be equal to $. The Parties agree that such liquidated damages are not a penalty but represent a genuine and reasonable pre-estimate of the damages that the City will suffer as a result of a failure by Project Co to achieve LEED Certification or deliver a LEED Compliance Certificate and it would be difficult or impossible to quantify such damages upon the happening of such event. Such payment shall constitute full and final settlement of any and all damages that may be claimed by the City as a result of a failure by Project Co to achieve LEED Certification or deliver a LEED Compliance Certificate and, for greater certainty, a failure by Project Co to achieve LEED Certification or deliver a LEED Compliance Certificate shall not result in a Project Co Event of Default. The Parties agree that such liquidated damages shall be payable whether or not the City incurs or mitigates its damages, and that the City shall not have any obligation to mitigate any such damages.

(d) Notwithstanding that an application to CaGBC by Project Co for LEED Certification has been made but such LEED Certification has not been received from CaGBC, Project Co shall be deemed to have met the obligations under Section 24.4 if it has delivered a certificate (the "**LEED Compliance Certificate**"), certified by an Expert appointed pursuant to Schedule 27 – Dispute Resolution Procedure, that Project Co has performed and completed the relevant Works in the manner required to obtain all necessary prerequisites, credits and points under the LEED Rating System in order for Project Co to achieve LEED Certification.

24.6 LEED Progress Reports

(a) As part of each report provided in accordance with Section 22.5, Project Co shall submit a progress report comparing its actual Construction Activities and procurement activities with LEED rating requirements.

24.7 Belfast MSF Expansion Works Impacts on LEED Certification

(a) In connection with any Belfast MSF Expansion Works Submittals submitted in accordance with Appendix 10 of Schedule 45, Project Co shall concurrently with such submission identify with reasonable specificity any impacts that any such submittal shall have on the ability of Project Co to achieve LEED Certification in accordance with this Article 24 (such impacts, a "**Belfast MSF Expansion LEED Impact**"). Within 10 days of the delivery of the relevant Submittal, the City and Project Co shall meet to discuss the applicable Belfast MSF Expansion LEED Impact and use reasonable commercial efforts

to agree on any appropriate mitigation measures that may be taken to preserve LEED Certification in accordance with this Article 24 and whether a Variation is required as a result of such mitigation measures or to remove the obligation to achieve LEED Certification. To the extent the City and Project Co cannot agree on appropriate mitigation measures in connection with such applicable Belfast MSF Expansion LEED Impact or whether a Variation is required as a result of such mitigation measures or to remove the obligation to achieve LEED Certification, either Party may refer the question of whether a Variation is required as a result of such Belfast MSF Expansion LEED Impact for resolution in accordance with Schedule 27 - Dispute Resolution Procedure. The City shall, within 10 Business Days of agreement or determination that a Variation is required, issue a Variation Enquiry and the relevant provisions of Schedule 22 - Variation Procedure shall apply, except that the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree.

25. INDEPENDENT CERTIFIER

25.1 Appointment

(a) On or prior to Financial Close, the Parties shall appoint an independent, suitably qualified and experienced consultant to act as the Independent Certifier for the purposes of this Project Agreement and shall enter into an agreement with the Independent Certifier substantially in the form of Schedule 6 – Independent Certifier Agreement. If the Parties are unable to agree upon the Independent Certifier within such period of time, then the determination of the Independent Certifier shall be made in the same manner as the identification of a replacement Independent Certifier under Section 25.7(b).

(b) Neither Party shall, without the prior written consent of the other Party, enter into any agreement with the Independent Certifier in connection with the Project other than the Independent Certifier Agreement, and Project Co shall ensure that no Project Co Party enters into any separate agreement with the Independent Certifier in connection with the Project.

25.2 Role of Independent Certifier

(a) The general role, obligations and functions of the Independent Certifier are described in Schedule 6 – Independent Certifier Agreement (subject to the amendments agreed to such agreement pursuant to the Belfast MSF Expansion Variation).

25.3 Changes to Terms of Appointment

(a) Neither the City nor Project Co shall without the other's prior written approval:

(i) waive, settle, compromise or otherwise prejudice any rights or claims which the other may from time to time have against the Independent Certifier; or

(ii) vary the terms of the Independent Certifier Agreement or the services performed or to be performed by the Independent Certifier.

(b) The Parties shall perform their respective obligations arising under or in connection with the Independent Certifier Agreement.

25.4 Right to Change Appointment

(a) The Parties agree that the Independent Certifier shall not provide any services or reports or other information to Project Co, the Lenders, the Project Co Parties or any other person other than pursuant to the performance of the functions of the Independent Certifier under this Project Agreement unless agreed to in writing by both Parties. The Parties may agree to terminate the Independent Certifier Agreement upon 30 days notice to the Independent Certifier. If such notice is given, then, pursuant to Section 25.7, a new Independent Certifier will be appointed. The Parties agree that, notwithstanding the 30 days' notice of termination, the Independent Certifier shall continue on a day-to-day basis thereafter until a new Independent Certifier is appointed.

25.5 Cooperation

(a) The Parties agree to cooperate with each other generally in relation to all matters within the scope of or in connection with the Independent Certifier Agreement. All instructions and representations issued or made by either of the Parties to the Independent Certifier shall be simultaneously copied to the other and both Parties shall be entitled to attend all inspections performed by or meetings involving the Independent Certifier.

25.6 Payment of Independent Certifier

(a) Project Co and the City shall share equally the responsibility for the payment of all fees and costs of the Independent Certifier.

25.7 Replacement

(a) In the event of the Independent Certifier's engagement being terminated otherwise than for full performance, the Parties shall liaise and cooperate with each other in order to appoint a replacement consultant to act as the Independent Certifier as soon as reasonably practicable. The identity of any such replacement shall be as agreed by the Parties and the terms of his/her appointment shall, unless otherwise agreed, be as set out in the Independent Certifier Agreement.

(b) In the event the Parties fail to agree upon the identity of a replacement Independent Certifier within 5 Business Days of the original Independent Certifier's appointment being terminated, then a replacement Independent Certifier shall be chosen as follows:

(i) each Party shall, within 5 Business Days thereafter, select 3 suitably qualified and experienced replacements that would be acceptable to that Party, and shall provide notice thereof to the other Party, with a ranking of preference for replacements;

(ii) if the Parties have both selected a common replacement, then such common replacement shall be the Independent Certifier, and if there is more than one

common replacement, then the common replacement with the highest overall ranking (calculated by adding together the ordinal rank assigned by both Parties) shall be selected, and in the event of a tie, the lowest-cost of such tied replacements shall be selected; and

(iii) if the Parties have not selected a common replacement, then the determination of the new replacement may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

26. COMMISSIONING AND COMPLETION

26.1 Commissioning Activities

(a) Project Co shall perform all Project Co Commissioning, and shall support and facilitate the performance of all required commissioning by the City, as set forth in this Section 26 and in Schedule 14 – Commissioning in respect of Milestone Acceptance, Substantial Completion, Revenue Service Availability and Final Completion, as applicable.

(b) Project Co shall perform or cause to be performed all matters to ensure that Revenue Service Availability is achieved by the Required Revenue Service Availability Date.

26.2 Milestone Acceptance Certificate, Substantial Completion Certificate and Revenue Service Availability Certificate

(a) Project Co shall give the Independent Certifier and the City Representative at least 10 Business Days' notice prior to the date upon which Project Co anticipates all requirements for a Milestone Acceptance, Substantial Completion or Revenue Service Availability, as applicable, shall be satisfied.

(b) Project Co shall give the Independent Certifier and the City Representative notice:

(i) (the "**Milestone Acceptance Notice**") upon the satisfaction of all requirements for a Milestone Acceptance;

(ii) (the "**Substantial Completion Notice**") upon the satisfaction of all requirements for Substantial Completion; or

(iii) (the "**Revenue Service Availability Notice**") upon the satisfaction of all requirements for Revenue Service Availability,

which Milestone Acceptance Notice, Substantial Completion Notice, or Revenue Service Availability Notice, as applicable, shall describe, in reasonable detail, the satisfaction of the requirements for the relevant Milestone Acceptance, Substantial Completion, or Revenue Service Availability, together with Project Co's opinion as to whether the conditions for issuance of the Milestone Acceptance Certificate, Substantial Completion Certificate, or Revenue Service Availability Certificate have been satisfied.

(c) The City shall, within 5 Business Days after receipt of a Milestone Acceptance Notice, Substantial Completion Notice or Revenue Service Availability Notice provide the Independent Certifier and Project Co with the City's opinion as to whether the conditions for issuance of the Milestone Acceptance Certificate, Substantial Completion Certificate or Revenue Service Availability Certificate have been satisfied and, if applicable, any reasons as to why it considers that the Milestone Acceptance Certificate, Substantial Completion Certificate, or Revenue Service Availability Certificate should not be issued.

(d) Within 5 Business Days after Project Co's receipt of the City's opinion pursuant to Section 26.2(c), the Parties shall cause the Independent Certifier to determine whether the conditions for issuance of the Milestone Acceptance Certificate, Substantial Completion Certificate, or Revenue Service Availability Certificate have been satisfied, having regard for the opinions of both Project Co and the City, and in the case of Milestone Acceptance or Substantial Completion to determine whether any Minor Deficiencies exist, if applicable, and to issue to the City and to Project Co either:

(i) the relevant Milestone Acceptance Certificate, the Substantial Completion Certificate or the Revenue Service Availability Certificate setting out in such certificate the relevant Milestone Acceptance Date, the Substantial Completion Date or the Revenue Service Availability Date, as applicable, and the Minor Deficiencies List (if applicable) in accordance with Section 26.4; or

(ii) a report detailing the matters that the Independent Certifier considers are required to be performed by Project Co to satisfy the conditions for issuance of the Milestone Acceptance Certificate, the Substantial Completion Certificate, or the Revenue Service Availability Certificate.

(e) Where the Independent Certifier has issued a report in accordance with Section 26.2(d)(ii) and Project Co has not referred a Dispute in relation thereto for resolution in accordance with Schedule 27 – Dispute Resolution Procedure, Project Co shall, within 5 Business Days after receipt of such report, provide the Independent Certifier and the City Representative with:

(i) a detailed list indicating the rectification actions proposed for all matters raised in such report;

(ii) the schedule for completion of all such rectification actions; and

(iii) any additional Project Co Commissioning that needs to be undertaken as a result of the rectification actions, and Project Co shall perform all such additional rectification actions and Project Co Commissioning in a timely manner. Upon completion thereof, Project Co may give a further Milestone Acceptance Notice, a further Substantial Completion Notice, or a further Revenue Service Availability Certificate and Sections 26.2(c) to (e), inclusive, shall be repeated until the Milestone Acceptance Certificate, the Substantial Completion Certificate, or the Revenue Service Availability Certificate has been issued.

(f) The Independent Certifier's decision to issue or not to issue a Milestone Acceptance Certificate, or the Revenue Service Availability Certificate shall be final and binding on the Parties solely in respect of determining the relevant payment date, and a Dispute in relation to a Milestone Payment Date, or the Revenue Service Availability Payment Date shall not be subject to resolution pursuant to Schedule 27 – Dispute Resolution Procedure, provided, however, that any other Dispute in relation to the Independent Certifier's decision to issue or not to issue a Milestone Acceptance Certificate, the 2017 Readiness Certificate, the Substantial Completion Certificate, the Revenue Service Availability Certificate or the Final Completion Certificate may be referred for resolution pursuant to the Dispute Resolution Procedure.

26.3 Countdown Notice for Milestones and Substantial Completion

(a) Project Co shall deliver a notice (a "**Countdown Notice**") to the City and the Independent Certifier specifying the date with respect to each Milestone on which Project Co anticipates the Milestone Acceptance to occur (the "**Anticipated Milestone Acceptance Date**") in relation to the Scheduled Milestone Acceptance Date for such Milestone.

(b) Project Co shall also deliver a Countdown Notice to the City and the Independent Certifier specifying the date on which Project Co anticipates that Substantial Completion will be achieved (the "**Anticipated Substantial Completion Date**") in relation to the Scheduled Substantial Completion Date.

(c) The Countdown Notice with respect to subparagraph (a) or subparagraph (b) shall be delivered not less than 60 days prior to the Anticipated Milestone Acceptance Date or the Anticipated Substantial Completion Date, as the case may be. If Project Co fails to deliver the Countdown Notice not less than 60 days prior to the Scheduled Milestone Acceptance Date or the Scheduled Substantial Completion Date, as the case may be, the Anticipated Milestone Acceptance Date or the Anticipated Substantial Completion Date, as the case may be, shall be deemed to be the same date as the Scheduled Milestone Acceptance Date or the Scheduled Substantial Completion Date, as applicable.

(d) In accordance with Section 22.4(a), any Anticipated Milestone Acceptance Date shall not be earlier than the Scheduled Milestone Acceptance Date of the relevant Milestone, without the prior written consent of the City, in its Discretion.

26.4 Minor Deficiencies

(a) In the event that Minor Deficiencies exist when Project Co gives a Substantial Completion Notice, the Independent Certifier, in consultation with Project Co and the City, shall, within 15 Business Days of Project Co's application, prepare a list of all Minor Deficiencies (a "**Minor Deficiencies List**") identified at that time and an estimate of the cost and the time for rectifying such Minor Deficiencies.

(b) The Minor Deficiencies List will contain the schedule for the completion and rectification of the Minor Deficiencies. In determining the relevant time for rectifying Minor

Deficiencies, Project Co shall schedule the completion and rectification of Minor Deficiencies so as to minimize, to the greatest extent reasonably possible, any lane or track closures, traffic diversions or restrictions or other impairment of the public's use and enjoyment of the System or the relevant portion thereof, or disruption of the Project Scope or of the operations of the City, any City Party, any Governmental Authority or any Other Contractor, including the performance of the Governmental Activities and the Other Works, and otherwise in accordance with the Traffic and Transit Management Plan.

(c) The Independent Certifier must prepare the Minor Deficiencies List before the Substantial Completion Certificate is issued, but shall not withhold the Substantial Completion Certificate by reason solely that there are Minor Deficiencies.

(d) The City may, in its Discretion, waive any requirement for Substantial Completion, and the failure to meet any such requirement shall constitute a Minor Deficiency.

26.5 Rectification of Minor Deficiencies

(a) Project Co shall, in consultation with the City Representative and so as to minimize, to the greatest extent reasonably possible, any lane or track closures, traffic diversions or restrictions or other impairment of the public's use and enjoyment of the System or any portion thereof or disruption of the Project Scope or of the activities of the City, any City Party, any Governmental Authority or any Other Contractor, including the performance of the Governmental Activities and the Other Works, and otherwise in accordance with the Traffic and Transit Management Plan, complete and rectify all Minor Deficiencies within 180 days of the issuance of the applicable Minor Deficiencies List or such other period as the Independent Certifier may specify in the Minor Deficiencies List.

(b) Project Co acknowledges and agrees that the completion and rectification of Minor Deficiencies may require work outside of normal working hours in order to accommodate the efficient operation of the System or any portion thereof and to ensure compliance with the Traffic and Transit Management Plan.

26.6 Failure to Rectify Minor Deficiencies

(a) If Project Co has failed to complete and rectify any Minor Deficiency specified in any Minor Deficiencies List:

(i) within 60 days of the issuance of the applicable Minor Deficiencies List for the related Minor Deficiencies where no time for rectification or completion has been specified by the Independent Certifier, or

(ii) within 30 days after the time for completion and rectification of any Minor Deficiency where such a time has been specified in applicable Minor Deficiencies List by the Independent Certifier,

the City may:

(iii) withhold from the next payment or payments otherwise due to Project Co a holdback amount that is 200% of the amount estimated by the Independent Certifier for the City to complete and rectify all such Minor Deficiencies (to the extent then outstanding), which holdback shall be held in an interest bearing account; and

(iv) engage others to perform the work necessary to complete and rectify any such Minor Deficiency, at the risk and cost of Project Co, and the City may deduct such cost from the holdback amount and interest earned thereon.

(b) Upon completion and rectification of each Minor Deficiency, the City shall release to Project Co the amount of the holdback related to such Minor Deficiency. Upon completion and rectification of all Minor Deficiencies, the City shall release to Project Co the then remaining amount of the holdback, together with all interest accrued thereon. If the cost of such completion and rectification exceeds the amount of such holdback and interest, then Project Co shall reimburse the City for all such excess cost.

26.7 Revenue Service Availability

(a) Project Co shall deliver Revenue Service Availability Notice to the City and the Independent Certifier on or before 180 days prior to the Revenue Service Availability Date (the "**Required Notification Date**") confirming whether or not Revenue Service Availability shall occur by the Required Revenue Service Availability Date. If Project Co fails to deliver Revenue Service Availability Notice on or before the Required Notification Date, it shall be deemed to be a notification that Revenue Service Availability will not be achieved by the Required Revenue Service Availability Date. In the event that Project Co shall provide Revenue Service Availability Notice to the City on or before the Required Notification Date that Revenue Service Availability shall occur by the Required Revenue Service Availability Date, but Project Co shall determine following such notification that Revenue Service Availability shall not occur on or before the Required Revenue Service Availability Date, Project Co shall notify the City in writing in respect thereof (the "**Subsequent Notice**").

(b) In the event that Project Co provided the Revenue Service Availability Notice to the City on or before the Required Notification Date that Revenue Service Availability shall occur by the Required Revenue Service Availability Date but Revenue Service Availability does not occur by the Required Revenue Service Availability Date (whether or not Project Co sent a Subsequent Notice to the City), the City shall be entitled to an amount of $ on account of Liquidated Damages and Project Co shall pay such Liquidated Damages to the City. Such amount of Liquidated Damages shall constitute the City's sole recourse against Project Co in respect of a failure to achieve Revenue Service Availability by the Required Revenue Service Availability Date.

(c) If the Revenue Service Availability Notice (or a deemed notification or a Subsequent Notice pursuant to Section 26.7(a)) is provided that Revenue Service Availability will not

be achieved by the Required Revenue Service Availability Date, Project Co shall deliver a Notice to the City as soon as possible thereafter and in any event before the end of the second month following the Required Notification Date as to the date on, which Revenue Service Availability shall occur (the "**Proposed Date**"), which Proposed Date shall be at least one month plus the number of days to the first Monday after such one month period (the "**Minimum Subsequent Time**") following the Required Revenue Service Availability Date (or such earlier date as shall be approved by the City in its Discretion) and which Proposed Date shall require the approval of the City within a period of 10 Business Days thereafter. Failure by the City to provide a response, either positive or negative, shall imply approval by the City. In the event that the City does not approve the Proposed Date, the Proposed Date shall be as mutually agreed upon between Project Co and the City, each acting reasonably, as soon as possible thereafter, and failing agreement within a period of 10 Business Days, the Proposed Date shall be determined by the Dispute Resolution Procedure outlined in Schedule 27 – Dispute Resolution Procedure (which Proposed Date shall in any event be at least the Minimum Subsequent Time following the Required Revenue Service Availability Date) and take into account the City's operating booking and scheduling requirements. A Proposed Date determined in accordance with this Section 26.7 is herein referred to as the "**New Required Revenue Service Availability Date**".

(d) In the event that Revenue Service Availability is not achieved on or before the New Required Revenue Service Availability Date (as may be extended by a Delay Event) the procedure set out in Section 26.7(c) respecting the resetting of a New Required Revenue Service Availability Date shall be repeated (and such procedure shall continue to be repeated, if necessary). The Independent Certifier shall not withhold issuance of the Revenue Service Availability Certificate by reason solely that there are Minor Deficiencies.

(e) In the event that Revenue Service Availability is not achieved on or before the New Required Revenue Service Availability Date, the Liquidated Damages to which the City shall be entitled shall be the sum of $ following the New Required Revenue Service Availability Date to and including the reset New Required Revenue Service Availability Date, provided that Revenue Service Availability is achieved by such reset New Required Revenue Service Availability Date. Such amount of Liquidated Damages shall constitute the City's sole recourse against Project Co in respect of a failure to achieve Revenue Service Availability by the New Required Revenue Service Availability Date.

(f) In the event that there is a Dispute concerning Revenue Service Availability and such Dispute is ongoing, the City shall not be entitled to payment of Liquidated Damages unless and until such Dispute is resolved in accordance with the Dispute Resolution Procedure outlined in Schedule 27 – Dispute Resolution Procedure and, if resolved in favour of the City, the provisions, respecting Liquidated Damages contained in this Section 26.7 shall apply with retroactive effect, except that there shall be added to the amount payable by Project Co on account of Liquidated Damages, interest at the rate of 2 percent per annum from the date the Liquidated Damages were required to be paid in the absence of the Dispute to the date of payment.

(g) The payment of any amount of Liquidated Damages pursuant to Section 26.7 shall not reduce the maximum amount of liability of Project Co as provided for in Section 57.4.

26.8 Final Completion Certificate

(a) Project Co shall give the Independent Certifier and the City Representative at least 10 Business Days' notice prior to the date upon which Project Co anticipates all requirements for Final Completion shall be satisfied.

(b) Project Co shall give the Independent Certifier and the City Representative notice (a "**Final Completion Notice**") upon the satisfaction of all requirements for Final Completion, which Final Completion Notice shall describe, in reasonable detail, the satisfaction of the requirements for Final Completion, including the completion and rectification of all Minor Deficiencies, the time required for completion of all outstanding seasonal work, together with Project Co's opinion as to whether the conditions for issuance of the Final Completion Certificate have been satisfied.

(c) The City shall, within 5 Business Days after receipt of the Final Completion Notice, provide the Independent Certifier and Project Co with the City's opinion as to whether the conditions for issuance of the Final Completion Certificate have been satisfied and, if applicable, any reasons as to why it considers that the Final Completion Certificate should not be issued.

(d) Within 5 Business Days after Project Co's receipt of the City's opinion pursuant to Section 26.8(c), the Parties shall cause the Independent Certifier to determine whether the conditions for issuance of the Final Completion Certificate have been satisfied, having regard for the opinions of both Project Co and the City, and to issue to the City and to Project Co either:

(i) the Final Completion Certificate, setting out in such certificate the Final Completion Date, as applicable; or

(ii) a report detailing the matters that the Independent Certifier considers are required to be performed by Project Co to satisfy the conditions for issuance of the Final Completion Certificate, including any items on the Minor Deficiencies List which remain outstanding.

(e) Where the Independent Certifier has issued a report in accordance with Section 26.8(d)(ii) and Project Co has not referred a Dispute in relation thereto for resolution in accordance with Schedule 27 – Dispute Resolution Procedure, Project Co shall, within 5 Business Days after receipt of such report, provide the Independent Certifier and the City Representative with:

(i) a detailed list indicating the rectification actions proposed for all matters raised in such report;

(ii) the schedule for completion of all such rectification actions;

(iii) any additional Project Co Commissioning that needs to be undertaken as a result of the rectification actions, and

(iv) and Project Co shall perform all such additional rectification actions in a timely manner. Upon completion thereof, Project Co may give a further Final Completion Notice and Sections 26.8(c) to 26.8(e), inclusive, shall be repeated until the Final Completion Certificate, has been issued.

(f) Any Dispute in relation to the Independent Certifier's decision to issue or not to issue the Final Completion Certificate may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

(g) If, within 30 days after the time specified in the Final Completion Notice for completion of seasonal work, Project Co has failed to complete such seasonal work, the City may engage others to perform the work necessary to complete the seasonal work, at the risk and cost of Project Co. Project Co shall pay to the City the costs incurred by the City to complete such seasonal work within 10 Business Days of presentation of an invoice for such costs.

26.9 Effect of Certificates/Use

(a) The issue of a Milestone Acceptance Certificate, the Substantial Completion Certificate, the Revenue Service Availability Certificate or the Final Completion Certificate, the commencement of use by the City or the public of any part of the System under the terms of this Project Agreement or the commencement of any Governmental Activities shall, in no way:

(i) limit the obligations of Project Co under this Project Agreement including in respect of any defects, deficiencies or items of outstanding work existing or discovered prior to or after the date of any of such certificates or the date of the Minor Deficiencies List; or

(ii) be construed as an approval by the City of the Design and Construction Works or the way in which they have been carried out.

26.10 [Intentionally deleted]

26.11 Post-Completion Survey

(a) Not more than 90 days after the Final Completion Date, Project Co shall cause an up-to-date topographical and an up-to-date legal survey of the Lands to be completed by a duly qualified surveyor to be delivered to the City.

27. MAINTENANCE SERVICES

27.1 Overall Responsibility

(a) During the Maintenance Term, Project Co shall perform the Maintenance Services in respect of the System:

(i) so as to satisfy the Output Specifications; and

(ii) in accordance with the other terms of this Project Agreement.

(b) Subject to Section 33.1(b), one or more Maintenance Contractors may perform the Maintenance Services in respect of the System. Project Co may itself or through Subcontracts perform minor aspects of the Maintenance Services or such greater portion of the Maintenance Services as the City shall approve in its Discretion.

27.2 Commencement of Maintenance Services

(a) Project Co shall commence the Maintenance Services on the Revenue Service Commencement Date and shall perform the Maintenance Services until the end of the Maintenance Term, taking into account the Timing Principle.

27.3 Equipment for Maintenance Services

(a) Project Co will procure, deliver, install, commission, maintain, repair, decommission, upgrade and replace any equipment required by Project Co to perform the Maintenance Services.

27.4 Price adjustment for Maintenance Services arising from Stage 2 Variations and Stage 2 Integration Activities

(a) If, as a result of the activities carried out by Project Co under the Procurement Support Services Variation and/or the Stage 2 Interface and Design Management Variation, Project Co has notified the City in accordance with the terms of either such Variation that an adjustment to the Fixed Price (as defined in the Stage 2 MOU) is justified under the terms of the Stage 2 MOU and/or a change to the risk allocation under this Agreement is required to leave Project Co in the same commercial position contemplated by the Stage 2 MOU, and such an adjustment or change is either agreed or determined pursuant to the dispute resolution procedures set out in the Stage 2 MOU and/or the relevant Stage 2 Variations, the City shall promptly issue a Variation Enquiry to give effect to such adjustment under this Agreement and the relevant provisions of Schedule 22 - Variation Procedure shall apply except that the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree.

(b) In connection with the integration of the Stage 1 System with the Stage 2 System, including any trial running of any part of the System (the "**Stage 2 Integration Activities**"), the City shall issue a Variation Enquiry:

(i) to the extent that any support is required from Project Co beyond the performance of its obligations under this Agreement;

(ii) to the extent that any other change is required to, or any interference will occur to, the performance by Project Co of its obligations under this Agreement as a result of such activities; or

(iii) to the extent the proposed methodology for testing, commissioning and certification of such activities differs from the arrangements set out in Schedule 14 – Testing and Commissioning of the DB Co Works Agreement,

and the relevant provisions of Schedule 22 - Variation Procedure shall apply except that the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree.

27.5 Impact of Trial Running

(a) In this Section, the "**Variation Trigger Date**" is each of:

(i) the date falling sixteen weeks after the Stage 2 East Substantial Completion Date (the "**East Trigger Date**"); and

(ii) the date falling sixteen weeks after the Stage 2 West Substantial Completion Date (the "**West Trigger Date**").

(b) If the Stage 2 East Revenue Service Commencement Date occurs after the East Trigger Date or the Stage 2 West Revenue Service Commencement Date occurs after the West Trigger Date (and in each case, to the extent the delay has not been caused by Project Co or any Project Co Party, other than as a result of any act or omission of Project Co or a Project Co Party that forms part of the performance of any Stage 2 Integration Activities instructed pursuant to a Variation Enquiry under Section 27.4(b)), the City will issue a Variation Enquiry to ensure that Project Co is left in a no better and no worse position than it would have been had the DBF Warranty Period (as defined in the DB Co Interface Agreement) been for a period of two years from the Stage 2 East Revenue Service Commencement Date or the Stage 2 West Revenue Service Commencement Date, as the case may be, less a period of 16 weeks, and the relevant provisions of Schedule 22 - Variation Procedure shall apply, except that the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree.

(c) The City agrees that it will ensure that the Stage 2 East Revenue Service Commencement Date and the Stage 2 West Revenue Service Commencement Date start within 6 weeks of the completion of Trial Running (as defined in the DB Co Works Agreement) on the Stage 2 East System or the Stage 2 West System, as the case may be.

28. HUMAN RESOURCES

28.1 Subcontractors

(a) Project Co shall defend and indemnify the City from all claims, loss or damages arising out of or in connection with Project Co's contracts with any and all Subcontractor(s) and any related Subcontractor labour agreements in accordance with the provisions of the Project Agreement.

28.2 Admittance of Personnel

(a) The City shall have the right to order the removal from the Lands, the Highway Site, the System and/or the Highway of any person employed by (or acting on behalf of) Project Co, or any Project Co Party, whose presence, in the reasonable opinion of the City is likely to have an adverse effect on the Other Works or the Governmental Activities or who, in the reasonable opinion of the City is not a fit and proper person to be at the Lands, the Highway Site, the System and/or the Highway for any reason, including a failure to comply with any of the City's policies or any immediate obligation of the City to ensure the safety and well being of persons at the Highway Site, the System and/or the Highway.

28.3 Confirmation of Action

(a) Any action taken under Section 28.2 shall promptly be confirmed by the City to Project Co and, for greater certainty, shall not relieve Project Co of any of its obligations under this Project Agreement.

28.4 Finality as to Admission

(a) Any decision of the City made pursuant to Section 28.2 shall be final and conclusive.

28.5 Staff Competency

(a) Project Co shall ensure that:

(i) there shall at all times be a sufficient number of persons employed or engaged by Project Co or any Project Co Party (including all relevant grades of supervisory staff) engaged in the performance of the activities within the Project Scope with the requisite level of skill and experience to perform the activities within the Project Scope in accordance with this Project Agreement. For greater certainty, this obligation shall include ensuring that there are a sufficient number of such skilled and experienced persons employed or engaged by Project Co or any Project Co Party to complete the Works and the Highway Work in accordance with the Works Schedule and the Highway Construction Schedule and to cover periods of holiday, sickness, other absence, and anticipated and actual peaks in the Maintenance Services;

(ii) all persons employed or engaged by Project Co or any Project Co Party (including all relevant grades of supervisory staff) engaged in the provision of the activities within the Project Scope receive such training and supervision as is necessary to ensure the proper performance of this Project Agreement and compliance with all health and safety rules, procedures and requirements and Authority Requirement;

(iii) it creates and maintains, and causes all Project Co Parties to create and maintain, a process which allows it to assess, monitor and correct, on an ongoing basis, the competency of persons employed or engaged by Project Co or any Project Co Party (including all relevant grades of supervisory staff) engaged in the provision of the activities within the Project Scope to ensure the proper performance of this Project Agreement.

(b) Project Co shall ensure all Project Co Parties establish and provide formal training programs and certification for the staff of Project Co and of all Project Co Parties required to be certified to perform specific tasks related to the Maintenance Services as required by any provincial or federal regulatory body including but not limited to training of Maintenance personnel regarding the Maintenance and repair of the Vehicles. All training programs and activities will be designed, developed, and implemented in accordance with established professional standards for performance based development. Project Co shall ensure all Project Co Parties consider all suggestions provided by the City to improve the training by Project Co and all Project Co Parties; however, the final decision on any training program is the responsibility of Project Co and the relevant Project Co Parties. Project Co shall ensure the relevant Project Co Parties, upon the City's request, provide training program materials to the City for filing with regulatory agencies as and when required. All such training program materials or other documentation provided by Project Co and the relevant Project Co Parties shall be provided in both paper and digital formats, and shall be written in English.

(c) Project Co and all Project Co Parties shall be responsible for the cost of all training and certification for Employees.

28.6 Human Resources Policies

(a) Project Co shall ensure that there are set up and maintained by it and by all Project Co Parties, human resources policies and procedures covering all relevant matters relating to the Project Scope (including, for example, health and safety). Project Co and all Project Co Parties shall ensure that the terms and the implementation of such policies and procedures comply with Applicable Law, Authority Requirement and Good Industry Practice (Works) and Good Industry Practice (Highway Work) and that they are published in written form and that copies of them (and any revisions and amendments to them) are available to the City on a timely basis.

28.7 Governmental Authority

(a) Project Co shall ensure that it and all Project Co Parties comply at all times with any regulations, policies or directions set by any Governmental Authority related to labour, employment and/or human resources.

28.8 City Human Resources Policies

(a) The City may, by written notice, require that Project Co or any Project Co Party comply with a specified Human Resources Policy of the City.

(b) Project Co may, within 90 days of receiving such notice, notify the City, in writing, that compliance with such City Policy necessitates a change in the Expanded Output Specifications or increases the Direct Costs to Project Co of providing the Maintenance Services. Within 30 Business Days of receipt of such notice, the City shall respond to Project Co indicating whether or not it agrees that compliance with the Policy necessitates a change in the Expanded Output Specifications or increases the Direct Costs to Project Co of providing the Maintenance Services. If it does agree, the City shall initiate the procedure set out in Schedule 22 – Variation Procedure as soon as reasonably practicable. If it does not agree, the matter may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

28.9 Convictions

(a) Project Co (to the extent permitted by Applicable Law) shall cause each Project Co Party to, ensure that all potential employees (including, for greater certainty, permanent, temporary, full-time and part-time employees) and persons who may otherwise perform any of the Maintenance Services:

(i) are questioned concerning their Relevant Convictions; and

(ii) are required to complete and deliver to Project Co a criminal records search form.

28.10 Effect of Convictions

(a) Project Co (to the extent permitted by Applicable Law) shall, and shall cause each Project Co Party to, ensure that no person who discloses any Relevant Convictions, or who is found to have any Relevant Convictions following the completion of a criminal records search, or of which Project Co or a Project Co Party is aware or ought to be aware, is allowed access to the Site and/or the System to perform any of the Maintenance Services, without the prior written consent of the City, in its Discretion.

28.11 Notification of Convictions

(a) To the extent permitted by Applicable Law, Project Co shall ensure that the City is kept advised at all times of any person employed or engaged by Project Co or any Project Co Party in the provision of any of the Maintenance Services who, subsequent to the commencement of such employment or engagement, receives a Relevant Conviction of

which Project Co or a Project Co Party becomes aware or whose previous Relevant Convictions become known to Project Co or a Project Co Party. Project Co shall use commercially reasonable efforts to obtain, or to cause all Project Co Parties to obtain, all consents as may be required by Applicable Law or otherwise authorizing the disclosure of such information to the City as contemplated in this Section 28.

28.12 Disciplinary Action

(a) The City, acting reasonably, may notify Project Co of any Project Co or Project Co Party employee who engages in misconduct or is incompetent or negligent in the performance of duties or whose presence or conduct on the Lands or at work is otherwise considered by the City to be undesirable, or to constitute a threat to the health and/or safety of any of the users of the Lands and/or the System Users or which the City considers may potentially compromise the reputation or integrity of the City and/or any City Party or the nature of the City or the Project, so as to negatively affect public perception of the City or the Project. Upon investigation, Project Co shall institute, or cause the relevant Project Co Party to institute, appropriate disciplinary proceedings, which shall be in accordance with the requirements of Applicable Law, and shall advise the City in writing of the outcome of any disciplinary action taken in respect of such person.

28.13 Additional Employment Obligations

(a) Project Co shall ensure all Project Co Parties comply with all other employment obligations as specified in Schedule 15-3 – Maintenance and Rehabilitation Requirements, including, and in particular, the obligations set out in Article 5, Security.

28.14 Maintenance Services

(a) Project Co will initially recognize, or cause the relevant Project Co Party to recognize, the Amalgamated Transit Union as the bargaining agent for those employees engaged in the Light Rail Transit Vehicle Maintenance Services (as defined in Appendix B of the City's collective agreement with the Union).

(b) Project Co or the relevant Project Co Party will negotiate in an effort to fix the terms and conditions of employment for those employees engaged in the Light Rail Transit Vehicle Maintenance Services with the Amalgamated Transit Union.

(c) All collective agreements applicable to Project Co or the relevant Project Co Party, engaged in the Light Rail Transit Vehicle Maintenance Services, will be resolved via final and binding interest arbitration.

(d) Within sixty (60) days of Financial Close, Project Co shall ensure that the Maintenance Contractor will make application to become an "**Associated Municipal Employer**" for the purposes of allowing members of the contractor's bargaining unit to participate in the pension plan established pursuant to the *Ontario Municipal Employees Retirement System Act*, R.S.O., c.029. The City agrees to support any such application for Associated Municipal Employer status.

28.15 Management Organization

(a) Project Co shall provide, and shall ensure that all Project Co Parties provide, to the City, as required to keep such information current, the names of the management teams responsible for the performance of the activities within the Project Scope.

29. VEHICLE COMPONENT, CONSUMABLES AND MATERIALS

29.1 Standards

(a) Project Co shall cause the Vehicle Component, consumables and materials used or supplied by it or any Contractor or Subcontractor in connection with the Project Scope to be:

(i) of good quality, fit for their intended purpose and maintained in a safe, serviceable and clean condition in accordance with the Output Specifications and Good Industry Practice (Works);

(ii) of the type specified in the Output Specifications, if applicable; and

(iii) in compliance with all Applicable Law,

and shall, as soon as practicable after receiving a request from the City Representative, supply to the City Representative evidence to demonstrate its compliance with this Section 29.1(a).

29.2 Stocks

(a) Project Co shall cause sufficient stocks of goods, consumables, equipment and materials including those in connection with the Vehicles to be held in compliance with its obligations under this Project Agreement.

29.3 Vehicle Working Drawings

(a) Subject to Schedule 15 – Output Specifications, commencing on Financial Close, Project Co shall proceed to prepare detailed plans and specifications sufficient to obtain all permits required by all Relevant Authorities necessary to Construct the Vehicle Component:

(i) in conformity with the Vehicle Drawings; and

(ii) in accordance with and as more particularly described in the Output Specifications, and as may be amended from time to time in accordance with this Project Agreement;

(the "**Vehicle Working Drawings**").

29.4 Vehicle Construction

(a) Upon the completion of the Vehicle Working Drawings Project Co shall construct the Stage 1 Vehicles and the Vehicle Equipment for the Stage 1 Vehicles in accordance with the Vehicle Working Drawings and the Project Scope and Output Specifications.

29.5 Bill of Sale and Warranties for Vehicles

(a) Project Co shall execute and deliver to the City a bill of sale for the Vehicles, in form and content satisfactory to the City (the "**Bill of Sale**") on the Milestone Acceptance Date of a Vehicle Milestone, and where Project Co does not select a Vehicle Milestone, on the Substantial Completion of the Vehicle Component, in which Project Co:

(i) represents and warrants that:

(A) Project Co is at the time of the delivery of such Bill of Sale rightfully and absolutely entitled to the Vehicles;

(B) Project Co at such time has good right, title and authority to grant, bargain, sell, assign, transfer, convey and set over to the City the Vehicles; and

(C) the City shall immediately on the execution and delivery of such Bill of Sale have possession of and peaceably and quietly have, hold, possess and enjoy the Vehicles to and for its own use and benefit without any manner of hindrance, interruption, molestation, claim or demand whatsoever of, from or by Project Co or any person whomsoever and with good title thereto, free and clear and absolutely released and discharged from and against all former and other bargains, sales, gifts, grants, mortgages, pledges, security interests, adverse claims, liens, charges and encumbrances of any nature or kind whatsoever;

(ii) grants, bargains, sells, assigns, transfers, conveys and sets over to the City absolutely, all of Project Co's right, title and interest in and to the Vehicles, subject to the provisions of Schedule 41 – Intellectual Property; and

(iii) covenants and agrees with the City that it will from time to time and at all times at Project Co's expense, on every reasonable request of the City make, do and execute or cause and procure to be made, done and executed all further acts, deeds or assurances as may be reasonably required by the City, whether for more effectually and completely vesting in the City the Vehicles in accordance with the terms of such Bill of Sale or for the purpose of registration or otherwise.

(b) On the Milestone Acceptance Date of a Vehicle Milestone, and where Project Co does not select a Vehicle Milestone, on the Substantial Completion of the Vehicle Component, Project Co shall provide the City with access to and copies of the Vehicle manuals, certificates, log books and other applicable records relating to the relevant Vehicles in the possession or control of Project Co. All such manuals, certificates, log books and records will be maintained by Project Co at the MSF administration building.

(c) On the Milestone Acceptance Date of a Vehicle Milestone, and where Project Co does not select a Vehicle Milestone, on the Substantial Completion of the Vehicle Component, Project Co shall obtain the warranties with respect to the relevant Vehicles contained in Schedule 34 - Vehicle and Fixed Equipment Warranties.

29.6 Vehicle Canadian Content Certification

(a) On the Milestone Acceptance Date of a Vehicle Milestone and where Project Co does not select a Vehicle Milestone, on the Substantial Completion of the Vehicle Component if not delivered pursuant to Section 34.1(e), Project Co shall deliver to the City the Canadian Content Certificate updated with effect as of the Milestone Acceptance Date, which shall:

(i) demonstrate that the Vehicles meet the Canadian Content Requirements;

(ii) include any necessary or desirable back-up information reasonably necessary to support the contents thereof and to address the requirements of the Canadian Content Policy;

(iii) be true and correct in all material respects; and

(iv) be in form and content satisfactory to the City.

29.7 Vehicle Option

(a) Project Co and the City shall comply with the provisions of Schedule 35 – Additional Vehicles.

29.8 Extension and Additional Phases

(a) Project Co and the City shall comply with the provisions of Schedule 38 – Extension and Additional Phases.

30. DAMAGE AND DESTRUCTION

30.1 Restoration and Reinstatement of Damage or Destruction

(a) Unless this Project Agreement is terminated in accordance with its terms (including under Section 45.3, Section 47.1, Section 47.2 or Section 47.3), if all or any part of the System is damaged or destroyed, Project Co shall, at its own cost and expense, repair or replace, as applicable, the System or such part of the System, as applicable (the "**Reinstatement Work**") promptly and in any event as soon as practicable in the circumstances. Except as otherwise expressly provided in this Project Agreement, damage to or destruction of all or any part of the System shall not terminate this Project Agreement or relieve Project Co of any of its obligations hereunder or entitle Project Co to any compensation from the City.

30.2 Reinstatement Plan

(a) If the Reinstatement Work is reasonably estimated to cost more than $10,000,000 (index linked) or in any other case where the City Representative, having regard to the nature of the damage or destruction, notifies Project Co that a Reinstatement Plan is required (excluding where the damage or destruction occurs before the Final Completion Date and the City Representative acting reasonably considers that the continued application of the Design and Certification Procedure would be able to adequately address the Reinstatement Work without the need for a separate Reinstatement Plan), Project Co shall, as soon as practicable and in any event within 20 Business Days after the occurrence of the damage or destruction or receipt of notification from the City Representative, as the case may be, (or if, with the exercise of all due diligence more than 20 Business Days is reasonably required for such purposes, then within such longer period of time after the occurrence of such damage or destruction or receipt of notification from the City Representative, as the case may be, as may be reasonably required with the exercise of all due diligence, provided Project Co exercises and continues to exercise all such due diligence) submit to the City Representative pursuant to Schedule 10 – Review Procedure a plan (a "**Reinstatement Plan**") prepared by Project Co for carrying out the Reinstatement Work setting out, in reasonable detail, *inter alia*:

(i) a description of the Reinstatement Work required to restore, replace and reinstate the damage or destruction;

(ii) Project Co's proposed schedule for the execution of the Reinstatement Work; and

(iii) the information required pursuant to Schedule 22 – Variation Procedure as if such plan were an Estimate;

and the Reinstatement Work must not be commenced until the City Representative consents thereto in accordance with Schedule 10 – Review Procedure except to the extent necessary to address any emergency or public safety needs.

30.3 Conduct of Reinstatement Work

(a) Project Co shall cause the Reinstatement Work to be carried out in accordance with the relevant part of the Expanded Output Specifications and all other applicable requirements under this Project Agreement and, where applicable, in accordance with the Reinstatement Plan consented to by the City Representative in accordance with Schedule 10 – Review Procedure. All designs, plans and specifications in respect of the Reinstatement Work shall be subject to the Design and Certification Procedure. If requested by the City Representative, the persons (and if applicable, a suitable parent entity thereof acceptable to the City) retained by Project Co to design and carry out any Reinstatement Work shall, as a condition to their retainer and prior to commencing any Reinstatement Work or design work in connection therewith, enter into a construction contract with Project Co and a direct agreement with the City in substantially the same forms as the Construction Contract and the Contractor's Direct Agreement.

(b) In the event any Insurance Proceeds under Insurance Policies as referred to in Schedule 30 – Insurance Trust Agreement are available to carry out the Reinstatement Work, such Insurance Proceeds shall be paid into the Insurance Trust Account and shall be dispensed in accordance with the provisions of the Insurance Trust Agreement to carry out the Reinstatement Work

30.4 Clarification concerning Insurance Trust Agreement

(a) For the purposes of the Insurance Trust Agreement, the City and Project Co agree that, to the extent the Insurance Trust Agreement contains terms that are defined by reference to this Project Agreement, this shall be taken to refer to such terms as they may be updated from time to time in accordance with this Project Agreement. The City and Project Co shall procure that the Lenders' Agent and the Account Trustee acknowledge and give effect to this agreement in their dealings under the Insurance Trust Agreement.

31. MONITORING

31.1 Monitoring of Performance

(a) Project Co shall monitor the performance of the Maintenance Services in the manner and at the frequencies set out in the Output Specifications and the Payment Mechanism, and shall compile and at all times maintain records which are accurate and complete of such monitoring and performance. In addition to Project Co's obligations as set out in the Output Specifications and the Payment Mechanism, Project Co shall, as reasonably requested by the City, provide the City Representative with relevant particulars of any aspects of Project Co's performance which fail to meet the requirements of this Project Agreement.

(b) The City may, at any and all reasonable times, observe, inspect, monitor, audit and take any steps reasonably necessary to satisfy itself as to the adequacy of the monitoring, including performing sample checks.

31.2 Failure Points

(a) In each Contract Month, Project Co shall measure the performance of the Maintenance Services, and based on the performance of the Maintenance Services in the applicable Contract Month, Failure Points may be awarded in respect of the Maintenance Services in accordance with the Payment Mechanism.

31.3 Warning Notices

(a) Without prejudice to the City's rights under Section 45 and any other rights under this Project Agreement, if Project Co accrues more than the following number of Failure Points in any one Contract Month, then the City may give written notice (a "**Warning Notice**") to Project Co setting out the matter or matters giving rise to such notice and stating that it is a "**Warning Notice**":

(i) 120 Failure Points in respect of Vehicle and System Availability Failures;

(ii) 120 Failure Points in respect of Station Availability Failures; or

(iii) 50 Failure Points in respect of Quality Failures and Service Failures, combined.

31.4 Monitoring Notices

(a) Without prejudice to the City's rights under Section 45 and any other rights under this Project Agreement, if Project Co accrues more than the following number of Failure Points in any rolling 3 Contract Months, the City may, by notice (a "**Monitoring Notice**") to Project Co require Project Co to increase the level of Project Co's monitoring of its own performance of its obligations under this Project Agreement until such time as Project Co shall have demonstrated to the reasonable satisfaction of the City that it is performing, and is capable of continuing to perform, its obligations under this Project Agreement in respect of the relevant Maintenance Services:

(i) 240 Failure Points in respect of Vehicle and System Availability Failures;

(ii) 240 Failure Points in respect of Station Availability Failures; or

(iii) 75 Failure Points in respect of Quality Failures and Service Failures, combined.

(b) The City may give a Warning Notice pursuant to Section 31.3 despite the issuance of a Monitoring Notice in respect of the same matter where a further breach occurs or the original breach has not been remedied within a reasonable period, and whether or not the previous Monitoring Notice remains in effect.

(c) If a Monitoring Notice is given, then:

(i) such Monitoring Notice shall specify in reasonable detail the additional measures to be taken by Project Co in monitoring its own performance;

(ii) if Project Co, acting reasonably, objects to any of the specified measures on the grounds that they are excessive or that the City was not entitled to give the Monitoring Notice, Project Co shall, within 3 Business Days of the receipt of the Monitoring Notice, notify the City in writing of the matters objected to and any changes necessary in order to prevent prejudice to Project Co's performance of its obligations under this Project Agreement;

(iii) if Project Co gives the City a notice under Section 31.4(c)(ii), the measures to be taken by Project Co shall be agreed between the Parties or, in the absence of agreement within 10 Business Days of the City's receipt of such notice, may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure;

(iv) if Project Co fails to increase Project Co's monitoring as provided herein, the City may perform such monitoring save where Project Co, acting in good faith, is pursuing a Dispute pursuant to Section 31.4(c)(iii);

(v) if it is determined in accordance with Schedule 27 – Dispute Resolution Procedure that the City was entitled to give the applicable Monitoring Notice, Project Co shall bear its own costs and reimburse the City for any reasonable costs and expenses incurred by or on behalf of the City in relation to the giving of such Monitoring Notice; and

(vi) if it is determined in accordance with Schedule 27 – Dispute Resolution Procedure that the City was not entitled to give the applicable Monitoring Notice, the City shall bear its own costs and reimburse Project Co for any reasonable costs and expenses incurred by or on behalf of Project Co in relation to the giving of such Monitoring Notice.

(d) In respect of any Monitoring Notice, if Project Co shall have demonstrated to the reasonable satisfaction of the City that Project Co has performed its obligations under this Project Agreement for a period of 90 consecutive days and during such period has not received a Warning Notice or Monitoring Notice in respect of the same or similar Maintenance Services, Project Co may apply for the withdrawal of such Monitoring Notice. If the City is satisfied, acting reasonably, that Project Co has satisfied the aforesaid requirements, it shall, within 10 Business Days of receipt of such application, withdraw such Monitoring Notice and cease to perform or require the performance of the increased monitoring implemented in respect of such Monitoring Notice.

(e) If it is determined in accordance with Schedule 27 – Dispute Resolution Procedure that the City was not entitled to give any Monitoring Notice, the City shall promptly withdraw such Monitoring Notice and cease to perform or require the performance of the increased monitoring implemented in respect of such Monitoring Notice.

32. CITY'S REMEDIAL RIGHTS

32.1 Exercise of Remedial Rights

(a) The City may exercise all rights set out in this Section 32 at any time and from time to time if:

(i) the City, acting reasonably, considers that a breach by Project Co of any obligation under this Project Agreement, or any act or omission on the part of Project Co or any Project Co Party:

(A) does or can reasonably be expected to create a serious threat to the health, safety or security of any person, including any System User, City Party or City Third Party Beneficiary;

(B) does or can reasonably be expected to result in a materially adverse interruption in the Maintenance Services or the availability of the System to System Users;

(C) does or can reasonably be expected to materially prejudice the performance of any Governmental Activities; or

(D) may potentially compromise the reputation or integrity of the City or any City Party or the nature of the City or the Project, so as to negatively affect public perception of the City or the Project,

provided that:

(E) in respect of a breach by Project Co of any obligation under this Project Agreement, or any act or omission on the part of Project Co or any Project Co Party, which can reasonably be expected to cause any of the consequences set out in Sections 32.1(a)(i)(A), 32.1(a)(i)(B) and 32.1(a)(i)(C), the City shall not exercise its rights under this Section 32 unless Project Co has failed to cure the relevant breach, act or omission within 5 Business Days of notice from the City or, if such breach, act or omission cannot reasonably be cured within such 5 Business Day period, Project Co thereafter fails to diligently and continuously pursue such cure and to cure such breach, act or omission within a reasonable period thereafter, provided that Project Co shall not be entitled to a cure period if any of the consequences set out in Sections 32.1(a)(i)(A), 32.1(a)(i)(B) and 32.1(a)(i)(C) actually occur; and

(F) in respect of Section 32.1(a)(i)(D), the City shall not exercise its rights under this Section 32 unless Project Co has failed to cure the relevant breach, act or omission within 5 Business Days of notice from the City or, if such breach, act or omission cannot reasonably be cured within such 5 Business Day period, Project Co thereafter fails to diligently and continuously pursue such cure and to cure such breach, act or omission within a reasonable period thereafter;

(ii) Project Co accrues, in any Contract Month, more than:

(A) 300 Failure Points in respect of Vehicle and System Availability Failures;

(B) 300 Failure Points in respect of Station Availability Failures; or

(C) 150 Failure Points in respect of Quality Failures and Service Failures, combined;

(iii) while a Monitoring Notice is in effect that is not being disputed by Project Co, acting in good faith, Project Co receives a Warning Notice in respect of the same or similar Maintenance Services;

(iv) if, pursuant to Part 5 of Schedule 11 – Quality Management, a Quality Audit that is not being disputed by Project Co, acting in good faith, shows that Project Co has not performed or is not performing its obligations and Project Co has failed to perform the rectification or Maintenance Services as provided in the Output Specifications;

(v) a labour dispute materially affects or can reasonably be expected to materially affect the Project Scope, the Governmental Activities or the availability of the System to System Users;

(vi) the City has received a notice under any Maintenance Contractor's Direct Agreement, if applicable, that entitles the City to exercise step-in rights thereunder; or

(vii) Project Co has failed to comply with any written direction issued by or on behalf of the City.

32.2 Emergency

(a) Notwithstanding that Project Co is not in breach of its obligations under this Project Agreement, the City may exercise all of the rights set out in this Section 32 at any time and from time to time during the Maintenance Term if the City, acting reasonably, considers the circumstances to constitute an Emergency.

32.3 Rectification

(a) Without prejudice to the City's rights under Section 45 and any other rights under this Project Agreement, in any of the circumstances set out in Sections 32.1 or 32.2, the City may, by written notice, require Project Co to take such steps as the City, acting reasonably, considers necessary or expedient to mitigate, rectify or protect against such circumstance, including, if applicable, the termination and replacement of Subcontractors, and Project Co shall use commercially reasonable efforts to comply with the City's requirements as soon as reasonably practicable.

(b) If the City gives notice to Project Co pursuant to Section 32.3(a) and either:

(i) Project Co does not either confirm, within 5 Business Days of such notice or such shorter period as is appropriate in the case of an Emergency or, if applicable, in the event the City is entitled to exercise step-in rights under the Maintenance Contractor's Direct Agreement, that it is willing to take the steps required in such notice or present an alternative plan to the City to mitigate, rectify and protect against such circumstances that the City may accept or reject acting reasonably; or

(ii) Project Co fails to take the steps required in such notice or accepted alternative plan within such time as set out in such notice or accepted alternative plan or within such longer time as the City, acting reasonably, shall think fit,

then the City may take such steps as it considers to be appropriate, acting reasonably, including, if applicable, exercising step-in rights under the Maintenance Contractor's Direct Agreement and requiring the termination and replacement of Subcontractors, either itself or by engaging others (including a third party) to take any such steps, and may perform or obtain the performance of the relevant Maintenance Services to the standards required by this Project Agreement, and the provisions of Section 42 including Section 42.1(a)(iv) and Section 42.2, shall apply. For greater certainty Maintenance

Services performed by Project Co and by Subcontractors from time to time pursuant to the provisions of Section 27.1(b) do not require Project Co or such Subcontractors to enter into a Maintenance Contractor's Direct Agreement in respect of the Maintenance Services that they perform.

(c) Notwithstanding the foregoing provisions of this Section 32.3, in the event of an Emergency, the notice under Section 32.3(a) shall be given as promptly as possible having regard to the nature of the Emergency and the City may, prior to Project Co's confirmation under Section 32.3(b)(i), take such steps as are appropriate having regard to the nature of the Emergency.

(d) Where the City considers it to be necessary to do so, the steps which the City may take pursuant to this Section 32.3 subsequent to the provision of the notice under Section 32.3(a) unless the notice is given at a later time as provided in Section 32.3(c), may, at the City's option, include the partial or total suspension of Project Co's right and obligation to perform any Maintenance Services having regard to the circumstances in question (without any extension of the Project Term or suspension of any other Maintenance Services, and the provisions of Section 42, including Section 42.1(a)(iv) and Section 42.2, shall apply, but such suspension shall be only for so long as, as applicable:

(i) the circumstances referred to in Section 32.1 or 32.2 subsist; or

(ii) in respect of any such circumstances relating to Project Co's performance of the Maintenance Services, until such time as Project Co shall have demonstrated to the reasonable satisfaction of the City that, notwithstanding such circumstances, Project Co has taken such steps, including, if applicable, the termination and replacement of Subcontractors, as are required pursuant to this Section 32.3 and as are necessary to be capable of performing its obligations in respect of the relevant Maintenance Services to the required standard in accordance with this Project Agreement, and thereafter Project Co shall perform its obligations as aforesaid.

32.4 Costs and Expenses

(a) Subject to the City's obligations pursuant to Sections 32.5 and 32.6:

(i) Project Co shall bear all costs and expenses incurred by Project Co in relation to the exercise of the City's rights pursuant to this Section 32; and

(ii) Project Co shall reimburse the City for all reasonable costs and expenses incurred by the City in relation to the exercise of the City's rights pursuant to this Section 32.

32.5 Reimbursement Events

(a) In this Section 32.5, a "**Reimbursement Event**" means:

(i) an act or omission of Project Co or any Project Co Party or a breach of any obligation under this Project Agreement, but only to the extent such act, omission or breach is caused by a City Party or City Third Party Beneficiary;

(ii) a labour dispute involving employees of any City Party or City Third Party Beneficiary that materially affects or can reasonably be expected to materially affect the Project Scope; or

(iii) an Emergency not resulting from Project Co's breach of its obligations under this Project Agreement.

(b) If the City either takes steps itself or requires Project Co to take steps in accordance with this Section 32 as a result of a Reimbursement Event:

(i) the City shall reimburse Project Co for the reasonable costs and expenses incurred by Project Co in relation to the exercise of the City's rights pursuant to this Section 32 that would not otherwise have been incurred by Project Co in the proper performance of its obligations under this Project Agreement; and

(ii) subject to Section 32.5(c), the City shall bear all costs and expenses incurred by the City in relation to the exercise of the City's rights pursuant to this Section 32.

(c) If, in exercising its rights pursuant to this Section 32, the City performs any part of the Maintenance Services either itself or by engaging others, the City shall be entitled to deduct from any Monthly Service Payment the reasonable cost of performing such Maintenance Services. If the City makes such a deduction, then Project Co shall be relieved of its reimbursement obligations under Section 32.4(a)(ii) up to the amount equal to the deduction.

32.6 Reimbursement if Improper Exercise of Rights

(a) If the City exercises its rights pursuant to this Section 32, but the City was not entitled to do so, the City shall reimburse Project Co for the reasonable costs and expenses directly incurred by Project Co over and above those that would otherwise have been incurred by Project Co in the proper performance of its obligations under this Project Agreement and that are directly and reasonably incurred by Project Co in complying with those written requirements of the City issued as a result of the City having exercised such rights.

(b) Project Co acknowledges and agrees that Project Co has no right to require a determination of whether or not the City is entitled to exercise its rights pursuant to this Section 32 before taking any such action that the City may require and Project Co shall comply with all of the City's requirements. Only concurrently with or after complying with the City's requirements shall Project Co be entitled to refer any Dispute for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

33. ALLOCATION OF RESPONSIBILITY

33.1 Responsibility among Contractors

(a) Without prejudice to the rights and priorities of the Lenders pursuant to Schedule 4 – Lenders' Direct Agreement or the rights of Project Co pursuant to the Contracts without derogation of the provisions respecting Integration contained in Section 9.2, in the event of a default by Project Co with respect to the activities within the Project Scope (the "**Work Default**"), if there is a dispute amongst the Contractors relating to which of the Contractors (or Subcontractor) has responsibility for the Work Default (the "**Responsibility Dispute**"):

(i) the City shall be entitled to send Notice to Project Co requiring an acknowledgment from Project Co as to the Contractor responsible for the Work Default (the "**Responsibility Notice**");

(ii) if Project Co has not sent notice in writing to the City within 30 days from receipt of the Responsibility Notice advising of the resolution of the Responsibility Dispute and identifying the Contractor responsible for the Work Default (the "**Responsible Contractor**"), the City shall have the right to send a further notice to Project Co determining the Responsible Contractor and the determination by the City shall be binding on Project Co and all of the Contractors.

(b) In the event of more than one Maintenance Contractor, the Maintenance Contractors shall be collectively responsible for the integration of the Maintenance Services and the relevant Contractor's Direct Agreement shall so provide. Project Co shall ensure that the Maintenance Contractor or one designate of the Maintenance Contractors shall at all times provide a nominated individual with whom the City may correspond or communicate with respect to all matters relating to Maintenance Services regardless of which of the Maintenance Contractors is responsible for any relevant matters. Project Co shall ensure that during the Maintenance Term one individual who is critical to the performance of the Maintenance Services is identified in Schedule 9 – Key Individuals and the provisions of Section 10.4 shall apply in respect of such individual. The City shall be entitled, but not required, to raise any issues in respect of the Maintenance Services with such individual who shall have full authority to act on behalf of Project Co for all purposes related to the Maintenance Services subject to the limitation that such individual shall not be entitled to modify or waive any provision of this Project Agreement. Notwithstanding the integration responsibilities in this Section 33.1(b), there will be no joint and several liability created amongst the Maintenance Contractors by virtue of anything in this Project Agreement.

33.2 [Intentionally Deleted]

34. PAYMENT

34.1 Milestone and Revenue Service Availability Payments

(a) The City shall pay to Project Co the Milestone Payment due and payable in respect of the relevant Milestone plus, for clarity, applicable HST on the Milestone Payment Date.

(b) Subject to Section 11.6(h) of Schedule 40 – Highway Work, the City shall pay to Project Co the Highway Milestone Payment, as adjusted by the Net Highway Payment Adjustment and less the Highway Minor Deficiencies Holdback, due and payable plus applicable HST on the Highway Milestone Payment Date. The Highway Milestone Payment, as adjusted by the Net Highway Payment Adjustment and less the Highway Minor Deficiencies Holdback, shall be paid to Project Co in accordance with and subject to Applicable Law.

(c) The City shall pay to Project Co the Highway Final Payment plus applicable HST on the Highway Final Payment Date. The Highway Final Payment shall be paid to Project Co in accordance with and subject to Applicable Law.

(d) The Parties agree that the Highway Milestone Payment and the Highway Final Payment will not be subject to adjustment in favour of Project Co despite changes in the Highway Work, unless such changes in the Highway Work constitute a Variation in the Scope of the Highway Work. The Parties further agree that the Highway Milestone Payment and the Highway Final Payment will only be adjusted where the Contract Documents specifically and expressly refer to an adjustment to the Highway Milestone Payment and the Highway Final Payment, and no claim for an adjustment to the Highway Milestone Payment and the Highway Final Payment on any legal or equitable basis outside of the specific and express rights to an adjustment of the Highway Milestone Payment and the Highway Final Payment set out in the Contract Documents will be allowed. In order to be effective, any permitted adjustment to the Highway Milestone Payment and the Highway Final Payment must be provided for in a Variation Confirmation under Schedule 22 – Variation Procedure. The provisions of this Section 34.1(d) are subject to the adjustments contemplated pursuant to the Net Highway Payment Adjustment.

(e) There will be no payment in respect of a Vehicle Milestone unless and until Project Co delivers to the City the Canadian Content Certificate updated with effect as of the date of payment, which shall:

(i) demonstrate that the Vehicles meet the Canadian Content Requirements as of the date of the payment;

(ii) include any necessary or desirable back-up information reasonably necessary to support the contents thereof and to address the requirements of the Canadian Content Policy;

(iii) be true and correct in all material respects; and

(iv) be in form and content satisfactory to the City.

(f) The City shall pay to Project Co the Revenue Service Availability Payment due and payable in respect of Revenue Service Availability plus, for clarity, applicable HST less all Mobility Matters Deductions, on the Revenue Service Availability Payment Date.

(g) The City shall pay to Project Co the amount of $, as such amount is adjusted by the Net Highway Maintenance Adjustment, due and payable in respect of the Highway Post Substantial Completion Maintenance plus applicable HST within 3 Business Days of the expiry of the Highway Warranty provided, however, that such payment shall not be made in the event that the specifications in Annex G of Schedule 40 – Highway Work in respect of the Highway Post Substantial Completion Maintenance have not been complied with as of the expiry of the Highway Warranty.

34.2 Monthly Service Payments

(a) Subject to and in accordance with this Project Agreement, including this Section 34.2, Schedule 20 – Payment Mechanism and Schedule 39 – Operations Matters, the City shall pay to Project Co the all inclusive Monthly Service Payments.

34.3 Payment Adjustments

(a) Project Co acknowledges and agrees that:

(i) the amount of any Monthly Service Payment may be adjusted pursuant to Schedule 20 – Payment Mechanism;

(ii) the amount of any Monthly Service Payment may be adjusted pursuant to Schedule 39 – Operations Matters; and

(iii) such adjustments are integral to the provisions of this Project Agreement.

(b) If, for any reason, any adjustment (including a Deduction) made pursuant to Schedule 20 – Payment Mechanism or Schedule 39 – Operations Matters is invalid and unenforceable, and an Applicable Law that is a Change in Law is enacted that permits the City to recover or to cause such adjustment to be enforceable, such Change in Law (only to the extent that it permits the City to recover or to cause such adjustment to be enforceable) shall be deemed to not be a Relevant Change in Law and Project Co shall not be entitled to any compensation hereunder for such Change in Law.

34.4 Monthly Service Payment Commencement

(a) Subject to and in accordance with this Project Agreement, the City shall pay Project Co the Monthly Service Payments calculated as being due to Project Co in respect of each Contract Month following the Revenue Service Commencement Date in accordance with Schedule 20 – Payment Mechanism and Schedule 39 – Operations Matters.

(b) Project Co shall not be entitled to any Monthly Service Payments for any period prior to the Revenue Service Commencement Date.

34.5 Adjustments to Monthly Service Payment Periods

(a) The Annual Service Payment payable in respect of each of the first Contract Year and the last Contract Year shall be adjusted in accordance with Schedule 20 – Payment Mechanism.

34.6 Invoicing and Payment Arrangements

(a) Within 5 Business Days following the end of each Contract Month, Project Co shall issue to the City an invoice for the amount of the Monthly Service Payment owing by the City to Project Co for such Contract Month, with such adjustments as provided in the Payment Adjustment Report issued in the previous Contract Month.

(b) Project Co shall comply with all requirements of Schedule 20 – Payment Mechanism in respect of invoices and shall include with each invoice such supporting documentation as the City may reasonably require in connection with payments hereunder.

(c) Each invoice shall be in a form agreed by the Parties, acting reasonably, and shall include as a minimum:

(i) the Monthly Service Payment payable in respect of the applicable Contract Month;

(ii) any adjustments set out in the Payment Adjustment Report issued in the previous Contract Month that have been approved by the City;

(iii) any other adjustments to reflect overpayments and underpayments, as agreed between the Parties or determined in accordance with Schedule 27 – Dispute Resolution Procedure;

(iv) any amount owing to the City under this Project Agreement;

(v) any amount owing to Project Co under this Project Agreement;

(vi) the net amount owing by the City to Project Co, or by Project Co to the City, as applicable; and

(vii) a statutory declaration in form and in substance satisfactory to the City with respect to CLA compliance and payment to all lien claimants:

(A) from Project Co, and

(B) upon request by the City, from any Project Co Party.

(d) The invoices issued to the City in respect of the first Monthly Service Payment following the Revenue Service Commencement Date shall include up to date copies of the parcel registers for all of the Stage 1 Lands, which subsearches of title in support thereof shall not be performed earlier than 45 days following the Revenue Service Availability Date.

(e) HST shall be shown separately on all invoices from Project Co, together with Project Co's HST registration number.

(f) Upon agreement of the Parties, the form of invoice may be changed from time to time.

(g) The City Representative shall review each invoice submitted in accordance with this Section 34.6. The City shall pay the amount stated in such invoice on the first Business Day of the Contract Month next following the Contract Month in which the invoice is received. Any such payment shall be subject to adjustment pursuant to Section 34.6(k).

(h) The City shall not be obligated to make any payment to Project Co unless all conditions precedent applicable to such payment under this Project Agreement have been satisfied by Project Co. Further, the City shall not be obligated to pay an invoice delivered by Project Co after the second Contract Month following the Revenue Service Commencement Date until Project Co has delivered the Payment Adjustment Report referred to in Section 34.6(i) for the previous Contract Month. In the event that Project Co delivers any Payment Adjustment Report later than the stipulated date in Section 34.6(i), the City's obligation to pay the invoice issued by Project Co for the immediately following Contract Month shall be extended by the number of days by which Project Co was late in delivering the applicable Payment Adjustment Report to the City.

(i) Within 5 Business Days following the end of each Contract Month, Project Co shall also submit to the City:

(i) a Performance Monitoring Report in respect of the Contract Month just ended (as further described in Part 8 of Schedule 11 – Quality Management); and

(ii) a report (a "**Payment Adjustment Report**") setting out any adjustments required between the actual Monthly Service Payments determined by Project Co to be owing by the City to Project Co in respect of the Contract Month just ended and the amount that was paid by the City during such Contract Month, including details of:

(A) all Deductions in relation to Availability Failures;

(B) all Deductions in relation to Quality Failures;

(C) all Deductions in relation to Service Failures; and

(D) any Gainshare Adjustment or Painshare Adjustment.

(j) Project Co shall include with each Payment Adjustment Report such supporting documentation as is reasonably required to substantiate and confirm the adjustments set out in each Payment Adjustment Report.

(k) Within 10 Business Days of receipt by the City of the Payment Adjustment Report, the City Representative shall:

(i) determine and advise Project Co that the Payment Adjustment Report is approved by the City, in which case the adjustments set out therein will be reflected by Project Co in the invoice next issued by Project Co; or

(ii) if the City disputes Project Co's entitlement to any part of the amounts set out therein, notify Project Co in writing of that part of the amounts (insofar as at the time of such notice the City is reasonably able to quantify it) which the City disputes and submit to Project Co such supporting documentation as is reasonably required to substantiate and confirm such claim. In such event, the City shall withhold payment of any disputed amount pending agreement or determination of Project Co's entitlement to the disputed amount in accordance with Section 34.9.

34.7 Electronic Invoicing

(a) Project Co shall cooperate with the reasonable requirements of the City, and shall submit its invoices and all other documentation relating to this Project Agreement in a form and with the structure and content as is reasonably required to be compatible with the City's information systems.

34.8 Final Payment Periods

(a) At the beginning of each of the final 3 Contract Months immediately prior to the Expiry Date, the City shall estimate, acting reasonably, the adjustments to the Monthly Service Payments for each such Contract Month. The City may withhold the amounts that it has reasonably estimated for such adjustments from amounts paid to Project Co during each of the final 3 Contract Months.

(b) Within 10 Business Days of receipt by the City of the applicable Payment Adjustment Report for each of the final 3 Contract Months, the City Representative shall either:

(i) determine and advise Project Co that the Payment Adjustment Report is approved by the City and perform a reconciliation between the amount payable based on such Payment Adjustment Report and the amount the City previously paid in respect of the applicable Contract Month. Based on such reconciliation, either the City or Project Co shall pay to the other Party the amount properly owing in accordance with such reconciliation; or

(ii) if the City disputes Project Co's entitlement to any part of the amounts set out therein, notify Project Co in writing of that part of the amounts (insofar as at the time of such notice the City is reasonably able to quantify it) which the City disputes and submit to Project Co such supporting documentation as is reasonably

required to substantiate and confirm such claim. In such event, the City Representative shall perform a reconciliation between the undisputed amount payable based on such Payment Adjustment Report and the amount the City previously paid in respect of the applicable Contract Month. Based on such reconciliation, either the City or Project Co shall pay to the other Party the amount properly owing in accordance with such reconciliation, provided that the City shall withhold payment of any disputed amount pending agreement or determination of Project Co's entitlement to the disputed amount in accordance with Section 34.9.

34.9 Disputes

(a) If the City, acting in good faith, disputes all or any part of a Payment Adjustment Report and/or the Monthly Service Payments payable thereunder, it shall notify Project Co in writing of that part of the amounts (insofar as at the time of such notice the City is reasonably able to quantify it) which the City disputes and submit to Project Co such supporting documentation as is reasonably required to substantiate and confirm such claim. The Parties shall use commercially reasonable efforts to resolve the Dispute in question within 10 Business Days of the aforesaid notice of the Dispute. If they fail to so resolve the Dispute within such period, the Dispute may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure. Following resolution of the Dispute, any amount which has been paid by the City that is determined not to have been payable shall be paid forthwith by Project Co to the City and Project Co shall indemnify and hold harmless the City from and against any damages suffered or incurred resulting from such overpayment by the City as provided for at Section 56.1(e) on the basis that the due date was the date of the overpayment by the City. Following resolution of the Dispute, any amount which has been withheld by the City that is determined to have been payable shall be paid forthwith by the City to Project Co and the City shall indemnify and hold harmless Project Co from and against any damages suffered or incurred resulting from such withholding by the City as provided for at Section 56.2(c) on the basis that the due date was the date upon which such amount became payable to Project Co.

34.10 Payments

(a) Unless specific timeframes are stipulated for payment of any amounts owing or payable by one Party to the other Party under this Project Agreement, such amounts shall be due within 30 days of receipt or deemed receipt of an invoice therefor.

(b) Project Co shall maintain or cause to be maintained all holdbacks required pursuant to the CLA and shall only release holdbacks on being satisfied that no claims for lien can be claimed in respect of the Subcontracts for which holdbacks are to be released.

34.11 Manner of Payment

(a) All payments under this Project Agreement shall be made in Canadian dollars and shall be electronically transferred, quoting the invoice number or description against which

payment is made, in immediately available funds on the due date to a single bank account located in Canada as may be designated by the recipient from time to time by written notice to the other Party.

(b) If the due date is not a Business Day, then the electronic transfer shall be made on the Business Day immediately succeeding such day.

34.12 [Intentionally deleted]

34.13 Set Off

(a) The Parties agree that their rights of set off at law or in equity are limited to the right of:

(i) the City to set off against any amounts otherwise due to Project Co pursuant to the terms of this Project Agreement, any amounts (including, without limitation, any amounts payable in accordance with Section 56 and Section 20.13) which are due to the City by Project Co pursuant to the terms of this Project Agreement; and

(ii) Project Co to set off against any amounts otherwise due to the City pursuant to the terms of this Project Agreement, any amounts (including, without limitation, any amounts payable in accordance with Section 56 and Section 20.13) which are due to Project Co by the City pursuant to the terms of this Project Agreement.

34.14 Effect of Payment

(a) No payment hereunder shall be construed as an acceptance or approval of incomplete, defective or improper performance by Project Co of any of its obligations under this Project Agreement, nor shall it operate to relieve Project Co from the performance of any of its obligations under this Project Agreement which have not been performed.

34.15 Audit of Performance and Payment

(a) Without limiting the City's rights and Project Co's obligations pursuant to Section 37.2, at any time and from time to time until the later of: (i) December 1, 2026, and (ii) three hundred and sixty-five (365) days after the Termination Date, the City may give notice to Project Co requiring an audit of any matter relating to performance of the activities within the Project Scope and payments by or to the City, including any Payment Adjustment Reports, and any other records, reports, information, documents or data relating to performance and payments to verify their accuracy, correctness and completeness.

(b) The City shall appoint an auditor to perform and complete such audit at the City's cost and expense and pursuant to terms of reference determined by the City.

(c) Within a reasonable time following receipt of a notice referred to in Section 34.15(a), Project Co shall make available to the City's auditor, any Payment Adjustment Reports, and any other records, reports, information, documents or data relating to performance and payments.

(d) The City shall notify Project Co of the results of the audit, and if the City's auditor discovers any inaccuracy, incorrectness or incompleteness, then, subject to Project Co's right to dispute the same in accordance with Schedule 27 – Dispute Resolution Procedure:

(i) Project Co shall:

(A) remedy any such inaccuracy, incorrectness or incompleteness and issue a revision to the applicable Payment Adjustment Report or other record, report, information, document or data; and

(B) where the inaccuracy, incompleteness or incorrectness has resulted in any material overpayment by the City, reimburse the City for all costs relating to the auditor and audit to a maximum amount that is the lesser of:

(I) the actual costs relating to the auditor and audit; or

(II) an amount equal to the amount of any overpayment;

(ii) where the inaccuracy, incompleteness or incorrectness has resulted in any overpayment, whether or not material, by the City, Project Co shall reimburse the City for the amount of such overpayment and, further, shall indemnify and hold harmless the City from and against any damages suffered or incurred resulting from such overpayment by the City as provided for at Section 56.1(e) on the basis that the due date was the date of the overpayment by the City; and

(iii) where the inaccuracy, incompleteness or incorrectness has resulted in any underpayment by the City, whether or not material, the City shall pay Project Co the amount of such underpayment and, further, shall indemnify and hold harmless Project Co from and against any damages suffered or incurred resulting from such underpayment by the City as provided for at Section 56.2(c) from the date of each such underpayment.

34.16 No Other Entitlement

(a) Project Co shall not be entitled to any payments, compensation, rights, remedies, benefits or entitlements under or in connection with this Project Agreement, except as specifically and expressly set out in this Project Agreement.

35. TAXES

35.1 Taxes

(a) All amounts specified in this Project Agreement are expressed exclusive of HST but inclusive of all other Taxes. Except as specified in Section 35.1(c), applicable HST shall be paid simultaneously with any amount due hereunder, including, for clarity, any compensation on termination.

(b) The City shall pay, when due and payable, all property taxes or payments in lieu of property taxes that are assessed in respect of ownership or use of the Site or System or Highway.

(c) Within 3 weeks of the end of the month in which a supply is completed for the purposes of paragraph 168(3) of the *Excise Tax Act* (Canada) (an "**HST Acceleration Event**"), the City shall pay to Project Co all HST payable in accordance with paragraph 168(3) of the *Excise Tax Act* (Canada) in respect of such supply for remittance to the Canada Revenue Agency, which amount, if any, shall be set out in an invoice issued by Project Co to the City upon the occurrence of the HST Acceleration Event and shall reflect the capital cost of such supply as set out in the Financial Model, which shall serve as a reasonable estimate of the full consideration for such supply. For clarity, the amount of each payment made by the City to Project Co pursuant to paragraph 168(3) of the *Excise Tax Act* (Canada) does not include any HST amounts already paid by the City to Project Co.

(d) Subject to Section 35.1(e), in each Monthly Service Payment invoice provided by Project Co to the City, Project Co shall show on a distinct line of the invoice the Previously Paid Monthly HST Amount used to determine the amount of unpaid HST payable by the City on such Monthly Service Payment. For clarity, a Previously Paid Monthly HST Amount must be credited to the City on each Monthly Service Payment invoice.

(e) The City shall pay all applicable HST properly payable in accordance with the *Excise Tax Act* (Canada) by the City upon and in connection with payments by the City to Project Co under this Project Agreement.

35.2 Changes in Recoverability of Tax Credits

(a) The City will pay to Project Co from time to time, as the same is incurred by Project Co, amounts equal to any Irrecoverable Tax to the extent such Irrecoverable Tax results from a Change in Law. In the event an Irrecoverable Tax becomes a Recoverable Tax as a result of a Change in Law, Project Co will pay to the City from time to time, as the same is recovered by Project Co, amounts equal to such Recoverable Tax.

(b) For the purposes of this Section 35.2, the term "**Irrecoverable Tax**" means HST or an irrecoverable sales tax levied by the Legislative Assembly of Ontario in lieu of all or a portion of HST incurred by Project Co in respect of the supply of any good or service to the City which is consumed, used or supplied, or to be consumed, used or supplied, exclusively by Project Co in the course of carrying out the Works or Highway Work or otherwise performing the activities within the Project Scope to the extent that Project Co is unable to recover or be credited with input tax credits, refunds, rebates or exemptions for such HST, or after obtaining an input tax credit, is required to pay an additional amount to the Canada Revenue Agency equal to all or part of the input tax credit claimed.

(c) For the purposes of this Section 35.2, the term "**Recoverable Tax**" means HST incurred by Project Co in respect of the supply of any good or service to the City which is consumed, used or supplied, or to be consumed, used or supplied, exclusively by

Project Co in the course of carrying out the Works or Highway Work or otherwise performing the activities within the Project Scope to the extent that Project Co is able to recover or be credited with input tax credits, refunds, rebates or exemptions for such HST.

35.3 Information and Assistance Provided by Project Co

(a) Project Co shall, at the City's request and cost, assist the City in applying for and obtaining all remissions and credits of HST to which the City is entitled.

(b) The City may apply for a global or general exemption, waiver, remission, or refund of some or all Taxes which may otherwise be applicable in relation to this Project Agreement. Project Co shall, at the City's cost, assist the City in making any applications for such global or general exemption, waiver, remission or refund and shall provide the City with such documentation as the City may reasonably require to support such application and, in any event, shall provide such consent as the City may require. Any exemption, waiver, remission, refund or other recovery of Taxes obtained by the City through such application shall accrue to the sole benefit of the City.

(c) Project Co will provide the City with any information reasonably requested by the City from time to time in relation to the HST chargeable in accordance with this Project Agreement and payable by the City to Project Co from time to time.

35.4 Residency – *Income Tax Act* (Canada)

(a) Project Co shall not undertake any action or transaction that, if undertaken, would cause or result in Project Co ceasing to be a partnership for purposes of the *Income Tax Act* (Canada) or any Partner becoming a Non-Resident without the City's prior written consent, which consent may be withheld in the City's Discretion.

35.5 Taxes – General

(a) Project Co shall not, without the prior written consent of the City (which consent may be withheld in its Discretion), undertake any action or transaction that, if undertaken, would cause the City or any City Party (for the purposes of this section, not including DB Co or any DB Co Party) to have (or result in the City or any such City Party having) any obligation to deduct, withhold or remit any Taxes that are required by Applicable Law to be deducted, withheld or remitted from any amounts paid or credited to Project Co or any Project Co Party under this Project Agreement or under any other Project Document.

35.6 Taxes – Indemnity

(a) If (i) Project Co becomes a Non-Resident, or (ii) the City or any City Party is or becomes required by Applicable Law to deduct and withhold any amount in respect of Taxes on or in respect of any amounts paid or credited to Project Co or a Project Co Party by the City or any City Party under this Project Agreement or under any of the Project Documents, then the City or any City Party shall be entitled to make any applicable deductions or withholdings from any amount paid or credited or to be paid or credited to Project Co or

a Project Co Party on or after the date on which (A) Project Co or the Project Co Party becomes a Non-Resident and at all times while it remains a Non-Resident; or (B) the City or any City Party is required by Applicable Law to deduct or withhold amounts in respect of any such amounts, in each case, in respect of all Taxes that are required by Applicable Law to be deducted or withheld from amounts paid or credited to a Non-Resident or otherwise as required by Applicable Law; and all amounts paid or credited by the City or any City Party under this Project Agreement or under any other Project Document to Project Co or a Project Co Party shall be paid or credited net of such deductions or withholdings.

(b) If (i) Project Co becomes a Non-Resident, or (ii) the City or any City Party is or becomes required by Applicable Law to deduct and withhold any amount in respect of Taxes on or in respect of any amounts paid or credited to Project Co or a Project Co Party by the City or any City Party under this Project Agreement or under any of the Project Documents, Project Co shall, in each case, indemnify and hold harmless the City and the City Parties for (A) the full amount of all Taxes ("**Indemnifiable Taxes**") that arise, are imposed on or are required to be paid by the City or any City Party in respect of any amounts paid or credited by the City or any City Party to Project Co or any Project Co Party under this Project Agreement or under any other Project Document as a result of either of the foregoing items less any amount withheld or deducted by the City or any City Party (as applicable) in respect of such Taxes, and (B) any liability payable or incurred in connection with Indemnifiable Taxes (including penalties, interest and reasonable expenses associated with Tax compliance, reporting and contesting such liability for Indemnifiable Taxes, including reasonable professional expenses payable or incurred in connection therewith) arising from or with respect to Indemnifiable Taxes, whether or not they were correctly or legally asserted ("**Associated Liabilities**"). Payment under this indemnification shall be made within 30 days from the date the City makes written demand for it. A certificate containing reasonable detail as to the amount of Indemnifiable Taxes and Associated Liabilities submitted to Project Co by the City shall be conclusive evidence, absent manifest error, of the amount due from Project Co to the City. The City shall be entitled to exercise its rights of set-off under Section 34.13 against any amounts owing under this indemnification. Notwithstanding the foregoing, this Section 35.6 shall not apply to DB Co or any DB Co Party, and each instance where the defined term "City Party" is used in this Section 35.6 shall be read so as to exclude DB Co and each DB Co Party from such definition.

36. FINANCIAL MODEL

36.1 Appointment of Custodian

(a) On or prior to Financial Close, the Parties shall appoint a suitably qualified and experienced person to act as the custodian for the purposes of this Project Agreement, and shall enter into an agreement with the Custodian substantially in the form of Schedule 3 – Custody Agreement.

36.2 Delivery and Use of Financial Model

(a) In accordance with Schedule 2 – Completion Documents, Project Co shall deliver copies of the Financial Model (1 printed copy and 2 copies on CD-Rom) to the City and the Custodian to be held in custody on terms to be agreed by the Parties.

(b) Following the approval by the City of any amendment to the Financial Model, Project Co shall promptly deliver copies of the revised Financial Model, in the same form as the original Financial Model (or such other form as may be agreed by the Parties from time to time), to the City and the Custodian.

(c) The Parties shall instruct the Custodian to keep both a hard copy and an electronic copy of all versions of the Financial Model.

(d) Project Co hereby grants to the City an irrevocable, royalty free, perpetual, non-exclusive and transferable licence, including the right to grant sub-licences, to use the Financial Model or any revised Financial Model for any purpose in connection with this Project Agreement, whether during or after the Project Term.

(e) For greater certainty, Project Co acknowledges and agrees that the City shall not be liable to Project Co for, and Project Co shall not seek to recover from the City or any City Party any damages, losses, costs, liabilities or expenses which may arise (whether in contract, tort or otherwise) as a result of any errors in the Financial Model.

37. RECORDS, INFORMATION AND AUDIT

37.1 Records Provisions

(a) Project Co shall comply with Schedule 26 – Record Provisions.

(b) Project Co shall ensure the back up and storage in safe custody of the data, materials and documents referred to in this Article 37 and all Project Data and Drawings in accordance with Good Industry Practice. Project Co shall submit to the City Representative Project Co's proposals for the back up and storage in safe custody of such data, materials and documents and the City shall be entitled to object if the same is not in accordance with Good Industry Practice, Project Co shall comply, and shall cause all Project Co Parties to comply, with all procedures to which the City Representative has not objected. Project Co may vary its procedures for such back up and storage subject to submitting its proposals for change to the City Representative, who shall be entitled to object on the basis set out above. Any Disputes in connection with the provisions of this Section 37.1(b) may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure with reference to Good Industry Practice.

37.2 Information and General Audit Rights

(a) Project Co shall provide and shall cause each Subcontractor to provide to the City all information, reports, documents, records and the like, including as referred to in Schedule 26 – Record Provisions, in the possession of, or available to, Project Co as the

City may reasonably require from time to time for any purpose in connection with this Project Agreement, other than Sensitive Information. Project Co shall use commercially reasonable efforts to ensure that, for such purpose, all such information, reports, documents, records and the like in the possession of, or available to the Contractors shall be available to Project Co and Project Co shall include relevant terms in all Subcontracts to this effect.

(b) Project Co shall also provide to the City, and shall require each Subcontractor, including the Contractors, to provide to the City (at the City's reasonable cost), all information, reports, documents, records and the like required to be provided pursuant to Section 37.2(a) which subsequently come into the possession of, or become available to, Project Co or each Subcontractor, as the City may reasonably require from time to time to enable the City to provide reports, notices, returns and the like pursuant to Applicable Law, including information and documentation pertaining to the physical condition of the System or the Highway, security, health and safety, fire safety, emergency preparedness, environmental matters, employees and human resources related matters, other than Sensitive Information.

(c) Project Co shall promptly after receipt provide the City with a copy of any material notice, order, direction, requirement or other similar communication received by it or by any Subcontractor from any Governmental Authority in relation to any of the Project Scope or the System or the Highway, and Project Co shall include relevant terms in all Subcontracts to this effect.

(d) Project Co shall promptly notify the City of any actions, suits, proceedings, or investigations commenced, pending or threatened against Project Co or, to Project Co's knowledge, any Subcontractor at law or in equity before any Governmental Authority or arbitral body (whether or not covered by insurance) that individually or in the aggregate could result in any material adverse effect on the business, properties, or assets or the condition, financial or otherwise, of Project Co or in any impairment of its ability to perform its obligations under this Project Agreement.

(e) All information, reports, documents and records in the possession of, or available to, Project Co, including as referred to in Schedule 26 – Record Provisions, which are required to be provided to or available to the City hereunder, shall be subject and open to inspection and audit by the City at any time and from time to time, which inspection and audit shall take place during normal business hours and at Project Co's normal places of business unless the City and Project Co otherwise agree. The City shall also have the right to monitor and audit the performance of any and all the activities within the Project Scope wherever located, and Project Co shall cooperate with, and shall require each Subcontractor to cooperate with, and provide access to the representatives of the City monitoring and auditing the Project Scope, including providing them with access and copies (at the City's reasonable cost) of all relevant information, reports, documents and records pertaining to the performance of the activities within the Project Scope. Except as otherwise provided herein, all of the City's costs for the inspections, audits and monitoring shall be borne by the City.

(f) In conducting an audit of Project Co under Section 37.2(e) or as otherwise provided under this Project Agreement, the City shall have all rights necessary or incidental to conducting an audit, including the right to have access to and inspect and take copies (at the City's reasonable cost) of all books and records of Project Co required to be provided to or available to the City hereunder, upon reasonable notice and at reasonable times. Project Co shall fully cooperate with the City and its auditors in the conduct of any audits, including by making available all such records and accounts (other than Sensitive Information) in existence at that time as they may require to perform a full and detailed audit, and Project Co further agrees to promptly review and settle with the City all matters arising from such audits, including the refunding of monies to the City where applicable. At the reasonable request of the City's auditors, Project Co shall provide such information, reports, documents and records as the City's auditors may reasonably require, other than Sensitive Information.

(g) The City's rights pursuant to this Section 37.2 shall be in addition to, and shall not limit, any other audit, information, inspection or similar rights under this Project Agreement.

(h) The City's rights pursuant to this Section 37.2 shall not limit or restrict any Governmental Authority's right of review, audit, information or inspection under Applicable Law. Upon notice to Project Co, the City's right pursuant to this Section 37.2 may also be exercised by HMQ, the Auditor General of Ontario, Her Majesty the Queen in Right of Canada, the Auditor General of Canada and anyone acting on their behalf without the requirement for further action on the part of the City.

(i) Project Co shall use its best efforts and co-operate with the City to assist the City in interpreting and assessing the performance of the Project in the context of the Financial Model.

37.3 Delivery of Reports to the City

(a) During the Maintenance Term, in addition to Project Co's obligations pursuant to this Section 37, Project Co shall provide the City with a copy of all reports required pursuant to the Project Agreement including, but not limited to, the Performance Monitoring Report, the Payment Adjustment Report, the Energy Analysis Report, the Joint Insurance Cost Report and any other reports which are required to be delivered to the City pursuant to this Project Agreement and which are requested by the City.

38. CHANGES IN LAW

38.1 Performance after Change in Law

(a) Following any and all Changes in Law, Project Co shall carry out the activities within the Project Scope in accordance with the terms of this Project Agreement, including in compliance with Applicable Law.

38.2 Works Change in Law

(a) On the occurrence of a Works Change in Law:

(i) either Party may give notice to the other of the need for a Variation as a result of such Works Change in Law;

(ii) the Parties shall meet within 10 Business Days of such notice to consult with respect to the effect of the Works Change in Law and to reach an agreement on whether a Variation is required as a result of such Works Change in Law, and, if the Parties have not, within 10 Business Days of this meeting, reached an agreement, either Party may refer the question of whether a Works Change in Law has occurred or the effect of any Works Change in Law for resolution in accordance with Schedule 27 – Dispute Resolution Procedure; and

(iii) the City shall, within 10 Business Days of agreement or determination that a Variation is required, issue a Variation Enquiry and the relevant provisions of Schedule 22 – Variation Procedure shall apply except that:

(A) Project Co may only object to any such Variation Enquiry on the grounds that the implementation of the Variation would not enable it to comply with the Works Change in Law;

(B) Project Co shall be responsible for obtaining all Project Co Permits, Licences and Approvals required in respect of the Variation;

(C) the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree;

(D) Project Co shall proceed to implement the Variation within such period as will enable it to comply with the Works Change in Law as soon as reasonably practicable; and

(E) Project Co shall not be entitled to any payment or other compensation or relief from performance of its obligations under this Project Agreement in respect of any Works Change in Law or associated Variation other than as established pursuant to Schedule 22 – Variation Procedure.

38.3 Relevant Change in Law

(a) On the occurrence of a Relevant Change in Law, either Party shall be entitled to seek compensation for any increase or decrease (as the case may be) in the net cost to Project Co of performing the activities within the Project Scope so as to put such Party in no better and no worse position than it would have been in had the Relevant Change in Law not occurred. Any such compensation shall be calculated in accordance with this Section 38.3.

(b) On the occurrence of a Relevant Change in Law:

(i) either Party may give notice to the other of the need for a Variation as a result of such Relevant Change in Law;

(ii) the Parties and the Consultant shall meet within 10 Business Days of such notice to consult with respect to the effect of the Relevant Change in Law and to reach an agreement on whether a Variation is required as a result of such Relevant Change in Law, and, if the Parties have not, within 10 Business Days of this meeting, reached an agreement, either Party may refer the question of whether a Relevant Change in Law has occurred or the effect of any Relevant Change in Law for resolution in accordance with Schedule 27 – Dispute Resolution Procedure; and

(iii) the City shall, within 10 Business Days of agreement or determination that a Variation is required, issue a Variation Enquiry and the relevant provisions of Schedule 22 – Variation Procedure shall apply except that:

(A) Project Co may only object to any such Variation Enquiry on the grounds that the implementation of the Variation would not enable it to comply with the Relevant Change in Law;

(B) Project Co shall be responsible for obtaining all Development Approvals and Project Co Permits, Licences and Approvals required in respect of the Variation;

(C) the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree;

(D) Project Co shall proceed to implement the Variation within such period as will enable it to comply with the Relevant Change in Law as soon as reasonably practicable;

(E) the Parties shall, without prejudice to their respective general obligations to comply with the terms of this Project Agreement:

(I) use commercially reasonable efforts to mitigate the adverse effects of any Relevant Change in Law and take commercially reasonable steps to minimize any increase in costs arising from such Relevant Change in Law; and

(II) use commercially reasonable efforts to take advantage of any positive or beneficial effects of any Relevant Change in Law and take commercially reasonable steps to maximize any reduction in costs arising from such Relevant Change in Law; and

(F) any entitlement to compensation payable shall be in accordance with this Section 38.3, and any calculation of compensation shall take into consideration, *inter alia*:

(I) any failure by a Party to comply with Section 38.3(b)(iii)(E);

(II) the extent to which a Party has been, or shall be, compensated in respect of such Change in Law as a result of any indexation or adjustment of the Monthly Service Payments under this Project Agreement;

(III) any increase or decrease in its costs resulting from such Relevant Change in Law; and

(IV) any amount which Project Co recovers under any insurance policy (or would recover if it complied with its obligations to insure under this Project Agreement or the terms of any policy of insurance required under this Project Agreement) which amount, for greater certainty, shall not include the amount of any excess or deductibles or any amount above the maximum insured amount applicable to any such insurance policy.

(c) Within 10 Business Days of agreement or determination that a Variation is required in respect of the Highway Work, the Consultant shall issue a Variation Confirmation and the relevant provisions of Schedule 22 – Variation Procedure shall apply except that the same exceptions set out in Section 38.3(b)(iii) shall be applied.

(d) Project Co shall not be entitled to any payment or compensation or, except as provided in Section 40 or otherwise in this Project Agreement, relief in respect of any Relevant Change in Law, or the consequences thereof, other than in accordance with this Section 38.3, and Section 41 shall be construed accordingly.

(e) In relation to a Relevant Change in Law that results in a net increase or decrease in costs incurred by Project Co in delivery of the activities within the Project Scope, taking into consideration, *inter alia*, Section 38.3(b)(iii)(E), if the cost impact of such Relevant Change in Law in a given Contract Year (in aggregate with all other such Relevant Changes in Law that have a cost impact in the same Contract Year) amounts to less than $10,000 (index linked) in that Contract Year, neither the City nor Project Co shall be entitled to any payment or compensation pursuant to this Section 38.3 or otherwise in respect of the cost impact of that Relevant Change in Law in that Contract Year, or, except as provided in Section 40 or otherwise in this Project Agreement, any other relief in respect of such Relevant Change in Law in that Contract Year.

38.4 Changes to OLRT Regulations

For greater certainty, a change to OLRT Regulations, including the adoption of a supplemental or new OLRT Regulation shall be considered to be a Discriminatory Change in Law if Project Co objects in writing to the change unless the City can demonstrate (with a supporting declaration from the City Representative) that:

(a) the change to the OLRT Regulations was: (i) caused by or the result of a Change in Law emanating from a Governmental Authority other than the City and without prior

consultation regarding the change by that Governmental Authority with the City and (ii) not a System Specific Change in Law; or

(b) the change to the OLRT Regulations: (i) was caused by or the result or outcome of a Change in Law emanating from a department or division of the City having no direct authority or responsibility over the Project or System; (ii) involved no prior consultation by that City department or division with, or direction from, a City employee or City Party (for the purposes of this section, not including DB Co or any DB Co Party) who has responsibility or authority in respect of the Project or the System; and (iii) is not a System Specific Change in Law.

38.5 City Rights, Powers and Authority

Nothing in this Project Agreement fetters or otherwise interferes with, limits or compromises the rights, powers, and authority of the City to:

(a) adopt, enact, implement, amend, repeal or replace any enactment, law or regulation, including the OLRT Regulations;

(b) exercise or refrain from exercising any discretion conferred upon the City under Applicable Laws and the Delegation Agreement; or

(c) administer, apply and enforce Applicable Laws, including the OLRT Regulations.

39. VARIATIONS

39.1 Variation Procedure

(a) Except as otherwise expressly provided in this Project Agreement, Schedule 22 – Variation Procedure shall apply in respect of Variations and Small Works.

(b) For greater certainty, Project Co shall, subject to and in accordance with Schedule 22 – Variation Procedure, be entitled to a Variation if a written direction issued by or on behalf of the City to Project Co or any Project Co Party results in a variation, addition, reduction, substitution, omission, modification, deletion, removal or other change to the whole or any part of the Project Scope, including in relation to the whole or any part of the Works, the Highway Work or the Maintenance Services.

(c) Without limiting Project Co's obligations pursuant to Section 9.3 and Schedule 22 – Variation Procedure, Project Co shall include in each Subcontract, and shall cause each Project Co Party to comply with, the Variation Procedure, to the extent that the Variation Procedure requires Project Co to minimize the cost and impact of Variations, including Variations as to scope of the Works, the Highway Work or Maintenance Services.

39.2 Innovation and Value Engineering

(a) Project Co acknowledges that the City at all times desires to reduce the Monthly Service Payments and the overall cost to the City of the System, the Works and the Maintenance

Services, and Project Co agrees to cooperate, explore and work with the City in investigating and considering innovation and value engineering and other cost saving measures.

(b) If an innovation and value engineering proposal is at any time and from time to time originated and initiated solely by Project Co, Project Co may make a proposal (the "**Innovation Proposal**") by notice to the City.

(c) The Parties agree that the subject of an Innovation Proposal shall not include:

(i) any Variation Enquiry initiated by the City;

(ii) any Variation resulting from a Change in Law; or

(iii) any change to the City Activities.

(d) The Innovation Proposal must:

(i) set out sufficient detail to enable the City to evaluate the Innovation Proposal in full;

(ii) specify Project Co's reasons and justification for proposing the Innovation Proposal;

(iii) request the City to consult with Project Co with a view to deciding whether to agree to the Innovation Proposal and, if so, what consequential changes the City requires as a result;

(iv) indicate any implications of the Innovation Proposal, including a difference between the existing and the proposed requirements of this Project Agreement, and the comparative advantages of each to Project Co and the City;

(v) indicate, in particular, whether an increase or decrease to the Monthly Service Payments is proposed, and, if so, give a detailed cost estimate of such proposed change;

(vi) indicate if there are any dates by which a decision by the City must be made;

(vii) indicate the capital cost of the Innovation Proposal, including the cost of financing; and

(viii) include such other information and documentation as may be reasonably requested by the City to fully evaluate and consider the Innovation Proposal.

(e) The City shall, acting in good faith, evaluate the Innovation Proposal, taking into account all relevant issues, including whether:

(i) a change in the Monthly Service Payments will occur;

(ii) the Innovation Proposal affects the quality of the Works, the System or the Maintenance Services, or the likelihood of successful completion of the Works or performance of the Maintenance Services;

(iii) the Innovation Proposal will benefit or interfere with the efficient operation of the System;

(iv) the Innovation Proposal will interfere with the relationship between the City and third parties;

(v) the financial strength of Project Co is sufficient to deliver the changed Works or perform the changed Maintenance Services, as applicable;

(vi) the residual value of the System is affected;

(vii) the Innovation Proposal will change the Rehabilitation Payment;

(viii) the Innovation Proposal materially affects the risks or costs to which the City is exposed; or

(ix) any other matter the City considers relevant.

(f) The City may request clarification or additional information regarding the Innovation Proposal, and may request modifications to the Innovation Proposal.

(g) The City may, in its Discretion, accept or reject any Innovation Proposal.

(h) If the City accepts the Innovation Proposal, with or without modification, the relevant Innovation Proposal shall be documented and evidenced by a written Variation Confirmation, together with any other documents necessary to amend this Project Agreement or any relevant Project Documents to give effect to the Innovation Proposal.

(i) Unless the City specifically agrees to an increase in the Monthly Service Payments in accepting an Innovation Proposal pursuant to Section 39.2(h), there shall be no increase in the Monthly Service Payments as a result of an Innovation Proposal.

(j) If, after taking into account the agreed implementation and reasonably allocated development costs incurred by Project Co in connection with the Innovation Proposal and any other uses of the Innovation Proposal by Project Co, the Innovation Proposal causes or will cause the costs of Project Co and/or of a Subcontractor to decrease, the net savings in the costs of Project Co and/or the Subcontractor will be shared equally by Project Co and the City, and the City's share of the net savings shall, as agreed by the Parties, be reflected in either a lump sum payment or in a reduction of the Monthly Service Payments.

(k) If an Innovation Proposal causes or will cause the costs of the City to decrease, the net savings in the costs of the City will be shared as follows:

(i) equally by Project Co and the City for the first 5 years following the implementation of the Innovation Proposal;

(ii) thereafter, the City shall be entitled to the full benefit of the net savings in costs (if applicable); and

(iii) Project Co's share of the net savings shall, at the City's sole option, be reflected in either a lump sum payment or in an increase in the Monthly Service Payments.

40. DELAY EVENTS

40.1 Definition

(a) For the purposes of this Project Agreement, "**Delay Event**" means any of the following events or circumstances only to the extent, in each case, that: (1) it affects the Highway Work so as to cause a delay in achieving the Highway Scheduled Substantial Completion Date; (2) it affects the Design and Construction Works so as to cause a delay in achieving a Milestone Acceptance by the relevant Scheduled Milestone Acceptance Date or in achieving Revenue Service Availability by the Required Revenue Service Availability Date or the New Required Revenue Service Availability Date, as applicable; or (3) it affects the Civic Works so as to cause a delay in achieving the Civic Works Completion Dates by the applicable dates set out in Section 20.13(d):

(i) the implementation of a Variation to the extent Project Co has identified such delay in its Estimate and such delay has been documented in the Variation Confirmation;

(ii) any breach by the City of any of the City's obligations under this Project Agreement (including any delay by the City in giving access to: (A) the Lands and System pursuant to Section 14.1 or (B) the Highway Site and Highway pursuant to Section 9.1 of Schedule 40 – Highway Work, any obstruction of the rights afforded to Project Co under Section 14.1 or under Section 9.1 of Schedule 40 – Highway Work, any delay by the City in carrying out its obligations set forth in Schedule 10 – Review Procedure), except to the extent that any such breach is caused, or contributed to, by Project Co or any Project Co Party;

(iii) an uncovering of the Civic Works, the Works or Highway Work pursuant to Section 21.3 where such Civic Works, Works or Highway Work are not subsequently found to be defective or not in compliance with the requirements of this Project Agreement (including the Output Specifications, the Project Co Proposal Extracts and the Design Data), unless such uncovering of the Civic Works, the Works or Highway Work was reasonable in the light of other defects or non-compliance previously discovered by the City in respect of the same or a similar component of the Civic Works, the Works or Highway Work or subset of the Civic Works or Highway Work;

(iv) a requirement pursuant to Section 16.2(d)(i), 16.2(e) or 16.2(f) for Project Co to perform any alteration, addition, demolition, extension or variation in the Design and Construction Works, the Civic Works or the Highway Work, or to suspend or delay performance of the Design and Construction Works, the Civic Works or the Highway Work, upon the discovery of Contamination, which alteration, addition, demolition, extension or variation in the Design and Construction Works, the Civic Works or the Highway Work, or suspension or delay in the performance of the Design and Construction Works, the Civic Works or the Highway Work, would not otherwise be required under this Project Agreement;

(v) a requirement pursuant to Section 16.3(c)(ii)(A) or 16.3(d) for Project Co to perform any alteration, addition, demolition, extension or variation in the Design and Construction Works, the Civic Works or the Highway Work, or to suspend or delay performance of the Design and Construction Works, the Civic Works or the Highway Work, upon the discovery of any fossils, artifacts and other objects having artistic, historic, archaeological or monetary value, including human remains and burial sites, which alteration, addition, demolition, extension or variation in the Design and Construction Works, the Civic Works or the Highway Work, or suspension or delay in the performance of the Design and Construction Works, the Civic Works or the Highway Work, would not otherwise be required under this Project Agreement; provided, however, that the foregoing shall not apply to the extent that any item referred to in Section 16.3(a) was disclosed in or properly inferable, readily apparent or readily discoverable from the Highway Site Information;

(vi) a requirement pursuant to Section 16.4(a) or 16.4(c) for Project Co to perform any alteration, addition, demolition, extension or variation in the Design and Construction Works, the Civic Works or the Highway Work, or to suspend or delay performance of the Design and Construction Works, the Civic Works or the Highway Work, upon the discovery of Species-at-Risk for which the City is responsible, which alteration, addition, demolition, extension, or variation in the Design and Construction Works, the Civic Works or the Highway Work, or suspension or delay in the performance of the Design and Construction Works, the Civic Works or the Highway Work, would not otherwise be required under this Project Agreement;

(vii) subject to compliance by Project Co with the provisions of Section 9.7, damage, costs or delays from the execution of Additional Works or Third Party Works on the Lands or Highway Site by Additional Contractors or Third Party Contractors, as applicable, in the circumstances described in Section 9.7(e);

(viii) a requirement pursuant to Section 13.1 of Schedule 27 – Dispute Resolution Procedure for Project Co to proceed in accordance with the direction of the City during the pendency of a Dispute, which Dispute is subsequently determined in Project Co's favour;

(ix) an event of Force Majeure;

(x) a Relief Event;

(xi) a Relevant Change in Law;

(xii) any change to the terms, conditions or requirements of the Environmental Assessments, except in each case to the extent resulting from any change by Project Co in the design of the Project or from any other act or omission on the part of Project Co;

(xiii) the discovery of any Latent Defect for which the City is responsible pursuant to Section 16.5, including a requirement pursuant to Section 16.5(b) for Project Co to undertake any action in accordance with the instructions of the City to remedy a Latent Defect for which the City is responsible pursuant to Section 16.5(a);

(xiv) a failure by the City to provide for the attendance of at least the minimum number of employees for the employee training at all sessions of Project Co's training programs to be provided by Project Co in accordance with the requirements of Schedule 15-2 – Design and Construction Requirements;

(xv) a stop work order issued by a Governmental Authority in respect of the System, the Civic Works or the Highway Work, provided that such order was not issued as a result of a Relief Event, an act of Force Majeure or as a result of an act, omission or fault of Project Co or a Project Co Party;

(xvi) a requirement pursuant to Section 14.1(e) of Schedule 40 – Highway Work for Project Co to take any steps upon the discovery of Contamination, which steps would not otherwise be required under this Project Agreement;

(xvii) a failure by the City to obtain a requirement pursuant to Section 8.2(c) provided Project Co has fulfilled its obligations pursuant to Section 8.2(c);

(xviii) **[Intentionally deleted]**

(xix) a Delay Event in respect of the Highway Work which Delay Event affects the Design and Construction Works so as to cause a delay in achieving a Milestone Acceptance by the relevant Scheduled Milestone Acceptance Date or in achieving Revenue Service Availability by the Required Revenue Service Availability Date provided the Delay Event in respect of the Highway Work is not caused or contributed to by Project Co; or

(xx) any Variation in respect of the FLUA pursuant to Section 9.4(e)(ii) of this Project Agreement, provided such Variation is not caused or contributed to by Project Co or a Project Co Party; or

(xxi) the proposed OLRT Regulations are or the Support Documentation is consistent with the requirements of Section 2(a) of Schedule 15-4 – Regulatory Standards and the City's refusal to approve the OLRT Regulations or Support Documentation has resulted or will result in a delay or incremental expense or

liability to Project Co in the performance of activities within the Project Scope that cannot be reasonably mitigated by Project Co.

40.2 Consequences of a Delay Event

(a) Project Co shall provide written notice to the City Representative and the Independent Certifier and the Consultant within 5 Business Days of becoming aware of the occurrence of Delay Event. Project Co shall, within 10 Business Days after such notification, provide further written details to the City Representative and the Independent Certifier and the Consultant which shall include:

(i) a statement of which Delay Event the claim is based upon;

(ii) details of the circumstances from which the Delay Event arises;

(iii) details of the contemporary records which Project Co shall maintain to substantiate its claim for extra time;

(iv) details of the consequences (whether direct or indirect, financial or non-financial) which such Delay Event may have upon any Civic Works Completion Date, any relevant Scheduled Milestone Acceptance Date, the Highway Scheduled Substantial Completion Date or the Required Revenue Service Availability Date, as applicable; and

(v) details of any measures which Project Co proposes to adopt to mitigate the consequences of such Delay Event.

(b) As soon as possible but in any event within 3 Business Days of Project Co receiving, or becoming aware of, any supplemental information which may further substantiate or support Project Co's claim, Project Co shall submit further particulars based on such information to the City Representative and the Independent Certifier and the Consultant.

(c) The City Representative shall, after receipt of written details under Section 40.2(a), or of further particulars under Section 40.2(b), be entitled by written notice to require Project Co to provide such further supporting particulars as the City Representative may reasonably consider necessary. Project Co shall afford the City Representative and the Independent Certifier and the Consultant reasonable facilities for investigating the validity of Project Co's claim, including, without limitation, on-site inspection.

(d) Subject to the provisions of this Section 40, the City Representative shall allow Project Co an extension of time equal to the delay caused by the Delay Event and shall fix one or more revised Scheduled Milestone Acceptance Dates, a revised Highway Scheduled Substantial Completion Date or New Highway Scheduled Substantial Completion Date, as applicable, a new completion date for the Coventry Bridge Work or a revised Required Revenue Service Availability Date or a New Required Revenue Service Availability Date, as applicable, as soon as reasonably practicable and in any event within 10 Business Days of the later of:

(i) the date of receipt by the City Representative of Project Co's notice given in accordance with Section 40.2(a) and the date of receipt of any further particulars (if such are required under Section 40.2(c)), whichever is later; and

(ii) the date of receipt by the City Representative of any supplemental information supplied by Project Co in accordance with Section 40.2(b) and the date of receipt of any further particulars (if such are required under Section 40.2(c)), whichever is later.

(e) For the avoidance of doubt, there shall be no extension to the Project Term as a result of any delay caused by a Delay Event.

(f) Project Co acknowledges and agrees that the Highway Contract Time includes a Schedule Cushion in the Highway Construction Schedule at no additional cost to City. Project Co shall separately identify the extent of the Schedule Cushion in the Highway Construction Schedule.

(g) Project Co acknowledges and agrees that in the event that an extension of the Highway Contract Time is allowed under any provision of this Project Agreement, the City may, in its Discretion, elect to apply any portion of the Schedule Cushion with the result that such extension of the Highway Contract Time shall be reduced or eliminated, as the case may be, by the number of days of the Schedule Cushion the City has elected to apply.

(h) Notwithstanding any other provision in this Project Agreement, including Section 40.2(d), where City elects to apply all or any portion of the number of days of the Schedule Cushion, Project Co shall not be entitled to any Direct Losses or any other additional compensation related to the time that is reduced or eliminated by the Schedule Cushion, except as otherwise provided in Schedule 22 – Variation Procedure.

(i) If:

(i) the City Representative declines to fix a revised Scheduled Milestone Acceptance Date, Highway Scheduled Substantial Completion Date, date for completion of the Coventry Bridge Work or New Required Revenue Service Availability Date, as applicable;

(ii) Project Co considers that a different Scheduled Milestone Acceptance Date, Highway Scheduled Substantial Completion Date, date for completion of the Coventry Bridge Work or New Required Revenue Service Availability Date, as applicable should be fixed; or

(iii) there is a dispute as to whether a Delay Event has occurred,

then Project Co shall be entitled to refer the matter for determination by the Consultant, to the extent that the matter is in respect of Highway Work or the Coventry Bridge Work, and otherwise to the Independent Certifier. The decision of the Consultant and the Independent Certifier, as applicable, may be disputed by either Party and referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

40.3 Mitigation

(a) If Project Co is (or claims to be) affected by a Delay Event, Project Co shall, and shall require all Project Co Parties to, take and continue to take commercially reasonable steps:

(i) to eliminate or mitigate the consequences of such event upon the performance of its obligations under this Project Agreement;

(ii) to continue to perform its obligations under this Project Agreement to the extent possible notwithstanding the Delay Event; and

(iii) to resume performance of its obligations under this Project Agreement affected by the Delay Event as soon as practicable.

(b) To the extent that Project Co does not comply with its obligations under this Section 40.3, such failure shall be taken into account in determining Project Co's entitlement to an extension of time pursuant to this Section 40.

40.4 MTO Winter Maintenance Work

(a) Notwithstanding any other provision in this Project Agreement, Project Co acknowledges and agrees that the snow, ice and frost control winter maintenance activities carried out by Additional Contractors or other contractors of the MTO on the Highway (the "**MTO Winter Maintenance Work**") shall not give rise to a Delay Event nor a claim by Project Co for additional compensation. Project Co shall be responsible for the coordination and scheduling of the Highway Work in such a manner as to not interfere with the MTO Winter Maintenance Work and acknowledges that the contractors performing the MTO Winter Maintenance Work will be recognized as the senior contractors on the Highway Site such that any conflicts in the activities of the contractors performing the Highway Work and the contractors performing the MTO Winter Maintenance Work will be resolved in the favour of the contractors performing the MTO Winter Maintenance Work.

41. COMPENSATION EVENTS

41.1 Definition

(a) For the purposes of this Project Agreement, "**Compensation Event**" means:

(i) any event referred to in Sections 40.1(a)(ii), 40.1(a)(iii), 40.1(a)(iv), 40.1(a)(v), 40.1(a)(vi), 40.1(a)(vii), 40.1(a)(viii), 40.1(a)(xii), 40.1(a)(xiii), 40.1(a)(xiv), 40.1(a)(xv), 40.1(a)(xvi), 40.1(a)(xvii), 40.1(a)(xix), 40.1(a)(xx) and 40.1(a)(xxi) as a direct result of which Project Co has incurred loss or expense, whether or not any of these events has also caused a delay;

(ii) without prejudice to the terms of the Belfast MSF Expansion Variation, any event which constitutes a Compensation Event under either (i) the Belfast MSF Expansion Variation; or (ii) the DB Co Works Agreement, as a result of which Project Co has incurred loss or expense, save in each case, to the extent any such

Compensation Event is caused, or contributed to, by Project Co or any Project Co Party acting in connection with the Project Scope; and

41.2 Consequences of a Compensation Event

(a) If a Compensation Event occurs, Project Co's sole right to compensation shall be as set out in this Section 41. For greater certainty, except as aforesaid, no other Delay Event shall entitle Project Co to receive any compensation, except as otherwise provided in:

(i) Schedule 22 – Variation Procedure, in the case of a Delay Event referred to in Section 40.1(a)(i);

(ii) Section 44, in the case of a Delay Event referred to in Section 40.1(a)(ix);

(iii) Section 43, in the case of a Delay Event referred to in Section 40.1(a)(x); and

(iv) Section 38, in the case of a Delay Event referred to in Section 40.1(a)(xi).

(b) Subject to Sections 41.3 and 41.4, if it is agreed, or determined in accordance with Schedule 27 – Dispute Resolution Procedure, that there has been a Compensation Event, Project Co shall be entitled to such compensation as would place Project Co in no better and no worse position than it would have been in had the relevant Compensation Event not occurred. For greater certainty, in respect of a Compensation Event that is also a Delay Event, such compensation will include amounts which, but for the Delay Event, would have been paid by the City to Project Co. Project Co shall promptly provide the City Representative with any information the City Representative may require in order to determine the amount of such compensation.

(c) If the City is required to compensate Project Co pursuant to this Section 41.2, then the City may either pay such compensation as a lump sum payment or payments at times and in a manner to be agreed with Project Co, acting reasonably, or, alternatively, the City may request Project Co to agree to an adjustment to the Monthly Service Payments. If Project Co agrees to an adjustment to the Monthly Service Payments, then the provisions of Schedule 22 – Variation Procedure shall apply.

(d) Notwithstanding any other provision in this Project Agreement, including Section 41.2(b), where City elects to apply all or any portion of the number of days of the Schedule Cushion, Project Co shall not be entitled to any Direct Losses or any other additional compensation related to the time that is reduced or eliminated by the Schedule Cushion, except as otherwise provided in Schedule 22 – Variation Procedure. For the avoidance of doubt, this Section 41.2(d) shall not apply to the Compensation Event set out in Section 41.1(a)(ii).

41.3 Mitigation

(a) If Project Co is (or claims to be) affected by a Compensation Event, Project Co shall, and shall require all Project Co Parties to, take and continue to take commercially reasonable

steps to minimize the amount of compensation due in accordance with this Section 41 in relation to any Compensation Event.

(b) To the extent that Project Co does not comply with its obligations under this Section 41.3, such failure shall be taken into account in determining Project Co's entitlement to relief pursuant to this Section 41.

41.4 Insured Exposure

(a) The compensation payable to Project Co pursuant to this Section 41 shall be reduced by any amount which Project Co or a Project Co Party recovers, or is entitled to recover, under any insurance policy, or would have recovered if it had complied with the requirements of this Project Agreement in respect of insurance or the terms of any policy of insurance required under this Project Agreement, which amount, for greater certainty, shall not include any excess or deductibles or any amount over the maximum amount insured under any such insurance policy.

42. EXCUSING CAUSES

42.1 Definition

(a) For the purposes of this Project Agreement, "**Excusing Cause**" means any of the following events or circumstances if it occurs after the Revenue Service Availability Date to the extent, in each case, that it interferes adversely with, or causes a failure of, the performance of the Maintenance Services:

(i) the implementation of a Variation to the extent Project Co has identified any impact on the Maintenance Services in its Estimate and such impact has been documented in the Variation Confirmation;

(ii) any breach by the City of any of the City's obligations under this Project Agreement (including any obstruction of the rights afforded to Project Co under Section 14.1), except to the extent that any such breach is caused, or contributed to, by Project Co or any Project Co Party;

(iii) any deliberate or negligent act or omission of any City Party or any failure by any City Party (having regard to the interactive nature of the activities of such City Party and Project Co) to take commercially reasonable steps to perform its activities in a manner which minimizes undue interference with Project Co's performance of the Maintenance Services, except to the extent:

(A) any such act, omission or failure is caused, or contributed to, by Project Co or any Project Co Party;

(B) the City Party is acting in accordance with a recommendation or instruction of Project Co or any Project Co Party;

(C) any such act, omission or failure was contemplated in Schedule 15 – Output Specifications or was otherwise provided for in this Project Agreement; or

(D) the consequences of any such act, omission or failure would have been prevented by the proper performance of Project Co's obligations under this Project Agreement;

(iv) the implementation of any action taken by the City, or any suspension of Project Co's obligation to deliver all or any part of the Maintenance Services, or the compliance by Project Co with instructions given by the City, in each case in the circumstances referred to in Section 32;

(v) the performance of any Small Works in accordance with the terms of this Project Agreement during the period of time agreed between the City and Project Co;

(vi) any official or unofficial strike, lockout, work to rule or other labour-related action involving employees of any City Party;

(vii) the occurrence of any Contamination for which the City is responsible pursuant to Section 16.2;

(viii) the discovery of any Species-at-Risk for which the City is responsible pursuant to Section 16.4;

(ix) the discovery of any Latent Defect for which the City is responsible pursuant to Section 16.5;

(x) the outbreak or the effects of any outbreak of Medical Contamination, except to the extent that such Medical Contamination, or the effects of such Medical Contamination, are caused, or contributed to, by Project Co or any Project Co Party, including any failure by Project Co or any Project Co Party to comply with procedures or instructions relating to control of infection or to take commercially reasonable steps to mitigate the effects of such Medical Contamination, provided that neither Project Co nor any Project Co Party shall be deemed to have caused, or contributed to, an outbreak of Medical Contamination if such Medical Contamination was caused, or contributed to, by any employee of Project Co or any Project Co Party who was unaware of his or her condition;

(xi) any act or omission with respect to the operation of the Vehicles by any Driver or any failure by any Driver employed in the operation of the Vehicles that materially adversely affects Project Co's ability to maintain the Vehicles provided such act, omission or failure is not caused or contributed to by Project Co and does not relate to any failures or deficiencies in the E&M or the Tracks;

(xii) the proposed OLRT Regulations are or the Support Documentation is consistent with the requirements of Section 2(a) of Schedule 15-4 – Regulatory Standards and the City's refusal to approve the OLRT Regulations or Support

Documentation has resulted or will result in a delay or incremental expense or liability to Project Co in the performance of the activities within the Project Scope that cannot be reasonably mitigated by Project Co;

(xiii) the DB Co Works Agreement is terminated;

(xiv) DB Co admits in writing its inability to pay its debts generally as they become due, or makes a general assignment for the benefit of creditors, or a receiver, manager, administrator, administrative receiver, receiver and manager, trustee, custodian or other similar official or any other like person is appointed by or on behalf of or at the instance of a creditor of DB Co with respect to DB Co or any of the property, assets or undertaking of DB Co, or any creditor of DB Co takes control, or takes steps to take control, of DB Co or any of DB Co's assets, or any proceedings are instituted against DB Co that result in DB Co being declared or ordered bankrupt or in administration, liquidation, winding-up, reorganization, compromise, arrangement, adjustment, protection, relief or composition of it or with respect to it or its debts or obligations, or any such proceedings are instituted by DB Co seeking any such result, or any such proceedings are instituted by a person other than DB Co, the City, a City Party or a person related to any of them seeking such result and such proceedings have or will have a material adverse effect on the performance of the DB Co Works Agreement or of the City activities under the DB Co Works Agreement (where such proceedings have not been withdrawn, stayed, discharged, or are otherwise of no further effect, within 90 days after being instituted), under any Applicable Law (including the Bankruptcy and Insolvency Act (Canada) and the Companies' Creditors Arrangement Act (Canada)) relating to bankruptcy, insolvency or reorganization of or relief with respect to debtors or debtors' obligations or assets or other similar matters, or seeking the appointment of a receiver, manager, administrator, administrative receiver, receiver and manager, trustee, custodian or other similar official or like person for it or with respect to any of its assets, or any resolutions are passed or other corporate actions of DB Co are taken to authorize any of the actions set forth in this Section 42.1(a)(xiv);

(xv) any breach by DB Co of the DB Co Works Agreement (other than the occurrence of a DBF Defect, to which Section 42.1(a)(xix) applies) which is notified to the City, and which shall be an Excusing Cause from the date the breach is notified to the City or the City is otherwise aware of the breach (or, where such notification is issued no later than the day following the discovery of the breach by Project Co, from the date of the breach) until such time breach is rectified. The determination of whether a breach has occurred shall be determined pursuant to Section 9.12(c)(iii)(A);

(xvi) subject to Section 9.12, any damage to the Stage 1 System at any time or to the Stage 2 East System after the Stage 2 East Substantial Completion Date or the Stage 2 West System after the Stage 2 West Substantial Completion Date caused by DB Co or any DB Co Party which was not authorised by Project Co or any

Project Co Party or which does not arise as a result of DB Co or any DB Co Party complying with any instructions on the part of Project Co or any Project Co Party;

(xvii) the performance of the Stage 2 Integration Activities, whether carried out by Project Co, a Project Co Party or any third party and including any work carried out by any person to rectify any defect in the Stage 2 Integration Activities, including any DBF Defect;

(xviii) the Compensation Event set out in Section 41.1(a)(ii); or

(xix) DBF Defects as follows:

(A) the existence of a DBF Defect which is notified as a Warranty Request and which is agreed by DB Co to be its responsibility shall be an Excusing Cause from the date the DBF Defect is notified as a Warranty Request (or, where such Warranty Request is issued no later than the day following the occurrence of the DBF Defect, from the date the DBF Defect occurs) until such time as the DBF Defect is rectified;

(B) an alleged DBF Defect which is notified as a Warranty Request and for which DB Co considers the alleged DBF Defect not to be a DBF Defect or disputes the nature or extent of DB Co's liability for the alleged DBF Defect, but for which DB Co agrees to take corrective action, shall be an Excusing Cause from the date such DBF Defect is notified as a Warranty Request until such time as the DBF Defect is rectified;

(C) an alleged DBF Defect which is notified as a Warranty Request, but where DB Co considers the alleged DBF Defect not to be a DBF Defect or disputes the nature or extent of DB Co's liability for the alleged DBF Defect and does not agree to take corrective action:

(1) where Project Co can establish *prima facie* proof, to the City's reasonable satisfaction, that the alleged DBF Defect is the responsibility of DB Co, the City will act in good faith and treat the matter as an Excusing Cause (that is, as if it had been determined to be a DBF Defect) pending resolution of the matter under the DB Co Interface Agreement, provided that to the extent Project Co is not ultimately successful in establishing that the matter is a DBF Defect under the terms of the DB Co Interface Agreement, the Excusing Cause shall to such extent be retrospectively disapplied;

(2) in all other cases, the alleged DBF Defect shall not be treated as an Excusing Cause until it is determined under the DB Co Interface Agreement to be a DBF Defect, in which case it shall be retrospectively treated as a DBF Defect from the date the DBF Defect is notified as a Warranty Request (or, where such Warranty Request is issued no later than the day following the occurrence of

the DBF Defect, from the date the DBF Defect occurs) until such time as the DBF Defect is rectified,

provided that: (i) where Project Co has agreed with DB Co to rectify any DBF Defect on DB Co's behalf, or (ii) where Project Co is instructed by the City to rectify the DBF Defect through a Variation Enquiry and a Variation Confirmation or Variation Directive is issued, the Excusing Cause under this Section 42.1(a)(xix) shall not extend beyond such time as is reasonably necessary for Project Co to rectify the DBF Defect in question.

(xx) during any Post-Warranty Delay Period, the discovery of a DBF Defect for which DB Co would have been contractually responsible under the DB Co Interface Agreement if such DBF Defect had been notified to DB Co within the DBF Warranty Period (as defined in the DB Co Interface Agreement), and the Excusing Cause shall apply from the date the DBF Defect is notified to the City during the Post-Warranty Delay Period until such time as the DBF Defect is rectified, provided that the Excusing Cause shall not extend beyond such time as is reasonably necessary for Project Co to rectify the DBF Defect in question.

For the purpose of this Excusing Cause, "**Post-Warranty Delay Period**" shall mean a period equivalent to the length of the East Trial Running Period, or as the case may be, the West Trial Running Period, in each case, commencing on the expiry of the DBF Warranty Period (as defined in the DB Co Interface Agreement) in respect of the Stage 2 East System or as the case may be the Stage 2 West System.

(b) Without prejudice to the terms of the Belfast MSF Expansion Variation, for the purposes of determining whether a Delay Event has occurred pursuant to Section 40.1(a)(ii), a Compensation Event has occurred pursuant to Section 41.1 in respect of Section 40.1(a)(ii), an Excusing Cause has occurred pursuant to paragraphs (a)(ii), (iii) and (x) of this Section 42.1, a Relief Event has occurred in applying the proviso to Section 43.1, any breaches, acts or omissions of Project Co or any Project Co Party under the Belfast MSF Expansion Variation shall be treated as breaches, acts or omissions of the City and not Project Co or a Project Co Party.

42.2 Consequences of an Excusing Cause

(a) Provided that the effect of an Excusing Cause is claimed by Project Co, in writing, within 10 Business Days of the date on which Project Co or any Project Co Party became aware of the occurrence of such Excusing Cause, then (subject to Sections 42.3 and 42.4):

(i) any failure by Project Co to perform, and any poor performance of, any affected Maintenance Services shall not constitute a breach of this Project Agreement by Project Co, no Failure Points shall accrue in respect of such failure and Project Co shall be relieved of its obligations to perform such Maintenance Services for the duration and to the extent prevented by such Excusing Cause;

(ii) any interference shall be taken into account in measuring the performance of any affected Maintenance Services in accordance with the Performance Monitoring Program, which shall be operated as though the relevant Maintenance Services had been performed free from such adverse interference;

(iii) any interference shall be taken into account in operating the Payment Mechanism, which shall be operated as though any Service Failure, Availability Failure or Quality Failure resulting from such interference had not occurred, so that Project Co shall be entitled to payment under this Project Agreement as if there had been no such interference with the Maintenance Services, provided however that Project Co shall not be entitled to any additional compensation, except as may be provided hereunder for compensation on termination of this Project Agreement, if this Project Agreement is terminated as provided herein;

(iv) this Section 42.2 shall not limit the City's entitlement to reimbursement pursuant to Section 32.4;

(v) the City shall reimburse Project Co for all incremental Direct Costs (including all applicable Taxes and all legal or professional services, legal costs being on a full indemnity basis) incurred by Project Co as a result of any Excusing Cause referred to in Section 42.1(a)(ii), 42.1(a)(iii), 42.1(a)(vi), 42.1(a)(vii), 42.1(a)(viii), 42.1(a)(ix), 42.1(a)(x), 42.1(a)(xi), 42.1(a)(xii), 42.1(a)(xiii), 42.1(a)(xiv), 42.1(a)(xvi) or 42.1(a)(xvii) including costs arising from any steps taken to cure or mitigate against such events, together with any applicable margin for overhead and profit on such Direct Costs as set out in Schedule 22 – Variation Procedure; and

(vi) the Monthly Service Payments payable by the City shall be reduced by any savings in Direct Costs arising from Project Co being relieved of its obligations to perform the Maintenance Services as otherwise provided herein, together with any applicable margin for overhead and profit on such Direct Costs as set out in Schedule 22 – Variation Procedure.

(b) In the case of the Excusing Cause referred to in Section 42.1(a)(xix):

(i) if Project Co is retroactively awarded relief from Deductions, Section 56.2(c) shall apply to such retroactive relief on the basis that the payment under that section was due at the time the relevant Deduction was incurred;

(ii) the Parties agree that provided that:

(A) Project Co is prosecuting the relevant DBF Defect allegation(s) against DB Co in a timely manner (and in accordance with the dispute resolution procedures in the DB Co Interface Agreement, where appropriate); and

(B) Project Co keeps the City regularly appraised of such claim(s) (and notifying the City as to the Failure Points which it believes will be

excused following the establishment of the DBF Defect allegation(s) in question),

the City shall not use any such Failure Points to terminate this Project Agreement on grounds of a Project Co Event of Default and shall not take any action under Sections 31.3, 31.4, 32 or 45.5 in respect of such Failure Points, unless and to the extent that the City can demonstrate that:

(1) the DBF Defect allegation(s) has/have no reasonable prospect of success; and/or

(2) the Failure Points in question were not caused by the alleged DBF Defect(s);

(iii) if the City terminates this Project Agreement on grounds of a Project Co Event of Default in reliance of any Failure Points which are the subject of a notification in Section 42.2(b)(ii)(B) above, and it is subsequently determined that Project Co would have been entitled to an Excusing Cause in respect of the DBF Defect(s) in question (such that the City would not have had a right to terminate for a Project Co Event of Default at the date of the termination notice in question), the Project Agreement shall be deemed to have terminated on grounds of a City Event of Default as of such date.

42.3 Mitigation

(a) If Project Co is (or claims to be) affected by an Excusing Cause, Project Co shall, and shall require all Project Co Parties to, take and continue to take commercially reasonable steps:

(i) to eliminate or mitigate the consequences of such event upon the performance of its obligations under this Project Agreement;

(ii) to continue to perform its obligations under this Project Agreement to the extent possible notwithstanding the Excusing Cause; and

(iii) to resume performance of its obligations under this Project Agreement affected by the Excusing Cause as soon as practicable.

(b) To the extent that Project Co does not comply with its obligations under this Section 42.3, such failure shall be taken into account in determining Project Co's entitlement to relief pursuant to this Section 42.

42.4 Insured Exposure

(a) The compensation payable to Project Co pursuant to this Section 42 shall be reduced by any amount which Project Co or a Project Co Party recovers, or is entitled to recover, under any insurance policy, or would have recovered if it had complied with the requirements of this Project Agreement in respect of insurance or the terms of any policy

of insurance required under this Project Agreement, which amount, for greater certainty, shall not include any excess or deductibles or any amount over the maximum amount insured under any such insurance policy.

43. RELIEF EVENTS

43.1 Definition

(a) For the purposes of this Project Agreement, "**Relief Event**" means any of the following events or circumstances to the extent, in each case, that it causes any failure by a Party to perform any of its obligations under this Project Agreement:

(i) fire, explosion, lightning, storm, tempest, hurricane, tornado, flood, ionizing radiation (to the extent it does not constitute Force Majeure), earthquake, riot or civil commotion;

(ii) failure by any Utility Company, Railway Company, local authority or other like body to perform works or provide services, provided, however, that a failure by any Utility Company to perform works or provide services in connection with the construction, installation or relocation of Utility Infrastructure in connection with the Design and Construction Works and Highway Work shall not, in any event, be cause for a Relief Event, unless Project Co:

(A) has performed its obligations under any applicable Utility Agreement and the relevant Utility Company has failed to meet its obligations thereunder; and

(B) has made all, and is continuing to make any, commercially reasonable efforts to diligently enforce its legal rights under any applicable Utility Agreement and otherwise cause the Utility Company to perform those works or services;

(iii) accidental loss or damage to the Civic Works, the Works and/or the System, the Highway Work and/or the Highway or any roads servicing the Site or the Highway Site;

(iv) without prejudice to any obligation of Project Co to provide stand-by power facilities in accordance with this Project Agreement, failure or shortage of power, fuel or transport;

(v) blockade or embargo falling short of Force Majeure;

(vi) any official or unofficial strike, lockout, work to rule or other labour-related action generally affecting the System, the Highway, the construction industry (or a significant sector of the industry), the facilities maintenance industry, transit systems or public highways in the Province of Ontario;

(vii) any civil disobedience or protest action, including any action taken by any person or persons protesting or demonstrating against the carrying out of any part of the Project Scope or the construction and/or operation of transit systems or public highways in general, provided, however, that a civil disobedience or protest action shall not, in any event, be cause for a Relief Event unless Project Co has fully complied with Section 9.6;

(viii) with respect to Tunnel Work only, bursting or overflowing of water tanks, apparatus or pipes if such events are not attributable to the actions or omissions of Project Co or any Project Co Parties and are not properly inferable, readily apparent or readily discoverable from the Background Information;

(ix) the occurrence of a Belfast MSF Expansion Relief Event (as defined in the Belfast MSF Expansion Variation), provided for the purposes of the proviso below only, any acts of omissions of Project Co or a Project Co Party under the terms of the Belfast MSF Variation shall be disregarded; or

(x) the event described in Section 1.5(f)(i) of Schedule 15-3 - Maintenance and Rehabilitation Requirements.

provided, in each case, that such event does not arise (directly or indirectly) as a result of any act or omission of the Party claiming relief and (i) in the case of Project Co claiming relief, as a result of any act or omission of any Project Co Party or (ii) in the case of the City claiming relief, as a result of any act or omission of any City Party.

43.2 Consequences of a Relief Event

(a) Subject to Section 43.3:

(i) no right of termination, other than either Party's right to terminate this Project Agreement pursuant to Section 47.1, shall arise under this Project Agreement by reason of any failure by a Party to perform any of its obligations under this Project Agreement; and

(ii) as soon as the events or circumstances constituting a Relief Event have ceased, any Failure Points accrued in respect of any failure by Project Co to perform any of its obligations under this Project Agreement shall be cancelled and any related Warning Notices and Monitoring Notices shall be withdrawn,

but only to the extent that such failure to perform is caused by the occurrence of a Relief Event (it being acknowledged and agreed by the Parties that all other rights and obligations of the Parties under this Project Agreement remain unaffected by the occurrence of a Relief Event). For greater certainty, the City shall be entitled to make Deductions in accordance with Schedule 20 – Payment Mechanism notwithstanding the cancellation of Failure Points pursuant to Section 43.2(a)(ii). Any Deduction to Project Co as a result of Relief Events referred to in Section 43.1(a)(v), 43.1(a)(vi), 43.1(a)(vii), 43.1(a)(viii) or 43.1(a)(ix) shall not exceed, in the aggregate, the amount that

would be necessary to reduce payments to Project Co to an amount below the Senior Debt Service Amount.

(b) In respect of a Relief Event that is also a Delay Event pursuant to Section 40.1(a)(ix):

(i) Project Co shall only be relieved of its obligations under this Project Agreement to the extent, if any, provided for in Section 40; and

(ii) in respect of a Relief Event occurring prior to a Milestone Acceptance Date or the Highway Substantial Completion Date or the Revenue Service Availability Date which Milestone, Substantial Completion of the Highway Work or Revenue Service Availability is affected by that Delay Event and referred to in Section 43.1(a)(ii), 43.1(a)(iv), 43.1(a)(v), 43.1(a)(vi), 43.1(a)(vii), or 43.1(a)(viii) on the earlier of: (A) the relevant Milestone Acceptance Date, (B) Highway Substantial Completion Date, (C) the Revenue Service Availability Date; and (D) the date of payment of the City Default Termination Sum, Non-Default Termination Sum or Prohibited Acts Termination Sum (and as a part thereof) in accordance with Schedule 23 – Compensation on Termination, the City shall pay to Project Co an amount equal to the Senior Debt Service Amount accrued and paid or which became payable in accordance with the Lending Agreements during the period of delay by Project Co or any Project Co Party to the Senior Lenders up to and including such date, together with interest thereon at the rate payable on the Senior Debt Amount, which, but for the Delay Event, would have been paid by the City to Project Co in respect of Revenue Service Availability.

(c) If a Relief Event occurs prior to the Revenue Service Availability Date, Project Co shall not be entitled to receive any compensation other than as expressly provided in Sections 43.2(b)(ii) and 49.

(d) During a Relief Event which occurs on or after the Revenue Service Availability Date, the provisions of Schedule 20 – Payment Mechanism will continue to be in full force and effect, subject to Section 43.2(a).

(e) Subject to Section 49, Project Co's sole right to payment or otherwise in relation to the occurrence of a Relief Event shall be as provided in this Section 43.

43.3 Mitigation and Process

(a) Where a Party is (or claims to be) affected by a Relief Event, such Party shall take commercially reasonable steps to mitigate the consequences of the Relief Event upon the performance of its obligations under this Project Agreement, shall resume performance of its obligations affected by the Relief Event as soon as practicable and shall use commercially reasonable efforts to remedy its failure to perform.

(b) To the extent that the Party claiming relief does not comply with its obligations under this Section 43.3, such failure shall be taken into account in determining such Party's entitlement to relief pursuant to this Section 43.

(c) The Party claiming relief shall give written notice to the other Party within 5 Business Days of such Party becoming aware of the relevant Relief Event. Such initial notice shall give sufficient details to identify the particular event claimed to be a Relief Event.

(d) A subsequent written notice shall be given by the Party claiming relief to the other Party within a further 5 Business Days of the initial notice, which notice shall contain such relevant information relating to the failure to perform (or delay in performing) as is available, including, without limitation, the effect of the Relief Event on the ability of the Party to perform, the action being taken in accordance with Section 43.3(a), the date of the occurrence of the Relief Event, and an estimate of the period of time required to overcome the Relief Event and/or its effects.

(e) The Party claiming relief shall notify the other as soon as the consequences of the Relief Event have ceased and of when performance of its affected obligations can be resumed.

(f) If following the issue of any notice referred to in Section 43.3(d), the Party claiming relief receives or becomes aware of any further information relating to the Relief Event and/or any failure to perform, such Party shall submit such further information to the other Party as soon as reasonably possible.

43.4 Insured Exposure

(a) The compensation payable to Project Co pursuant to this Section 43 shall be reduced by any amount which Project Co or a Project Co Party recovers, or is entitled to recover, under any insurance policy, or would have recovered if it had complied with the requirements of this Project Agreement in respect of insurance or the terms of any policy of insurance required under this Project Agreement, which amount, for greater certainty, shall not include any excess or deductibles or any amount over the maximum amount insured under any such insurance policy.

44. FORCE MAJEURE

44.1 Definition

(a) For the purposes of this Project Agreement, "**Force Majeure**" means any of the following events or circumstances which directly causes either Party to be unable to perform all or a material part of its obligations under this Project Agreement:

(i) war, civil war, armed conflict, terrorism, acts of foreign enemies or hostilities;

(ii) nuclear or radioactive contamination of the Civic Works, the Design and Construction Works, the System and/or the Site, or the Highway, the Highway Work and/or the Highway Site, unless Project Co or any Project Co Party is the source or cause of the contamination;

(iii) chemical or biological contamination of the Civic Works, the Design and Construction Works, the System and/or the Site or the Highway, the Highway Work and/or the Highway Site, from any event referred to in Section 44.1(a)(i);

(iv) pressure waves caused by devices traveling at supersonic speeds; or

(v) the discovery of any Species-at-Risk, fossils, artifacts and other objects having artistic, historic, archaeological or monetary value, including human remains and burial sites, which, as a result of Applicable Law, requires the Design and Construction Works or the Highway Work to be abandoned.

(b) The occurrence of an event of Belfast MSF Expansion Force Majeure (as defined in the Belfast MSF Expansion Variation) which causes Project Co to be unable to perform all or part of its obligations under this Project Agreement shall also constitute an event of Force Majeure under this Project Agreement.

44.2 Consequences of Force Majeure

(a) Subject to Section 44.3, the Party claiming relief shall be relieved from liability under this Project Agreement to the extent that, by reason of the Force Majeure, it is not able to perform its obligations under this Project Agreement.

(b) In respect of an event of Force Majeure that is also a Delay Event pursuant to Section 40.1(a)(ix):

(i) Project Co shall only be relieved of its obligations under this Project Agreement to the extent, if any, provided for in Section 40; and

(ii) where such Delay Event causes a delay in achieving Milestone Acceptance of a Milestone by the Scheduled Milestone Acceptance Date of that Milestone or a delay in achieving Substantial Completion of the Highway Work by the Highway Scheduled Substantial Completion Date or in achieving Revenue Service Availability by the Required Revenue Service Availability Date, on the earlier of (A) the Milestone Acceptance Date of that Milestone, (B) the Highway Substantial Completion Date, (C) the Revenue Service Availability Date, and (D) the date of payment of the City Default Termination Sum, Non-Default Termination Sum or Prohibited Acts Termination Sum (and as a part thereof) in accordance with Schedule 23 – Compensation on Termination, the City shall pay to Project Co an amount equal to the Senior Debt Service Amount and the Junior Debt Service Amount accrued and paid or which became payable in accordance with the Lending Agreements during the period of delay by Project Co or any Project Co Party to the Lenders up to and including such date, together with interest thereon at the rate or rates payable on the principal amount of debt funded under the Lending Agreements, which, but for the Delay Event, would have been paid by the City to Project Co.

(c) If an event of Force Majeure occurs prior to the Revenue Service Availability Date to be achieved, Project Co shall not be entitled to receive any compensation other than as expressly provided in Sections 44.2(b)(ii) and 49.

(d) During an event of Force Majeure which occurs on or after the Revenue Service Availability Date, the provisions of Schedule 20 – Payment Mechanism will be

suspended, and the City shall pay to Project Co, for each Contract Month, the Senior Debt Service Amount, the Junior Debt Service Amount and an amount which reflects the cost to Project Co of the Maintenance Services performed, provided that, during such Contract Month, the amount paid to Project Co pursuant to this Section 44.2(d) shall never be more than the Maximum Monthly Service Payment.

(e) Subject to Section 49, Project Co's sole right to payment or otherwise in relation to the occurrence of an event of Force Majeure shall be as provided in this Section 44.

44.3 Mitigation and Process

(a) Where a Party is (or claims to be) affected by an event of Force Majeure, such Party shall take commercially reasonable steps to mitigate the consequences of such event of Force Majeure upon the performance of its obligations under this Project Agreement, shall resume performance of its obligations affected by the event of Force Majeure as soon as practicable and shall use commercially reasonable efforts to remedy its failure to perform.

(b) To the extent that the Party claiming relief does not comply with its obligations under this Section 44.3, such failure shall be taken into account in determining such Party's entitlement to relief pursuant to this Section 44.

(c) The Party claiming relief shall give written notice to the other Party within 5 Business Days of such Party becoming aware of the relevant event of Force Majeure. Such initial notice shall give sufficient details to identify the particular event claimed to be an event of Force Majeure.

(d) A subsequent written notice shall be given by the Party claiming relief to the other Party within a further 5 Business Days of the initial notice, which notice shall contain such relevant information relating to the failure to perform (or delay in performing) as is available, including, without limitation, the effect of the event of Force Majeure on the ability of the Party to perform, the action being taken in accordance with Section 44.3(a), the date of the occurrence of the event of Force Majeure, and an estimate of the period of time required to overcome the event of Force Majeure and its effects.

(e) The Party claiming relief shall notify the other as soon as the consequences of the event of Force Majeure have ceased and of when performance of its affected obligations can be resumed.

(f) If, following the issue of any notice referred to in Section 44.3(d), the Party claiming relief receives or becomes aware of any further information relating to the event of Force Majeure and/or any failure to perform, such Party shall submit such further information to the other Party as soon as reasonably possible.

44.4 Insured Exposure

(a) The compensation payable to Project Co pursuant to this Section 44 shall be reduced by any amount which Project Co or a Project Co Party recovers, or is entitled to recover,

under any insurance policy, or would have recovered if it had complied with the requirements of this Project Agreement in respect of insurance or the terms of any policy of insurance required under this Project Agreement, which amount, for greater certainty, shall not include any excess or deductibles or any amount over the maximum amount insured under any such insurance policy.

44.5 Modifications

(a) The Parties shall use commercially reasonable efforts to agree to any modifications to this Project Agreement which may be equitable having regard to the nature of an event or events of Force Majeure. Schedule 27 – Dispute Resolution Procedure shall not apply to a failure of the City and Project Co to reach agreement pursuant to this Section 44.5.

45. PROJECT CO DEFAULT

45.1 Project Co Events of Default

(a) Subject to Section 45.1(b), for the purposes of this Project Agreement, "**Project Co Event of Default**" means any one or more of the following events or circumstances:

(i) the occurrence of any of the following events other than as a consequence of a breach by the City of its payment obligations hereunder:

(A) Project Co admits in writing its inability to pay its debts generally as they become due, or makes a general assignment for the benefit of creditors, or a receiver, manager, administrator, administrative receiver, receiver and manager, trustee, custodian or other similar official or any other like person is appointed by or on behalf of or at the instance of a creditor of Project Co with respect to Project Co or any of the property, assets or undertaking of Project Co, or any creditor of Project Co takes control, or takes steps to take control, of Project Co or any of Project Co's assets, or any proceedings are instituted against Project Co that result in Project Co being declared or ordered bankrupt or in administration, liquidation, winding-up, reorganization, compromise, arrangement, adjustment, protection, relief or composition of it or with respect to it or its debts or obligations, or any such proceedings are instituted by Project Co seeking any such result, or any such proceedings are instituted by a person other than Project Co, the City, a City Party or a person related to any of them seeking such result and such proceedings have or will have a material adverse effect on the Governmental Activities or the availability of the System to System Users (where such proceedings have not been withdrawn, stayed, discharged, or are otherwise of no further effect, within 90 days of being instituted), under any Applicable Law (including the *Bankruptcy and Insolvency Act* (Canada) and the *Companies' Creditors Arrangement Act* (Canada)) relating to bankruptcy, insolvency or reorganization of or relief with respect to debtors or debtors' obligations or assets or other similar matters, or seeking the appointment of a receiver,

manager, administrator, administrative receiver, receiver and manager, trustee, custodian or other similar official or like person for it or with respect to any of its assets, or any resolutions are passed or other corporate actions of Project Co are taken to authorize any of the actions set forth in this Section 45.1(a)(i)(A);

(B) Project Co ceases performing a substantial portion of its business, or a substantial portion of such business is suspended or is not being performed, whether voluntarily or involuntarily, that has or will have a material adverse effect on Project Co's ability to perform its obligations under this Project Agreement;

(C) if any execution, sequestration, extent, garnishment or other process of or order by any court becomes enforceable against Project Co or if a distress or analogous process is levied against any property of Project Co that materially adversely affects Project Co's ability to perform its obligations hereunder; or

(D) Project Co shall suffer any event, or any event or set of circumstances occurs or comes about, analogous to the foregoing events or sets of circumstances set out this Section 45.1(a)(i) in any jurisdiction in which it is incorporated or resident and such event or set of circumstances would, if set out in Section 45.1(a)(i)(A), (B) or (C), constitute a Project Co Event of Default;

(ii) Project Co failing to achieve Revenue Service Availability within 365 days after the Required Revenue Service Availability Date (the "**Longstop Date**");

(iii) Project Co:

(A) failing to deliver a rectification plan under Section 22.3(a)(iii)(B);

(B) delivering a rectification plan under Section 22.3(a)(iii)(B) which indicates that Project Co will not achieve Revenue Service Availability by the Longstop Date; or

(C) delivering a rectification plan under Section 22.3(a)(iii)(B) that is not acceptable to the Independent Certifier, acting reasonably, as to the matters set out in Section 22.3(a)(iii)(B)(II);

(iv) Project Co making any representation or warranty herein that is false or misleading when made, and that has or will have at any time a material adverse effect on the performance of the activities within the Project Scope, the Governmental Activities or the availability of the System to System Users, or that may compromise (1) the City's or any City Party's reputation or integrity or the nature of the City or the Project, or (2) the ability of the City to conduct its affairs, so as to negatively affect public perception of the City or the Project, and, in the case of a false or misleading representation or warranty that is capable of being

remedied, such breach is not remedied within 10 Business Days of receipt of notice of the same from the City;

(v) Project Co committing a breach of Section 52 or 53 or a breach of its obligations under this Project Agreement (other than a breach that is referred to in Sections 45.1(a)(i) to (iv) inclusive or 45.1(a)(vi) to (xxi) inclusive) which has or will have a material adverse effect on the Governmental Activities, the availability of the Highway or the availability of the System to System Users, other than where such breach is a consequence of a breach by the City of its obligations under this Project Agreement, and upon becoming aware of such breach Project Co failing to remedy such breach in accordance with all of the following:

(A) Project Co shall:

(I) immediately commence and thereafter diligently continue to remedy the breach and to mitigate any adverse effects on the City and the Governmental Activities, the availability of the Highway or the availability of the System to System Users;

(II) put forward, within 5 Business Days of receipt of notice of such breach from the City, a reasonable plan and schedule for diligently remedying the breach and mitigating its effect, which plan and schedule shall specify in reasonable detail the manner in which, and the latest date by which, such breach is proposed to be remedied, which latest date shall in any event be within 60 days of notice of such breach, or if such breach is not capable of being rectified in such period then such longer period as is reasonable in the circumstances; and

(III) thereafter perform its obligations to achieve all elements of such plan and schedule in accordance with its terms within the time for the performance of its obligations thereunder; and

(B) upon Project Co failing to comply with any of the provisions of Section 45.1(a)(v)(A):

(I) Project Co shall continue to diligently remedy the breach and to mitigate any adverse effects on the City and the Governmental Activities, the availability of the Highway or the availability of the System to System Users;

(II) Project Co shall, within 3 Business Days after notice from the City, submit a plan and schedule, which the City shall have no obligation to accept, for remedying the breach and mitigating its effect within such period, if any, acceptable to the City, in its Discretion, and thereafter perform its obligations to achieve all elements of such plan and schedule in accordance with its terms

within the time for the performance of its obligations thereunder; and

(III) for greater certainty, Project Co failing to comply with any of the provisions of this Section 45.1(a)(v)(B), or the City, in its Discretion, not accepting the plan and schedule submitted by Project Co pursuant to that Section, shall constitute a Project Co Event of Default;

(vi) Project Co wholly abandoning the Works for a period which exceeds 3 Business Days from receipt by Project Co of a written request to return to the Site, other than as a consequence of a breach by the City of its obligations under this Project Agreement;

(vii) Project Co ceasing to perform any Maintenance Services in accordance with this Project Agreement which is necessary for the Governmental Activities or the availability of the System to System Users, other than as a consequence of a breach by the City of its obligations under this Project Agreement;

(viii) Project Co failing to comply with Section 59.1 or 59.3;

(ix) the occurrence of any Change in Ownership or Change in Control which is prohibited by Section 59.4;

(x) Project Co being awarded a total of 1300 or more Failure Points in any rolling 3 Contract Months;

(xi) Project Co being awarded a total of 1600 or more Failure Points in any rolling 6 Contract Months;

(xii) Project Co being awarded a total of 2000 or more Failure Points in any rolling 12 Contract Months;

(xiii) Project Co failing to remove an Encumbrance that arose due to an act or omission of Project Co or any Project Co Party (other than a Title Encumbrance and any Encumbrance derived through the City) within 45 days of the earlier of:

(A) the registration of such Encumbrance against title to the Lands or any part thereof; and

(B) the date on which Project Co or any Project Co Party knew, or ought to have known, about the existence of the Encumbrance;

(xiv) Project Co failing to pay any sum or sums due to the City under this Project Agreement, which sum or sums are not being disputed by Project Co in accordance with Schedule 27 – Dispute Resolution Procedure and which sum or sums, either singly or in aggregate, exceed(s) $ (index linked), and such failure

continues for 30 days from receipt by Project Co of a notice of non-payment from the City;

(xv) Project Co failing to comply with Section 60;

(xvi) Project Co failing to comply with Section 7.3 or Schedule 28 – Refinancing;

(xvii) Project Co failing to obtain any bond, security or insurance required to be obtained by or on behalf of Project Co pursuant to this Project Agreement or any such bond, security or insurance being vitiated or otherwise ceasing to be in full force and effect or in material compliance with the requirements set out in this Project Agreement, other than as a consequence of a breach by the City of its obligations under this Project Agreement, and:

(A) in respect of insurance, such breach by Project Co is not remedied within 10 Business Days of the occurrence of the breach; and

(B) in respect of a bond or security, such breach by Project Co is not remedied within 5 Business Days of Project Co becoming aware of such breach;

(xviii) Project Co failing to comply with any determination, order or award made against Project Co in accordance with Schedule 27 – Dispute Resolution Procedure;

(xix) at any time after the Revenue Service Availability Date, Project Co committing a breach of its obligations under this Project Agreement (other than its obligations in Schedule 45 or otherwise as a consequence of a breach by the City of its obligations under this Project Agreement) which results in a criminal conviction or a conviction under the *OHSA* against Project Co or any Project Co Party or the City (an "**H&S Conviction**") provided however that:

(A) an H&S Conviction against Project Co, a Project Co Party or the City shall not constitute a Project Co Event of Default if, within 90 days from the date of the H&S Conviction (whether or not the H&S Conviction is subject to an appeal or any further judicial process), the involvement in the Project Scope of each relevant Project Co Party (which in the case of an individual director, officer or employee shall be deemed to include the Project Co Party of which that person is a director, officer or employee) is terminated in accordance with Section 59.3 or Project Co takes such other disciplinary action against each such Project Co Party as is acceptable to the City, in its Discretion; and

(B) in determining whether to exercise any right of termination for a Project Co Event of Default pursuant to this Section 45.1(a)(xix), the City shall:

(I) act in a reasonable and proportionate manner having regard to such matters as the gravity of any offence and the identity of the person committing the act leading to the H&S Conviction; and

(II) give all due consideration, where appropriate, to action other than termination of this Project Agreement;

(xx) Project Co failing to comply with Section 28.5;

(xxi) Project Co wholly abandoning the Highway Work for a period which exceeds 3 Business Days from receipt by Project Co of a written request to return to the Highway Site, other than as a consequence of a Delay Event or a breach by the City of its obligations under this Project Agreement;

(b) The City shall not exercise any rights under this Section 45 (except its rights under Section 45.5(a)) as a result of a Project Co Event of Default referred to in Sections 45.1(a)(vii), 45.1(a)(x) to 45.1(a)(xii) until the day after the Revenue Service Availability Payment Date. For greater certainty, if the City is prevented from exercising any rights under this Section 45 by the terms of the immediately preceding sentence, then, notwithstanding the passage of time or any intervening event (including that the City may have exercised its rights under Section 45.5(a)), on and after the day after the Revenue Service Availability Payment Date, the City may exercise any such rights.

45.2 Notification of Occurrence

(a) Project Co shall, promptly upon Project Co becoming aware of the occurrence, notify the City of the occurrence, and details, of any Project Co Event of Default and of any event or circumstance which is likely, with the passage of time, giving of notice, determination of any condition, or otherwise, to constitute or give rise to a Project Co Event of Default.

45.3 Right to Termination

(a) On the occurrence of a Project Co Event of Default, or at any time after the City becomes aware of a Project Co Event of Default (and, if the occurrence of a Project Co Event of Default is disputed by Project Co in good faith, then following confirmation in accordance with Schedule 27 – Dispute Resolution Procedure that a Project Co Event of Default has occurred), the City may, subject to Section 45.4, terminate this Project Agreement in its entirety by written notice having immediate effect, such notice to be given to Project Co, and to any person specified in the Lenders' Direct Agreement to receive such notice.

45.4 Remedy Provisions

(a) In the case of a Project Co Event of Default referred to in Sections 45.1(a)(i)(B), 45.1(a)(i)(C), 45.1(a)(i)(D) (where the Project Co Event of Default referred to in Section 45.1(a)(i)(D) is analogous to a Project Co Event of Default referred to in Section 45.1(a)(i)(B) or 45.1(a)(i)(C)), 45.1(a)(iii), 45.1(a)(iv), 45.1(a)(vi), 45.1(a)(vii), 45.1(a)(viii), 45.1(a)(ix) (where the Project Co Event of Default referred to in Section 45.1(a)(ix) is capable of being remedied), 45.1(a)(xiv), 45.1(a)(xvi), 45.1(a)(xvii) (where the Project Co Event of Default referred to in Section 45.1(a)(xvii) is not in respect of insurance), 45.1(a)(xviii), 45.1(a)(xix), 45.1(a)(xx) or 45.1(a)(xxi) the City shall, prior to being entitled to terminate this Project Agreement, give notice of default to

Project Co, and to any person specified in the Lenders' Direct Agreement to receive such notice, and Project Co shall:

(i) within 5 Business Days of such notice of default, put forward a reasonable plan and schedule for diligently remedying the Project Co Event of Default, which schedule shall specify in reasonable detail the manner in, and the latest date by which, such Project Co Event of Default is proposed to be remedied, which latest date shall, in any event, be within 30 days of the notice of default, or if such breach is not capable of being remedied in such period then such longer period as is acceptable to the City, acting reasonably; and

(ii) thereafter, perform its obligations to achieve all elements of such plan and schedule in accordance with its terms within the time for the performance of its obligations thereunder.

(b) Where Project Co puts forward a plan and schedule in accordance with Section 45.4(a)(i) that has a date for the Project Co Event of Default to be remedied that is beyond 30 days from the notice of default, the City shall have 5 Business Days from receipt of the same within which to notify Project Co that the City does not accept such longer period in the plan and schedule and that the 30 day limit will apply, failing which the City shall be deemed to have accepted the longer period in the plan and schedule.

(c) If a Project Co Event of Default, of which a notice of default was given under Section 45.4(a), occurs and:

(i) Project Co fails to immediately commence and thereafter diligently continue to remedy the Project Co Event of Default and to mitigate any adverse effects on the City and the Governmental Activities, the availability of the Highway or the availability of the System to System Users; or

(ii) Project Co fails to put forward a plan and schedule pursuant to Section 45.4(a)(i); or

(iii) such Project Co Event of Default is not remedied within 30 days of such notice of default or such longer period as is established pursuant to the plan and schedule established pursuant to Sections 45.4(a) and (b); or

(iv) where Project Co puts forward a plan and schedule pursuant to Section 45.4(a)(i) and Project Co fails to perform its obligations thereunder necessary to achieve all elements of such plan and schedule in accordance with its terms within the time for the performance of its obligations,

then the City may terminate this Project Agreement in its entirety by written notice with immediate effect, such notice to be given to Project Co, and to any person specified in the Lenders' Direct Agreement to receive such notice.

(d) Notwithstanding that the City may give the notice referred to in Section 45.4(a), and without prejudice to the other rights of the City in this Section 45.4, at any time during

which a Project Co Event of Default is continuing, the City may, at Project Co's risk and expense, take such steps as the City considers appropriate, either itself or by engaging others (including a third party) to take such steps, to perform or obtain the performance of Project Co's obligations under this Project Agreement or to remedy such Project Co Event of Default.

(e) Upon the occurrence of a Project Co Event of Default that Project Co has remedied pursuant to this Section 45.4, such occurrence of a Project Co Event of Default shall thereafter cease to be a Project Co Event of Default and the City shall not be entitled to terminate this Project Agreement for that occurrence of a Project Co Event of Default.

(f) In the case of a Project Co Event of Default referred to in Sections 45.1(a)(x), (xi) or (xii), in addition to and without prejudice to any of the City's other remedies including its right to terminate this Project Agreement pursuant to Section 45, the City may require Project Co to provide the plan and schedule referred to in Section 45.4(a)(i) and thereafter perform the obligations referred to in Section 45.4(a)(ii), in which event the provisions of Sections 45.4(b), (c) and (d) shall thereupon apply.

45.5 Replacement of Non-Performing Maintenance Contractor

(a) The City may, acting reasonably, require Project Co to terminate the Maintenance Contract and ensure that a replacement Maintenance Contractor is appointed in accordance with Section 59.3 to provide the Maintenance Services within 60 days:

(i) if the City could have exercised a right to terminate this Project Agreement but for the provisions of Section 45.1(b), and the Project Co Event of Default was caused, or contributed to, by Project Co (in the case of Project Co directly performing the Maintenance Services) or a Maintenance Contractor, as applicable, or otherwise relates to the Maintenance Services; or

(ii) as an alternative to termination of this Project Agreement pursuant to Section 45.3 or 45.4, in any circumstance in which the City could exercise such right of termination, if the Project Co Event of Default was caused, or contributed to, by the Maintenance Contractor or otherwise relates to the Maintenance Services; or

(iii) if Project Co accrues, in any rolling 6 Contract Months more than:

(A) 1000 Failure Points in respect of Vehicle and System Availability Failures;

(B) 1500 Failure Points in respect of Station Availability Failures; or

(C) 250 Failure Points in respect of Quality Failures and Service Failures, combined,

provided that this Section 45.5 shall not give rise to partial termination of either the obligation to provide the activities within the Project Scope or this Project Agreement.

(b) If the City exercises its rights under this Section 45.5, Project Co shall, within 5 Business Days, put forward a proposal for the interim management or performance of the Maintenance Services until such time as a replacement Maintenance Contractor can be engaged by Project Co. If Project Co fails to do so, or if its proposal is not reasonably likely to give adequate performance of the Maintenance Services and the Parties cannot agree within a further 3 Business Days to a plan for the interim management or performance of the Maintenance Services, then, without prejudice to the other rights of the City in this Section 45.5, the City itself may perform, or engage others (including a third party) to perform, the Maintenance Services and Section 32.4 shall apply, mutatis mutandis, to the Maintenance Services. Any Dispute in respect of the interim management or provision of the Maintenance Services may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure.

(c) If Project Co fails to terminate, or secure the termination of, the Maintenance Contract and to secure a replacement Maintenance Contractor in accordance with Section 45.5, the City shall be entitled to exercise its termination rights in accordance with Sections 45.3 and 45.4, as applicable.

(d) Where a replacement Maintenance Contractor is appointed in accordance with this Section 45.5, 50% of the Failure Points accrued by Project Co prior to such replacement shall be cancelled. Where the replacement Maintenance Contractor is primarily responsible for the maintenance of Vehicles, then 100% of the Failure Points accrued by Project Co prior to such replacement shall be cancelled.

45.6 City's Costs

(a) Project Co shall reimburse the City for all reasonable costs (including all applicable Taxes and all legal or professional services, legal costs being on a full indemnity basis) properly incurred by the City in exercising its rights under this Section 45, including any relevant increased administrative expenses. The City shall take commercially reasonable steps to mitigate such costs.

45.7 No other Rights to Terminate

(a) The City shall have no right or entitlement to terminate this Project Agreement, or to accept any repudiation of this Project Agreement, and shall not purport to exercise any such right or entitlement except as set forth in Sections 45 and 47.

46. CITY DEFAULT

46.1 City Events of Default

(a) For the purposes of this Project Agreement, "**City Event of Default**" means any one or more of the following events or circumstances:

(i) the City failing to pay any sum or sums due to Project Co under this Project Agreement, which sum or sums are not being disputed by the City in accordance

with Schedule 27 – Dispute Resolution Procedure and which sum or sums, either singly or in aggregate, exceed(s) $250,000 (index linked), and:

(A) in respect of a Milestone Payment, the Highway Milestone Payment, the Highway Final Payment or the Revenue Service Availability Payment such failure continues for 10 Business Days;

(B) subject to Section 46.1(a)(i)(C), in respect of any Monthly Service Payment, such failure continues for 30 days;

(C) in respect of any 3 Monthly Service Payments in any rolling 9 month period, such failure continues for 15 Business Days in respect of each such Monthly Service Payment; or

(D) in respect of any other payment due and payable by the City to Project Co under this Project Agreement, such failure continues for 90 days,

in any such case, from receipt by the City of a notice of non-payment from or on behalf of Project Co;

(ii) the City committing a material breach of its obligations under Section 14 or Section 9 or Schedule 40 (other than as a consequence of a breach by Project Co of its obligations under this Project Agreement), which breach materially adversely affects the ability of Project Co to perform its obligations under this Project Agreement for a continuous period of not less than 60 days; or

(iii) an act of any Governmental Authority which renders it impossible for Project Co to perform all or substantially all of its obligations under this Project Agreement (other than as a consequence of a breach by Project Co of its obligations under this Project Agreement) for a continuous period of not less than 60 days (for greater certainty, the non-issuance of, or the imposition of any conditions or limitations in, any of the Project Co Permits, Licences and Approvals shall not constitute an "**act of any Governmental Authority**").

46.2 Project Co's Options

(a) On the occurrence of a City Event of Default and while the same is continuing, Project Co may give notice to the City of the occurrence of such City Event of Default, which notice will specify the details thereof, and, at Project Co's option and without prejudice to its other rights and remedies under this Project Agreement, may:

(i) suspend performance of the Design and Construction Works and the Maintenance Services until such time as the City has remedied such City Event of Default; or

(ii) if such City Event of Default has not been remedied within 30 days of receipt by the City of notice of the occurrence of such City Event of Default, terminate this Project Agreement in its entirety by notice in writing having immediate effect.

46.3 Project Co's Costs

(a) The City shall reimburse Project Co for all reasonable costs (including all applicable Taxes and all legal or professional services, legal costs being on a full indemnity basis) properly incurred by Project Co in exercising its rights under this Section 46, including any relevant increased administrative expenses. Project Co shall take commercially reasonable steps to mitigate such costs.

46.4 No Other Rights to Terminate

(a) Project Co shall have no right or entitlement to terminate this Project Agreement, nor to accept any repudiation of this Project Agreement, and shall not exercise, nor purport to exercise, any such right or entitlement except as expressly set forth in this Project Agreement.

47. RELIEF EVENT AND NON-DEFAULT TERMINATION

47.1 Termination for Relief Event

(a) Subject to Section 47.1(b), if a Relief Event occurs and the effects of the Relief Event continue for 180 days from the date on which the Party affected gives notice to the other Party pursuant to Section 43.3(c), either Party may, at any time thereafter, terminate this Project Agreement by written notice to the other Party having immediate effect, provided that the effects of the Relief Event continue during such period to prevent either Party from performing a material part of its obligations under this Project Agreement.

(b) Neither Party shall be entitled to exercise its right to terminate this Project Agreement in accordance with Section 47.1(a) if Project Co or a Project Co Party recovers, or is entitled to recover, under any insurance policy, or would have recovered if it had complied with the requirements of this Project Agreement in respect of insurance or the terms of any policy of insurance required under this Project Agreement, an amount which, together with the Monthly Service Payment, is equal to or greater than 85% of the Maximum Monthly Service Payment for the relevant Contract Month.

47.2 Termination for Force Majeure

(a) If an event of Force Majeure occurs and the Parties, having used commercially reasonable efforts, have failed to reach agreement on any modification to this Project Agreement pursuant to Section 44.5 within 180 days from the date on which the Party affected gives notice to the other Party as set out therein, either Party may, at any time thereafter, terminate this Project Agreement by written notice to the other Party having immediate effect, provided that the effects of the event of Force Majeure continue during such period to prevent either Party from performing a material part of its obligations under this Project Agreement.

47.3 Termination for Convenience

(a) The City shall, in its Discretion and for any reason whatsoever, be entitled to terminate this Project Agreement at any time on 180 days' written notice to Project Co.

(b) In the event of notice being given by the City in accordance with this Section 47.3, the City shall, at any time before the expiration of such notice, be entitled to direct Project Co to refrain from commencing, or allowing any third party to commence, the Works or the Highway Work, or any part or parts of the Works or the Highway Work, or the Maintenance Services, or any element of the Maintenance Services, where such Works, Highway Work or Maintenance Services have not yet been commenced.

47.4 Automatic Expiry on Expiry Date

(a) This Project Agreement shall terminate automatically on the Expiry Date.

(b) Project Co shall not be entitled to any compensation due to termination of this Project Agreement on expiry of the Project Term on the Expiry Date.

48. EFFECT OF TERMINATION

48.1 Termination

(a) Notwithstanding any provision of this Project Agreement, upon the service of a notice of termination or termination on the Expiry Date pursuant to Section 47.4, this Section 48 shall apply in respect of such termination.

48.2 Continued Effect – No Waiver

(a) Notwithstanding any breach of this Project Agreement by a Party, the other Party may elect to continue to treat this Project Agreement as being in full force and effect and to enforce its rights under this Project Agreement without prejudice to any other rights which such other Party may have in relation to such breach. The failure of either Party to exercise any right under this Project Agreement, including any right to terminate this Project Agreement and any right to claim damages, shall not be deemed to be a waiver of such right for any continuing or subsequent breach.

48.3 Continuing Performance

(a) Subject to any exercise by the City of its rights to perform, or to seek, pursuant to this Project Agreement, a third party to perform, the obligations of Project Co, the Parties shall continue to perform their obligations under this Project Agreement (including, if applicable, pursuant to Schedule 23 – Compensation on Termination) notwithstanding the giving of any notice of default or notice of termination, until the termination of this Project Agreement becomes effective in accordance with this Section 48.

48.4 Effect of Notice of Termination

(a) On the service of a notice of termination, or termination on the Expiry Date pursuant to Section 47.4:

(i) if termination is prior to the Revenue Service Availability Date, in so far as any transfer shall be necessary to fully and effectively transfer such property to the City as shall not already have been transferred to the City pursuant to Section 55.1, Project Co shall transfer to, and there shall vest in, the City, free from all Encumbrances (other than the Title Encumbrances and any Encumbrances caused or consented to by the City), such part of the Works and System as shall have been constructed and, such items of the plant and equipment as shall have been procured by Project Co, and, if the City so elects:

(A) all plant, equipment and materials (other than those referred to in Section 48.4(a)(i)(B)) on or near to the Site shall remain available to the City for the purposes of completing the Works; and

(B) all construction, plant and equipment shall remain available to the City for the purposes of completing the Works, subject to payment by the City of the relevant Construction Contractor's reasonable charges;

(ii) if termination is prior to the Revenue Service Availability Date, Project Co shall deliver to the City (to the extent such items have not already been delivered to the City) one complete set of all Project Data and Drawings;

(iii) if the termination is prior to the Highway Substantial Completion Date, Project Co shall cooperate with the City and turn over to the City copies of Project Co's records, documentation and drawings necessary for the City to proceed with the Highway Work, including, subject to Section 48.4(a)(vi), the legal assignment to the City of any of Project Co's rights in any agreement relating to the Highway Work as the City may require, and Project Co shall not do anything to impede the City's ability to proceed with the Highway Work. Further, Project Co agrees to turn over to the City, on a timely basis, enabling Project Co to make and retain copies as it may reasonably deem necessary, all of Project Co's records, files, documents, materials, drawings, and any other items relating to the Highway Work, whether located on the Highway Site, at Project Co's office or elsewhere and to vacate the Highway Site in accordance with the City's reasonable instructions. The City may retain such records, files, documents, materials, drawings and any other items for such time as it may need them and may reproduce any and all such items for its own use;

(iv) subject to the rights and obligations set forth in Schedule 41 – Intellectual Property, the City will be entitled to retain all Project Co Intellectual Property, Subcontractor Intellectual Property and Third Party Intellectual Property that has been Delivered up to the Termination Date or that is Delivered pursuant to this

Section 48.4, which may thereafter be Used by the City in accordance with the Licences granted herein;

(v) in so far as title shall not have already passed to the City pursuant to Section 55.1 or Section 48.4(a)(i), Project Co shall hand over to, and there shall vest in, the City, free from all Encumbrances (other than the Title Encumbrances and any Encumbrances caused or consented to by the City), the Highway, the System together with all other assets and rights capable of being transferred that are necessary for the performance of the Project and the activities within the Project Scope and all facilities and equipment including, notwithstanding that termination may occur prior to the Expiry Date, the verification and transfer of inventory as set forth in Appendix C (Expiry Date Requirements) of Schedule 15-3 – Maintenance and Rehabilitation Requirements, and to the extent that any such assets or rights are not capable of being transferred by Project Co to the City, Project Co shall enter into agreements or make other arrangements in order to permit the use of the assets or rights by the City in order to enable it, or its designated agents or Subcontractors, to continue to perform the activities which would have otherwise been performed by Project Co if this Project Agreement had not been terminated;

(vi) if the City so elects, Project Co shall ensure that any of the Subcontracts between Project Co and a Subcontractor (including the Contracts), and any other instrument entered into between any such Subcontractor and Project Co for securing the performance by such Subcontractor of its obligations in respect of the Project Scope or to protect the interests of Project Co, shall be novated or assigned to the City or its nominee, provided that where termination occurs other than as a result of a Project Co Event of Default, the consent of the relevant Subcontractor shall be required, and further provided that any such novation or assignment of a Subcontract with any Contractor or shall be made to the City pursuant to, and subject to, the terms of the applicable Contractor's Direct Agreement;

(vii) Project Co shall, or shall ensure that any Project Co Party shall, offer to sell (and if the City so elects, execute such sale) to the City at a fair value (determined as between a willing vendor and willing purchaser, with any Disputes as to such fair value being resolved in accordance with Schedule 27 – Dispute Resolution Procedure), free from all Encumbrances (other than the Title Encumbrances and any Encumbrances caused or consented to by the City), all or any part of the stocks of material and other assets, road vehicles, construction equipment, spare parts and other moveable property owned by Project Co or any Project Co Parties and dedicated to or predominantly used in respect of the Highway, the System, and reasonably required by the City in connection with the operation of the Highway, the System or the performance of the Maintenance Services;

(viii) Project Co shall deliver to the City (to the extent such items have not already been delivered to the City) one complete set of:

(A) the most recent As Built Drawings in the format that the City, acting reasonably, considers most appropriate at the time showing all alterations made to each Milestone since the relevant Milestone Acceptance Date; and

(B) the most recent maintenance, operation and training manuals for the System;

(ix) Project Co shall use commercially reasonable efforts to assign, or otherwise transfer, to the City, free from all Encumbrances (other than the Title Encumbrances and any Encumbrances caused or consented to by the City), the benefit of all manufacturers' warranties, including all documentation in respect thereof, in respect of mechanical and electrical and equipment used or made available by Project Co under this Project Agreement and included in the Highway and the System;

(x) Project Co shall deliver to the City all information, reports, documents, records and the like referred to in Section 37, including as referred to in Schedule 26 – Record Provisions, except where such are required by Applicable Law to be retained by Project Co or the Project Co Parties (in which case complete copies shall be delivered to the City);

(xi) Project Co will return to the City all City Intellectual Property and Confidential Information of the City; and

(xii) in the case of the termination of this Project Agreement on the Expiry Date in accordance with Section 47.4, the System and elements of the System shall be in the condition required in accordance with Section 50 and Schedule 24 – Expiry Transition Procedure.

48.5 Ownership of Information

(a) Subject to Section 51, all information obtained by Project Co, including the As Built Drawings and other technical drawings and data, supplier agreements and contracts, utilities consumption information, environmental and technical reports, lease, licence and subletting data and contracts, asset condition data, standard operating procedures, processes and manuals and all other information directly related to the Project Scope accumulated over the course of the Project Term shall be the property of the City and upon termination of this Project Agreement shall be provided or returned to the City, as applicable, in electronic format acceptable to the City, acting reasonably, where it exists in electronic format, and in its original format, when not in electronic format.

48.6 Provision in Subcontracts

(a) Project Co shall make provision in all Subcontracts to which it is a party (including requiring the relevant Project Co Parties to make such provision and to require other Project Co Parties to make such provision) to ensure that the City shall be in a position to

exercise its rights, and Project Co shall be in a position to perform its obligations, under this Section 48.

48.7 Transitional Arrangements

(a) On the termination of this Project Agreement for any reason, for a reasonable period both before and after any such termination, Project Co shall, subject to the continued performance of Maintenance Services pursuant to Sections 3.2 and 3.3 of Schedule 23 – Compensation on Termination if applicable:

(i) cooperate fully with the City and any successors providing services in the nature of any of the Maintenance Services or any part of the Maintenance Services in order to achieve a smooth transfer of the manner in which the Maintenance Services are performed and to avoid or mitigate, in so far as reasonably practicable, any inconvenience or any risk to the health and safety of any System Users;

(ii) as soon as practicable remove from the Site and the Highway Site all property belonging to Project Co or any Project Co Party that is not acquired or retained by the City pursuant to Section 48.4 or otherwise, and, if Project Co has not done so within 60 days after any notice from the City requiring it to do so, the City may, without being responsible for any loss, damage, costs or expenses, remove and sell any such property and shall hold any proceeds, less all costs incurred to the credit of Project Co;

(iii) forthwith deliver to the City Representative:

(A) all keys to, and any pass cards and other devices used to gain access to any part of the System; and

(B) to the extent transferable and in addition to and without prejudice to the City's rights pursuant to Section 51, any copyright licences for any computer programs, or licences to use the same, used in connection with the operation of the System; and

(iv) as soon as practicable vacate the Site, the Highway and, without limiting Project Co's obligations under Schedule 24 – Expiry Transition Procedure, shall leave the Site, the Highway Site and the System in a safe, clean and orderly condition.

(b) If the City wishes to conduct a competition prior to the Expiry Date with a view to entering into an agreement for the provision of services, which may or may not be the same as, or similar to, the Maintenance Services or any part of the Maintenance Services, following the expiry of this Project Agreement, Project Co shall, subject to payment of Project Co's reasonable costs, cooperate with the City fully in such competition process, including by:

(i) providing any information which the City may reasonably require to conduct such competition, including all information contained in any asset management system maintained by Project Co not otherwise transferred to the City, other than Sensitive Information; and

(ii) assisting the City by allowing any or all participants in such competition process unrestricted access to the Site, the Highway Site and the System.

48.8 Termination upon Aforesaid Transfer

(a) On completion of Project Co's obligations pursuant to this Section 48, this Project Agreement shall terminate and, except as provided in Section 48.9, all rights and obligations of the City and Project Co under this Project Agreement shall cease and be of no further force and effect.

48.9 Survival

(a) Except as otherwise provided in this Project Agreement, termination of this Project Agreement shall be without prejudice to, and shall not affect:

(i) all representations, warranties and indemnities under this Project Agreement; and

(ii) Sections 1.2, 1.3, 5, 6, 7, 15.2, 16.1, 16.1A, 16.1B, 16.2(a), 16.3(a), 16.4(a), 16.5(a), 25.6, 26.8, 31.4, 32, 34.6, 34.8, 34.13, 34.14, 34.15, 35, 36, 37, 45.6, 46.3, 47.4, 48, 49, 50, 52, 53, 55, 56, 57, 58, 60.3, 61.1, 64.4, 64.5, 64.9, 64.10, 64.11, 64.12 and 64.13 of this Project Agreement, Schedule 8 – Energy Matters, Schedule 23 – Compensation on Termination, Sections 2, 4 and 5 of Schedule 24 – Expiry Transition Procedure, Sections 1.1 to 1.4, 4 and 5 of Schedule 26 – Record Provisions, Schedule 27 – Dispute Resolution Procedure, Section 8.1 of Schedule 35 – Additional Vehicles, Sections 9.6, 11.9(f) and 14 of Schedule 40 – Highway Work, Sections 3.1 to 3.4, 3.6, 4.2, 4.6 and 4.9 of Schedule 41 – Intellectual Property and any other provisions of this Project Agreement which are expressed to survive termination or which are required to give effect to such provisions which survive termination or to such termination or to the consequences of such termination,

all of which shall survive the termination of this Project Agreement, including for termination on the Expiry Date pursuant to Section 47.4.

49. COMPENSATION ON TERMINATION

49.1 Compensation on Termination

(a) If this Project Agreement is terminated in accordance with the terms hereof, then Schedule 23 – Compensation on Termination shall apply and the City shall pay Project Co any applicable compensation on termination.

49.2 Full and Final Settlement

(a) Except as otherwise provided in Section 49.2(b), any compensation paid pursuant to this Section 49, including pursuant to Schedule 23 – Compensation on Termination in the total amount owing thereunder, shall be in full and final settlement of any claims, demands and proceedings of Project Co and the City, and each shall be released from all liability to the other in relation to any breaches or other events leading to such termination of this Project Agreement, and the circumstances leading to such breach or termination, and Project Co and the City shall be precluded from exercising all other rights and remedies in respect of any such breach or termination whether in contract, tort, restitution, statute, at common law or otherwise.

(b) Section 49.2(a) shall be without prejudice to:

(i) any liability of either Party to the other, including under the indemnities contained in this Project Agreement, that arose prior to the Termination Date (but not from the termination itself or the events leading to such termination) to the extent such liability has not already been set off pursuant to Section 34.13 or taken into account pursuant to Schedule 23 – Compensation on Termination in determining or agreeing upon the City Default Termination Sum, Adjusted Highest Qualifying Tender Price, Adjusted Estimated Fair Value, Non-Default Termination Sum, Prohibited Acts Termination Sum or any other termination sum, as the case may be;

(ii) any liabilities arising under or in respect of any breach by either Party of their obligations under Section 48.9 of this Project Agreement, or the Sections referred to therein, which did not lead to such termination and which arises or continues after the Termination Date; and

(iii) any amount owing to the City in relation to:

(A) taxes or tax withholdings, including workers' compensation levies;

(B) fines, penalties or restitution orders by a court under any Federal or Provincial statute;

(C) any order made by a court under the *Civil Remedies Act*, S.O. 2001, c.28 and

(D) any fraud or other criminal offence committed against the City.

50. EXPIRY TRANSITION PROCEDURE

50.1 Expiry Transition

(a) Project Co and the City shall each comply with the requirements of Schedule 24 – Expiry Transition Procedure.

51. INTELLECTUAL PROPERTY

51.1 Intellectual Property Ownership and Licences

(a) Project Co shall comply with the requirements of Schedule 41 –Intellectual Property.

52. CONFIDENTIALITY/COMMUNICATIONS

52.1 Disclosure

(a) Subject to Sections 52.1(b), 52.1(c) and 52.2, but notwithstanding anything else in this Project Agreement to the contrary, Project Co acknowledges and agrees that, in accordance with the transparency and accountability principles of the City each of the City and IO has a right to disclose or publish (including on websites) this Project Agreement, any or all terms hereof, including any or all contractual submissions and other records kept in accordance with this Project Agreement, any information related to the performance of Project Co (or any Project Co Party) or any information derived from this Project Agreement or the information related to the performance of Project Co (or any Project Co Party) as each of the City or IO, in its Discretion, may consider appropriate. In exercising its discretion, each of the City and IO will be guided by the principles set out in Sections 52.1(b) and 52.1(c). In relation to any information relating to the Stage 2 MOU and the Stage 2 System, the City shall not accede to any request to the City by IO for access to such information or for permission to publicly disclose such information without first consulting Project Co and having due regard to Project Co's views, provided that nothing shall prevent the City from acceding to such a request from IO after such consultation where it is compelled to do so by law or by any existing agreement with IO.

(b) Neither the City nor IO will disclose portions of this Project Agreement or any terms hereof, including any contractual submissions or other records kept in accordance with this Project Agreement, any information related to the performance of Project Co (or any Project Co Party) or any information derived from this Project Agreement or the information related to the performance of Project Co (or any Project Co Party) which would be exempt from disclosure under section 10(1) of MFIPPA or section 17(1) of FIPPA.

(c) Notwithstanding Section 52.1(b), but subject to Section 52.2, where a compelling public interest in the disclosure of the information clearly outweighs the public interest in limiting the disclosure of the information supplied by Project Co (or any Project Co Party), each of the City or IO may disclose such information.

(d) The City may disclose this Project Agreement, any or all terms hereof, including any or all contractual submissions and other records kept in accordance with this Project Agreement, any information related to the performance of Project Co (or any Project Co Party) or any information derived from this Project Agreement or the information related to the performance of Project Co (or any Project Co Party) to any of the Contribution Agreement Parties in support of the City's obligations under the Contribution

Agreements. In relation to any information relating to the Stage 2 MOU and the Stage 2 System, the City shall not accede to any request to the City by any Contribution Agreement Party for access to such information or for permission to publicly disclose such information without first consulting Project Co and having due regard to Project Co's views, provided that nothing shall prevent the City from acceding to such a request from a Contribution Agreement Party after such consultation where it is compelled to do so by law or by any Contribution Agreement. In the event of such disclosure, Project Co acknowledges and agrees that:

(i) the Contribution Agreement Parties may be subject to FIPPA, *Access to Information Act* (Canada) or other Applicable Laws in respect of protection and/or disclosure of such information;

(ii) such disclosure is not limited or prohibited by this Project Agreement, including pursuant to Section 52.2, Section 52.3, Section 52.4 or Section 52.5 hereof;

(iii) subject to compliance with as applicable, FIPPA, *Access to Information Act* (Canada) or other Applicable Laws, a Contribution Agreement Party will be free to use, disclose or publish (including on websites) any information, including Confidential Information, on such terms and in such manner as they see fit.

52.2 Redaction

(a) Prior to disclosing or publishing this Project Agreement, any terms hereof, including any contractual submissions or other records kept in accordance with this Project Agreement, any information related to the performance of Project Co (or any Project Co Party) or any information derived from this Project Agreement or the information related to the performance of Project Co (or any Project Co Party), each of the City and IO shall provide to Project Co a redacted version of this Project Agreement or other documents or information to be disclosed or published, on the basis that the information so redacted constitutes information which should not be disclosed pursuant to Section 52.1(b). The Parties acknowledge and agree that the Annual Service Payment, but not the breakdown thereof, may be disclosed.

(b) If Project Co, acting in good faith, contends that any of the information not redacted constitutes information that falls within the scope of Section 52.1(b) and, accordingly, would be exempt from disclosure under as applicable, MFIPPA or FIPPA, the dispute may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure, and the City shall not (and the City shall cause IO to not) disclose any information in dispute until a determination is made. Any such determination shall be made with reference to the text and principles of MFIPPA or FIPPA.

52.3 Disclosure to Government

(a) Project Co acknowledges and agrees that subject to compliance with as applicable, MFIPPA or FIPPA, either the City or IO will be free to use, disclose or publish

(including on websites) any information, including Confidential Information, on such terms and in such manner as either the City or IO sees fit.

(b) For greater certainty, Project Co acknowledges and agrees that, subject only to the removal of any information which Project Co is (or would be) entitled to refuse to disclose pursuant to section 10(1) of MFIPPA or Section 17(1) of FIPPA, this Project Agreement, any contractual submissions or other records kept in accordance with this Project Agreement, any information related to the performance of Project Co (or any Project Co Party) or any information derived from this Project Agreement or the information related to the performance of Project Co (or any Project Co Party) are public documents and information and, as such, may be disclosed by the City or IO.

52.4 Freedom of Information and Protection of Privacy Act

(a) The Parties acknowledge and agree that MFIPPA applies to the City, and that the City is required to fully comply with MFIPPA.

(b) The Parties acknowledge and agree that FIPPA applies to IO and that IO is required to fully comply with FIPPA.

(c) The City and IO respectively, shall, within the time periods provided in MFIPPA and FIPPA for a party to exercise rights to prevent disclosure of information, advise Project Co of any request for Confidential Information that relates to Project Co (or any Project Co Party) or of the City's intention to voluntarily release any information or documents which contain Confidential Information that relates to Project Co (or any Project Co Party).

52.5 Use and Disclosure of Confidential Information

(a) Except as authorized hereunder, each Party shall hold in confidence, not disclose and not permit any person any manner of access to, whether directly or indirectly, any Confidential Information of the other Party, provided that this Section 52 shall not restrict either Party from disclosing such Confidential Information to its professional advisors, to the extent necessary, to enable that Party to perform, to cause to be performed, or to enforce, its rights or obligations under this Project Agreement.

(b) Project Co may:

(i) disclose in confidence to the Lenders and prospective Lenders and their professional advisors such Confidential Information as is reasonably required by the Lenders in connection with the raising or syndication of the financing or any sub-participation in the financing of the Project Scope or which Project Co is obliged to supply by the terms of the Lending Agreements; and

(ii) disclose in confidence to any Project Co Party and their professional advisors, such Confidential Information as is necessary for the performance by that Project Co Party of that Project Co Party's obligations under this Project Agreement.

(c) Project Co acknowledges that the City and any City Party may use the Confidential Information of Project Co for Approved Purposes not specific to the Project, but for other general governmental purposes. The City will advise Project Co prior to using any Confidential Information of Project Co for Approved Purposes.

(d) Subject to the foregoing, neither Party shall use, or directly or indirectly cause, authorize or permit any other person to use, any Confidential Information of the other Party except for the purposes of this Project Agreement, as permitted by this Project Agreement or as authorized by the disclosing Party in writing.

(e) Each Party shall protect all Confidential Information of the disclosing Party with the same degree of care as it uses to prevent the unauthorized use, disclosure, publication, or dissemination of its own confidential information of a similar nature or character, but in no event with less than a reasonable degree of care.

(f) Without limiting the generality of Section 52.5, Project Co shall comply with the document control and security protocol submitted by Project Co pursuant to Section 20.11 and approved by the City, which protocol shall prescribe limitations on the use, disclosure and storage of this Project Agreement and any other Confidential Information specified by the City.

52.6 Exceptions

(a) Information of a Party (the "**Proprietor**"), other than Government Sensitive Information and other than Personal Information will not be considered to be Confidential Information in the following circumstances:

(i) the Proprietor advises the other Party to whom the information has been disclosed (the "**Confidant**") that the information is not required to be treated as Confidential Information;

(ii) the information is as of Commercial Close, or becomes at any time thereafter, generally available to or accessible by the public through no fault or wrongdoing of the Confidant;

(iii) the information is a matter of public record or in the public domain;

(iv) the information was in the possession of the Confidant prior to its disclosure and the Confidant came into possession of such information without being in breach of this Project Agreement;

(v) the information is received by the Confidant on a non-confidential basis from a source other than the Proprietor, provided that to the best of the Confidant's knowledge such source is not bound by a confidentiality agreement with the Proprietor or otherwise prohibited from disclosing the information to the Confidant by a contractual, legal or fiduciary obligation;

(vi) the information was independently developed by the Confidant without access to the Confidential Information, as evidenced by written records;

(vii) the information is required to be disclosed pursuant to Applicable Law, provided that the Confidant provides the Proprietor with reasonable notification and an opportunity to contest such requirement prior to disclosure;

(viii) subject to the obligation set forth in Schedule 41 – Intellectual Property, the information is disclosed to the City upon a termination of this Project Agreement, pursuant to Section 48 or is otherwise required by the City for the purposes of performing (or having performed) the Project Scope, including the design or construction of the System, the maintenance or improvement of the System, or any other operations or services the same as, or similar to, the Project Scope; or

(ix) the information would not be exempt from disclosure under FIPPA or MFIPPA.

52.7 Survival of Confidentiality

(a) The obligations in Section 52.1 to Section 52.6 will cease on the date that is 3 years after the Termination Date and accordingly shall survive the termination of the Project Agreement.

52.8 Communications Protocol

(a) The Parties shall comply with the provisions of Schedule 18 – Communications and Public Consultation Protocol.

52.9 Government Use of Documents

(a) Project Co hereby disclaims any right, title or interest of any nature whatsoever it may have in or to this Project Agreement that might prohibit or otherwise interfere with the City's, IO, HMQ or Her Majesty the Queen in Right of Canada's ability to use this Project Agreement in any manner desired by the City, IO, HMQ or Her Majesty the Queen in Right of Canada.

(b) Project Co hereby consents to the use by the City, IO, HMQ or Her Majesty the Queen in Right of Canada of this Project Agreement, and any portion thereof, subject to compliance with MFIPPA, FIPPA and *Access to Information Act* (Canada) and to the removal by the City, IO, HMQ or Her Majesty the Queen in Right of Canada (in consultation with Project Co) of any information supplied in confidence to the City, IO, HMQ or Her Majesty the Queen in Right of Canada by Project Co in circumstances where disclosure may be refused under Section 10(1) of MFIPPA, section 17(1) of FIPPA or section 20 of *Access to Information Act* (Canada).

53. PERSONAL INFORMATION

53.1 General

(a) Project Co acknowledges the importance of maintaining the confidentiality and privacy of Personal Information.

(b) Project Co shall, and shall require each Project Co Party to, only collect, hold, process, use, store and disclose Personal Information with the prior consent of the City and: (i) shall not collect, hold, process, use or store Personal Information except to the extent necessary to perform Project Co's obligations under this Project Agreement; and (ii) shall not disclose Personal Information or otherwise permit access to or make Personal Information available to any person except as expressly permitted or instructed by the City.

(c) Project Co shall, and shall require each Project Co Party to, at all times treat Personal Information as strictly confidential and shall comply with all applicable requirements of the Output Specifications and the requirements of Applicable Law, including FIPPA and MFIPPA, the *Personal Information Protection and Electronic Documents Act* (Canada) and any other Canadian federal or provincial legislation now in force or that may in the future come into force governing the collection, use, disclosure and protection of personal information applicable to Project Co, each Project Co Party or to the Project Scope.

(d) Project Co shall take all necessary and appropriate action, and shall require each Project Co Party to take all necessary and appropriate action, against any person who fails to comply with this Section 53.

(e) Project Co shall allow the City on reasonable notice to inspect any Personal Information in the custody or possession of Project Co or a Project Co Party and to audit Project Co and each Project Co Party's compliance with this Section 53 including, without limitation, the measures used by Project Co and each Project Co Party to protect Personal Information, and otherwise promptly and properly respond to all reasonable inquiries of the City with respect to Project Co or each Project Co Party's handling of Personal Information.

(f) Project Co shall not subcontract or delegate to any third party any of the Project Scope that involve or may involve the collection, use, storage, processing or any other handling of Personal Information without the express consent of the City and without obtaining written contractual commitments of such third party substantially the same as those of this Section 53.

53.2 Protection of Personal Information

(a) Project Co shall implement and use, and shall require each Project Co Party to implement and use, appropriate technical, organizational and physical security measures to protect Personal Information against loss, theft and unauthorized access, disclosure, copying, use, modification or disposal, and shall otherwise ensure that Project Co, the Project Co

Parties, and its and their staff shall protect, secure and keep confidential any Personal Information.

(b) Project Co shall cause each Project Co Party to restrict access to Personal Information to only those authorized employees that require access to such Personal Information to fulfil their job requirements in connection with the Project Scope and that are subject to obligations of confidentiality and Personal Information protection no less stringent than those of this Section 53.

(c) Upon termination of this Project Agreement or upon request of the City, whichever comes first, Project Co shall immediately cease all use of and return to the City or, at the direction of the City, dispose of, destroy or render permanently anonymous all Personal Information, in each case using appropriate technical, organizational and physical security measures to protect Personal Information against loss, theft and unauthorized access, disclosure, copying, use or modification.

(d) To the extent that any of the Project Scope involves or may involve destruction or disposal of Personal Information, including any disposal or destruction pursuant to (c) above, such activities shall include, at a minimum, irreversible destruction, shredding or pulverizing of all documents, records or media containing Personal Information to a size or state that ensures that the document, record or other medium is permanently destroyed and that no information contained therein can be read, reconstructed or deciphered.

(e) Project Co shall immediately inform the City of any actual or suspected loss, theft or accidental or unauthorized access, disclosure, copying, use, modification or destruction of Personal Information by Project Co or any Project Co Party or any other breach of this Section 53.

(f) The City may from time to time require that Project Co and any Project Co Party or member of its or their staff execute and deliver within two Business Days of such request an agreement satisfactory to the City, acting reasonably, requiring such person to keep Personal Information confidential.

53.3 Personal Information

(a) Project Co shall provide, and shall cause each Project Co Party to provide, in a timely manner, all necessary and reasonable information and co-operation to the City and to any regulatory or other governmental bodies or authorities with jurisdiction or oversight over Applicable Law governing the collection, use, disclosure and protection of personal information in connection with any investigations, audits or inquiries made by any such bodies or authorities under such legislation.

(b) To the extent of any conflict or inconsistency between this Section 53 and any other provision of the Project Agreement, this Section 53 shall prevail.

(c) The obligations in this Section 53 shall survive the termination of this Project Agreement.

54. INSURANCE AND PERFORMANCE SECURITY

54.1 General Requirements

(a) Project Co and the City shall comply with the provisions of Schedule 25 – Insurance and Performance Security Requirements.

54.2 No Relief from Liabilities and Obligations

(a) Neither compliance nor failure to comply with the insurance provisions of this Project Agreement shall relieve Project Co or the City of their respective liabilities and obligations under this Project Agreement.

55. TITLE

55.1 Title

(a) Without derogation from the provisions of Section 29, Title to each item and part of the System, including any materials, supplies, equipment, facilities, parts and any other deliverable or component items, but not the risk of loss or damage or destruction thereto or thereof, shall pass to the City (or as the City may direct) upon the receipt of such item on the Site, provided however that title to items of tangible personal property (personal property that can be seen, weighed, measured, felt or touched or that is in any way perceptible to the senses and includes computer programs, natural gas and manufactured gas) that comprise the System or are to be affixed or attached to either Component of the System prior to Revenue Service Availability shall pass to the City (or as the City may direct) at the time that such items are included in the System or affixed or attached to the System.

56. INDEMNITIES

56.1 Project Co Indemnities to the City

(a) Project Co shall indemnify and save harmless the City, each City Party (for the purposes of this section, not including DB Co or any DB Co Party) and each of their respective directors, officers, employees, agents and representatives from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, or arising out of any one or more of the following:

(i) **[Intentionally deleted]**

(ii) any physical loss of or damage to all or any part of the Site, the Highway Site, the System, the Highway, or to any equipment, assets or other property related thereto;

(iii) the death or personal injury of any person;

(iv) any physical loss of or damage to property or assets of any third party;

(v) any other loss or damage of any third party including injurious affection arising from or in consequence of any act or omission of Project Co in respect of the Design and Construction Works that are not in compliance with the requirements set out in this Project Agreement and in the Applicable Law including the City's by-laws;

(vi) any obligations of Project Co to satisfy judgments and pay costs resulting from construction liens arising from the performance of the Highway Work or actions brought in connection with any such liens, or in connection with any other claim or lawsuit brought against the City by any person that provided services or materials to the Highway Site which constituted part of the Highway Work; and

(vii) (A) Project Co's obligations under Article 14 of Schedule 40; and

(B) Project Co Hazardous Substances,

(collectively, the "**Project Co Indemnified Hazardous Substances Claims**"), which indemnification shall apply and extend to:

(I) Project Co Indemnified Hazardous Substances Claims made by federal, provincial or local government entities or agencies, and

(II) all Project Co Indemnified Hazardous Substances Claims arising out of such actual Release of Hazardous Substances even if such Project Co Indemnified Hazardous Substances Claims are not discovered or made until after the performance of the Highway Work or after conclusion of this Project Agreement, provided this indemnity shall not be construed to negate, abridge or reduce other rights or obligations of indemnity set out in this 56.1, or which otherwise exist respecting a person or party described in this Section 56.1,

in each case, arising, directly or indirectly, out of, or in consequence of, or involving or relating to, the performance or any breach of this Project Agreement by Project Co or any act or omission of Project Co or any Project Co Party, including any failure on the part of Project Co to adhere to the collective bargaining obligations set out in Section 28.14, except to the extent caused, or contributed to, by:

(A) the breach of this Project Agreement by the City; or

(B) **[Intentionally deleted]**

(C) in respect of Sections 56.1(a)(ii), 56.1(a)(iii), 56.1(a)(iv) or 56.1(a)(v) any act or omission of the City or any City Party; or

(D) a deliberate or negligent act or omission of a System User that results in undue interference with Project Co's performance of the Maintenance Services and Project Co has been unable to take commercially reasonable

steps necessary to prevent, negate or mitigate the undue interference due to acting in accordance with a recommendation or instruction of the City or an appropriate City Party, except to the extent:

(1) any such deliberate or negligent act or omission is caused or contributed to by Project Co or any Project Co Party; or

(2) the System User is acting in accordance with a direction, recommendation or instruction of Project Co or any Project Co Party.

(b) Project Co shall indemnify and save harmless the City and each of its directors, officers, employees, agents and representatives from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, or arising out of any breach of a representation or warranty by Project Co herein.

(c) Project Co shall indemnify and save harmless the City and each of its directors, officers, employees, agents and representatives from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, arising out of, or involving or relating to any one or more of the following:

(i) the performance by Project Co of this Project Agreement not in accordance with or in breach of the requirements of any Permits, Licences and Approvals, Applicable Law or requirements of Governmental Authorities, or the failure of Project Co to obtain all necessary Project Co Permits, Licences and Approvals in accordance with this Project Agreement;

(ii) the failure of Project Co to manage, remediate and/or remove, as applicable, any Contamination as required in accordance with Section 16.2(a) or the failure of Project Co to discharge its obligations under Sections 16.2(d) and 16.2(e);

(iii) any release of Contamination or Existing Contamination described in Sections 16.2(b)(i) and 16.2(b)(ii); or

(iv) the provision of assistance by the City to Project Co pursuant to Section 9.6(c),

except to the extent that such Direct Losses are caused, or contributed to, by the breach of this Project Agreement by the City or by any act or omission of the City or any City Party.

(d) Without prejudice to the City's rights under Section 45 and any other rights under this Project Agreement, if the City exercises its step-in rights under any Contractor's Direct Agreement, Project Co shall indemnify the City for all obligations of Project Co assumed by the City under the Contracts, and for all reasonable costs and expenses incurred by the City in relation to the exercise of the City's rights.

(e) Project Co shall indemnify the City for damages suffered or incurred on account of any payment not duly made by Project Co pursuant to the terms of this Project Agreement on

the due date, by payment of an amount equal to the Payment Compensation Amount calculated from day to day at a rate per annum from the day after the date on which payment was due up to and including the date of payment.

(f) Where a demand, claim, action or proceeding is made or brought against the City or any City Party that any Project Co Intellectual Property or the Use thereof by the City or any City Party or the use of any materials, machinery or equipment in connection with the Project Scope infringes an Intellectual Property Right of a third party or misappropriates any confidential information or otherwise violates any right of a third party, unless such infringement has arisen out of the use of the allegedly infringing Project Co Intellectual Property, materials, machinery or equipment by the City or any City Party otherwise than in accordance with the terms of this Project Agreement, Project Co shall defend the City and such City Party from and against all such demands, claims, actions and proceedings in accordance with Section 56.3; and shall indemnify and save harmless the City and such City Party from and against all Direct Losses arising out of or relating to such demands, claims, actions and proceedings or the settlement thereof. References in this Section 56.1(f) to a City Party shall not include DB Co or any DB Co Party.

56.2 City Indemnities to Project Co

(a) The City shall indemnify and save harmless Project Co and the Project Co Parties and each of their respective directors, officers, employees, agents and representatives from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, or arising out of any one or more of the following:

(i) the death or personal injury of any person arising, directly or indirectly, out of, or in consequence of, or involving or relating to, the performance or breach of this Project Agreement by the City or any act or omission of any City Party, except to the extent caused, or contributed to, by the breach of this Project Agreement by Project Co or by any act or omission of Project Co or any Project Co Party;

(ii) any physical loss of or damage to all or any part of any property or assets of Project Co or any Project Co Party, arising, directly or indirectly, out of, or in consequence of, or involving or relating to, breach of this Project Agreement by the City or any deliberate or negligent act or omission of any City Party, except to the extent caused, or contributed to, by the breach of this Project Agreement by Project Co or by any act or omission of Project Co or any Project Co Party;

(iii) any physical loss of or damage to property or assets of any third party, or any other loss or damage of any third party, arising, directly or indirectly, out of, or in consequence of, or involving or relating to, breach of this Project Agreement by the City or any deliberate or negligent act or omission of any City Party, except to the extent caused, or contributed to, by the breach of this Project Agreement by Project Co or by any act or omission of Project Co or any Project Co Party; and

(iv) (A) exposure to, or the presence of, Hazardous Substances at the Highway Site other than Project Co Hazardous Substances;

(B) the breach of any Applicable Law relating to such Hazardous Substances; and

(C) any Release or threatened Release at or from the Highway Site of any such Hazardous Substances which has or may have an adverse effect upon the environment or human health or safety,

other than Project Co Indemnified Hazardous Substances Claims as set out in Section 56.1(a)(vii) (collectively, the "**City Indemnified Hazardous Substances Claims**"), and in this regard, it is expressly agreed and understood that such indemnification shall apply and extend to City Indemnified Hazardous Substances Claims even if such City Indemnified Hazardous Substances Claims are not discovered or made until after the performance of the Highway Work or after conclusion of this Project Agreement, provided this indemnity shall not be construed to negate, abridge or reduce other rights or obligations of indemnity set out in this Section 56.2 or which otherwise exist respecting a person or party described in Section 56.1,

provided that there shall be excluded from the indemnity given by the City any liability for the occurrence of risks against which Project Co is required to insure under this Project Agreement to the extent of the proceeds available or that should have been available but for a failure by Project Co to comply with its obligations to properly insure under this Project Agreement.

(b) The City shall indemnify and save harmless Project Co and its directors, officers, employees, agents and representatives from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, or arising out of any breach of a representation or warranty by the City herein.

(c) The City shall indemnify Project Co for damages suffered or incurred on account of any Payment not duly made by the City pursuant to the terms of this Project Agreement on the due date, by payment of an amount equal to the Payment Compensation Amount calculated from day to day at a rate per annum from the day after the date on which payment was due up to and including the date of payment.

(d) To the extent that:

(i) Project Co has a valid claim against DB Co (and whether such claim is pursued directly by Project Co against DB Co under the Interface Agreement or is pursued by the City on behalf of Project Co as an EPR Claim pursuant to Section 9.12); and

(ii) such claim can only be brought against DB Co through the indemnity provisions of the DB Co Works Agreement and/or the the DB Co Interface Agreement; and

(iii) DB Co has a whole or partial defence to such claim due to the application of the limitation of liability in Section 47.4(a) of the DB Co Works Agreement (the portion unrecoverable for this reason being the "**Excess Claim Amount**"),

the City shall indemnify and save harmless Project Co and its directors, officers, employees, agents and representatives from and against the Excess Claim Amount.

56.3 Conduct of Claims

(a) This Section 56.3 shall apply to the conduct of claims, made by a third person against a Party having, or claiming to have, the benefit of an indemnity pursuant to this Project Agreement. The Party having, or claiming to have, the benefit of the indemnity is referred to as the "**Beneficiary**" and the Party giving the indemnity is referred to as the "**Indemnifier**".

(b) If the Beneficiary receives any notice, demand, letter or other document concerning any claim for which it appears that the Beneficiary is, or may become entitled to, indemnification under this Section 56, the Beneficiary shall give written notice to the Indemnifier as soon as reasonably practicable and in any event within 10 Business Days of receipt of the same. Such notice shall specify with reasonable particularity, to the extent that information is available, the factual basis for the claim and the amount of the claim.

(c) Subject to Sections 56.3(d), 56.3(e) and 56.3(f), on the giving of such notice by the Beneficiary, where it appears that the Beneficiary is or may be entitled to indemnification from the Indemnifier in respect of all, but not part only, of the liability arising out of the claim, the Indemnifier shall (subject to providing the Beneficiary with a secured indemnity to the Beneficiary's reasonable satisfaction against all costs and expenses that the Beneficiary may incur by reason of such action) be entitled to dispute the claim in the name of the Beneficiary at the Indemnifier's own expense and take conduct of any defence, dispute, compromise, or appeal of the claim and of any incidental negotiations. The Beneficiary shall give the Indemnifier all reasonable cooperation, access and assistance for the purposes of considering and resisting such claim. The Beneficiary shall have the right to employ separate counsel in respect of such claim and the reasonable fees and expenses of such counsel shall be to the account of the Indemnifier only where representation of both the Indemnifier and Beneficiary by common counsel would be inappropriate due to any actual or potential conflicting interests between the Indemnifier and Beneficiary.

(d) With respect to any claim conducted by the Indemnifier:

(i) the Indemnifier shall keep the Beneficiary fully informed and consult with it about material elements of the conduct of the claim;

(ii) the Indemnifier shall not bring the name or reputation of the Beneficiary into disrepute;

(iii) the Indemnifier shall not pay, compromise or settle such claims without the prior consent of the Beneficiary, such consent not to be unreasonably withheld or delayed;

(iv) the Indemnifier shall not admit liability or fault to any third party without the prior consent of the Beneficiary, such consent not to be unreasonably withheld or delayed; and

(v) the Indemnifier shall use commercially reasonable efforts to have the Beneficiary named as a beneficiary under any release given by the persons bringing the claim to which this Section 56.3 relates.

(e) The Beneficiary shall be free to pay or settle any such claim on such terms as it thinks fit and without prejudice to its rights and remedies under this Project Agreement if:

(i) the Indemnifier is not entitled to take conduct of the claim in accordance with Section 56.3(c);

(ii) the Indemnifier fails to notify the Beneficiary of its intention to take conduct of the relevant claim within 10 Business Days of the notice from the Beneficiary under Section 56.3(b) or notifies the Beneficiary that the Indemnifier does not intend to take conduct of the claim; or

(iii) the Indemnifier fails to comply in any material respect with Section 56.3(d).

(f) The Beneficiary shall be free at any time to give notice to the Indemnifier that the Beneficiary is retaining or taking over, as the case may be, the conduct of any defence, dispute, compromise or appeal of any claim, or of any incidental negotiations, to which Section 56.3(c) applies. For greater certainty, Project Co acknowledges and agrees that where the City is the Beneficiary, the City may retain or take over such conduct in any matter involving Personal Information or any matter involving public policy. On receipt of such notice the Indemnifier shall promptly take all steps necessary to transfer the conduct of such claim to the Beneficiary, and shall provide to the Beneficiary all relevant documentation and all reasonable cooperation, access and assistance for the purposes of considering and resisting such claim. If the Beneficiary gives any notice pursuant to this Section 56.3(f), then the Indemnifier shall be released from any liabilities arising under the applicable indemnity hereunder in respect of the applicable claim.

(g) If the Indemnifier pays to the Beneficiary an amount in respect of an indemnity and the Beneficiary subsequently recovers, whether by payment, discount, credit, saving, relief or other benefit or otherwise, a sum or anything else of value (the "**Recovery Amount**") which is directly referable to the fact, matter, event or circumstances giving rise to the claim under the indemnity, the Beneficiary shall forthwith repay to the Indemnifier whichever is the lesser of:

(i) an amount equal to the Recovery Amount less any out-of-pocket costs and expenses properly incurred by the Beneficiary in recovering the same; and

(ii) the amount paid to the Beneficiary by the Indemnifier in respect of the claim under the relevant indemnity,

provided that there shall be no obligation on the Beneficiary to pursue any Recovery Amount and that the Indemnifier is repaid only to the extent that the Recovery Amount, aggregated with any sum recovered from the Indemnifier, exceeds the loss sustained by the Beneficiary except, however, that if the Beneficiary elects not to pursue a Recovery Amount, the Indemnifier shall be entitled to require an assignment to it of the right to do so.

(h) Any person taking any of the steps contemplated by this Section 56.3 shall comply with the requirements of any insurer who may have an obligation to provide an indemnity in respect of any liability arising under this Project Agreement.

56.4 Mitigation – Indemnity Claims

(a) For greater certainty, Section 64.5 applies to any indemnity given under this Project Agreement and any such indemnity shall not extend to Direct Losses which could have been reduced or avoided by the Beneficiary complying with such Section.

57. LIMITS ON LIABILITY

57.1 Indirect Losses

(a) Without prejudice to the City's rights under the Payment Mechanism, or the Parties' rights in respect of payments provided for herein, the indemnities under this Project Agreement shall not apply and there shall be no right to claim damages for breach of this Project Agreement, in tort or on any other basis whatsoever, to the extent that any loss claimed by either Party is:

(i) for punitive, exemplary or aggravated damages;

(ii) for loss of profits, loss of use, loss of production, loss of business or loss of business opportunity sustained by either Party and not by third parties; or

(iii) is a claim for consequential loss or for indirect loss of any nature suffered or allegedly suffered by either Party,

(collectively, "**Indirect Losses**").

57.2 No Liability in Tort

(a) Subject to the indemnities provided herein, neither the City nor any City Party shall be liable in tort to Project Co or any Project Co Party, and neither Project Co nor any Project Co Party shall be liable in tort to the City or any City Party in respect of any negligent act or omission of any such person relating to or in connection with this Project Agreement and no such person shall bring such a claim.

57.3 Sole Remedy

(a) Subject to:

(i) any other rights of the City expressly provided for in this Project Agreement; and

(ii) the City's right to claim, on or after termination of this Project Agreement, the amount of its reasonable costs, losses, damages and expenses suffered or incurred by it as a result of rectifying or mitigating the effects of any breach of this Project Agreement by Project Co except to the extent that the same has already been recovered by the City pursuant to this Project Agreement or has been taken into account to reduce any compensation payable by the City pursuant to Section 49,

the sole remedy of the City in respect of a failure to perform the Maintenance Services in accordance with this Project Agreement shall be the operation of the Payment Mechanism.

(b) Nothing in Section 57.3(a) shall prevent or restrict the right of the City to seek injunctive relief or a decree of specific performance or other discretionary remedies of a court of competent jurisdiction.

(c) Notwithstanding any other provision of this Project Agreement, and except to the extent recovered under any of the insurances required pursuant to Schedule 25 – Insurance and Performance Security Requirements, neither Party shall be entitled to recover compensation or make a claim under this Project Agreement, or any other agreement in relation to the Project, in respect of any loss that it has incurred (or any failure of the other Party) to the extent that the Party has already been compensated in respect of that loss or failure pursuant to this Project Agreement, or otherwise.

57.4 Maximum Liability

(a) Subject to Section 57.4(b), the maximum aggregate liability of each Party in respect of all claims under Section 56 (other than any claim under Section 56.2(d)) shall not exceed $50,000,000. This limit shall be index linked and shall be exclusive of any insurance or performance security proceeds received or which will be received pursuant to policies maintained in accordance with Schedule 25 – Insurance and Performance Security Requirements. This limit shall not apply in cases of wilful misconduct or deliberate acts of wrongdoing.

(b) Nothing in this Section 57.4 shall restrict, limit, prejudice or in any other way impair the rights and/or remedies of the Parties under any other provision of this Project Agreement.

58. DISPUTE RESOLUTION PROCEDURE

(a) All Disputes shall be resolved in accordance with, and the Parties shall comply with, Schedule 27 – Dispute Resolution Procedure.

59. ASSIGNMENT, SUBCONTRACTING AND CHANGES IN CONTROL

59.1 Project Co Assignment

(a) Project Co shall not assign, transfer, charge, dispose of or otherwise alienate any interest in this Project Agreement, any of the Contracts or any agreement entered into in connection with this Project Agreement without the prior written consent of the City in its Discretion, provided however that no assignment, transfer, charge, disposition or other alienation shall be permitted to a person where that person or its Affiliate is a Restricted Person or a person whose standing or activities: (i) are inconsistent with the City's role (in the City's reasonable opinion); (ii) may compromise the reputation or integrity of the City and/or any City Party; or (iii) are inconsistent with the nature of the City or the Project; so as to negatively affect public perception of the City or the Project.

(b) Section 59.1(a) shall not apply to the grant of any security for any loan made to Project Co under the Lending Agreements provided that any grantee of such security shall enter into the Lenders' Direct Agreement in relation to the exercise of its rights, if the City so requires.

59.2 City Assignment

(a) The City may assign, transfer, dispose of or otherwise alienate any interest in this Project Agreement, including without limitation the Highway Warranty, or any agreement in connection with this Project Agreement to which Project Co and the City are parties:

(i) as may be required to comply with Applicable Law;

(ii) to any minister of the Province of Ontario or of Canada, for greater certainty, including but not limited to the MTO in respect of all or part of the Highway Work;

(iii) to a corporation, all of the shares of which are owned by the City provided that in such event, the City shall remain liable for all its obligations under this Project Agreement;

(iv) to an agency of the Government of Canada or Province of Ontario having the legal capacity, power, authority and ability to become a party to and to perform the obligations of the City under this Project Agreement provided that such person confirms in writing to Project Co that it will perform all of City's obligations hereunder and under the other Project Documents to which the City is a party in respect of the period from and after the assignment; and

(v) in circumstances other than those described in Sections 59.2(a)(i) to 59.2(a)(iv), with the prior written consent of Project Co; provided that the person to whom any such assignment, transfer, disposition or other alienation is made has the capacity to perform, and confirms in writing to Project Co that it will perform all the obligations of the City hereunder and under any agreement in connection with

this Project Agreement to which Project Co and the City are parties in respect of the period from and after the assignment; and

upon receiving written notification from the City of any such assignment, transfer, disposition, or other alienation of interest, Project Co agrees to be bound in respect thereof.

(b) The City shall not be released of any of its obligations under this Project Agreement except upon an assignment, transfer, disposition or other alienation of its interest in this Project Agreement in accordance with this Section 59.2 (with the exception of Section 59.2(a)(iii)).

59.3 Subcontractors

(a) Project Co shall not subcontract any interest in this Project Agreement or any of the Contracts, and shall not permit the Contractors to subcontract any interest in the applicable Contract to a Restricted Person, or any Affiliate thereof, or a person whose standing or activities: (i) are inconsistent with the City's role (in the City's reasonable opinion) (ii) may compromise the reputation or integrity of the City and/or any City Party; or (iii) are inconsistent with the nature of the City or the Project, so as to negatively affect public perception of the City or the Project.

(b) Project Co shall not terminate, agree to the termination of or replace Contractors, or make any appointment of the Contractors, unless Project Co has complied with Sections 7.2(a), 59.3(c), and 59.3(d) or received the prior written consent of the City. The City shall accept the Subcontractors named in Project Co's Response without further consent rights of the City.

(c) Subject to Section 59.3(d), if any of the Contracts, shall at any time lapse, terminate or otherwise cease to be in full force and effect, whether by reason of expiry, default or otherwise, with the effect that the Contractor, shall cease to act in relation to the Project, Project Co shall forthwith appoint a replacement, subject to the City's prior written consent, acting reasonably, as to the suitability of the replacement. The City's prior written consent does not apply to the initial Contractor.

(d) It is a condition of the appointment and replacement of the Construction Contractor and/or the Maintenance Contractor that, and Project Co shall require that:

(i) each of the Contractors enter into the applicable contract, as the case may be, in form and substance satisfactory to the City, acting reasonably, and into a direct agreement in the form of the Direct Agreement. The City shall accept the Subcontractors named in Project Co's Response without further consent rights of the City; and

(ii) replacement Contractors enter into a contract upon the same or substantially similar terms as the person so replaced and into a direct agreement on the same terms as the Direct Agreement entered into by the person so replaced, unless any material variations are approved by the City, acting reasonably.

59.4 Changes in Ownership and Control

(a) No Change in Ownership of Project Co, or of any person with any form of direct, indirect, beneficial or other ownership interest in Project Co, shall be permitted:

(i) where the person acquiring the ownership interest is a Restricted Person or a person whose standing or activities: (i) are inconsistent with the City's role (in the City's reasonable opinion); (ii) may compromise the reputation or integrity of the City and/or, any City Party; or (iii) are inconsistent with the nature of the City or the Project, so as to negatively affect public perception of the City or the Project; or

(ii) if such Change in Ownership would have a material adverse effect on the performance of the activities within the Project Scope, the Governmental Activities or the availability of the System to System Users.

(b) Prior to the third anniversary following the Revenue Service Commencement Date, the City shall be entitled to receive a 50 percent share of any Excess Equity Gain arising from a Change in Ownership of Project Co.

(c) Subject to Sections 59.4(a) and 59.4(b), no Change in Control of Project Co, or of any person with any form of direct, indirect, beneficial or other ownership interest in Project Co, shall be permitted without the prior written consent of the City not to be unreasonably withheld or delayed.

(d) This Section 59.4 shall not apply to a Change in Ownership or Change in Control of persons whose Securities evidencing ownership or any other ownership interests are listed on a recognized stock exchange.

(e) Whether or not Project Co is required to obtain the City's consent pursuant to this Section 59.4, Project Co shall provide notice to the City of any proposed Change in Ownership or Change in Control of Project Co, or of any person with any form of direct, indirect, beneficial or other ownership interest in Project Co, as the case may be, within 5 Business Days after such Change in Ownership or Change in Control, and such notification shall include a statement identifying, in respect of the relevant owners in the ownership interests of Project Co, or of any person with an ownership interest in Project Co, as the case may be, the holdings prior to and proposed holdings following the Change in Ownership or Change in Control, respectively.

(f) No Restricted Person or a person whose standing or activities are inconsistent with the Province's reputation or integrity shall be permitted to have at any time or acquire, Direct or Indirect Power or Control over any member of the Project Co Group in relation to the decisions, management, actions or policies of Project Co or in relation to the operation, management and ownership of the Project.

59.5 City Due Diligence

(a) Project Co shall promptly reimburse the City for the City's reasonable due diligence costs (including fees of professional advisors) in connection with any consent required of the City pursuant to, or the City's determination of Project Co's compliance with, Sections 59.1, 59.3 or 59.4, whether or not such consent is granted.

60. PROHIBITED ACTS

60.1 Definition

(a) The term "**Prohibited Act**" means:

(i) offering, giving or agreeing to give to the City or any public body (or anyone employed by or acting on their behalf), or to any family member of such person, any gift or consideration of any kind as an inducement or reward:

(A) for doing or not doing, or for having done or not having done, any act in relation to the obtaining or performance of this Project Agreement or any other agreement with the City or any public body in connection with the Project; or

(B) for showing or not showing favour or disfavour to any person in relation to this Project Agreement or any other agreement with the City or any public body in connection with the Project,

provided that this Section 60.1(a)(i) shall not apply to Project Co or any Project Co Party (or anyone employed by or acting on their behalf) providing consideration to the City or any public body in the ordinary course, or as reasonably necessary, to fulfill or comply with the obligations and liabilities of Project Co under this Project Agreement or any other agreement with the City or any public body in connection with the Project;

(ii) entering into this Project Agreement or any other agreement with the City or any public body in connection with the Project if a commission or a fee has been paid or has been agreed to be paid by Project Co, or on its behalf or to its knowledge, to the City or any public body (or anyone employed by or acting on their behalf), or to any family member of such person, unless, before the relevant agreement is entered into, particulars of any such commission or fee have been disclosed in writing to the City, provided that this Section 60.1(a)(ii) shall not apply to a fee or commission paid by Project Co or any Project Co Party (or anyone employed by or acting on their behalf) to the City or any public body pursuant to an agreement where such fee or commission is paid in the ordinary course, or as reasonably necessary, to fulfill or comply with the obligations and liabilities of Project Co under this Project Agreement or any other agreement with the City or any public body in connection with the Project without contravening the intent of this Section 60;

(iii) breaching or committing any offence under Applicable Law in respect of corrupt or fraudulent acts in relation to this Project Agreement or any other agreement with the City or any public body in connection with the Project; or

(iv) defrauding or attempting to defraud or conspiring to defraud the City or any other public body.

60.2 Remedies

(a) If Project Co or any Project Co Party (or anyone employed by or acting on their behalf) commits any Prohibited Act, then the City shall be entitled to act in accordance with the following:

(i) if the Prohibited Act is committed by Project Co or by an employee acting under the direction of a director or officer of Project Co, then the City may give written notice to Project Co and Section 45 shall apply;

(ii) if the Prohibited Act is committed by an employee of Project Co acting independently of a direction of a director or officer of Project Co, then the City may give written notice to Project Co and Section 45 shall apply, unless, within 30 days of receipt of such notice, Project Co terminates the employee's employment and ensures that the relevant part of the Project Scope shall be performed by another person;

(iii) if a Prohibited Act is committed by a Project Co Party or by an employee of that Project Co Party not acting independently of a direction of a director or officer of that Project Co Party, then the City may give written notice to Project Co and Section 45 shall apply, unless, within 30 days of receipt of such notice, Project Co terminates the relevant Subcontract and ensures that the relevant part of the Project Scope shall be performed by another person, where relevant, in accordance with Section 59.3;

(iv) if the Prohibited Act is committed by an employee of a Project Co Party acting independently of a direction of a director or officer of that Project Co Party, then the City may give notice to Project Co and Section 45 shall apply, unless, within 30 days of receipt of such notice, Project Co causes the termination of the employee's employment and ensures that the relevant part of the Project Scope shall be performed by another person; and

(v) if the Prohibited Act is committed on behalf of Project Co or a Project Co Party by a person not specified in Sections 60.2(a)(i) to 60.2(a)(iv), then the City may give notice to Project Co and Section 45 shall apply, unless, within 30 days of receipt of such notice, Project Co causes the termination of such person's employment or the appointment of their employer and, if necessary, ensures that the relevant part of the Project Scope shall be performed by another person.

(b) Any notice of termination under this Section 60.2 shall specify:

(i) the nature of the Prohibited Act;

(ii) the identity of the person whom the City believes has committed the Prohibited Act; and

(iii) the date of termination in accordance with the applicable provisions of this Project Agreement.

(c) Without prejudice to its other rights or remedies under this Section 60.2, the City shall be entitled to recover from Project Co any Direct Loss sustained in consequence of any breach of this Section 60.

60.3 Permitted Payments

(a) Nothing contained in this Section 60 shall prevent Project Co or any other person from paying any proper commission, fee or bonus whether to its employees within the agreed terms of their employment or otherwise, and such commission fee or bonus shall not constitute a Prohibited Act.

60.4 Notification

(a) Project Co shall notify the City of the occurrence and details of any Prohibited Act promptly on Project Co becoming aware of its occurrence.

60.5 Replacement of Project Co Party

(a) Where Project Co is required to replace any Project Co Party pursuant to this Section 60, the party replacing such Project Co Party shall from the time of the replacement be deemed to be a Project Co Party and the provisions of this Project Agreement shall be construed accordingly.

61. NOTICES

61.1 Notices to Parties

(a) All notices, requests, demands, instructions, certificates, consents and other communications (each being a "**Notice**") required or permitted under this Project Agreement shall be in writing (whether or not "**written notice**" or "**notice in writing**" is specifically required by the applicable provision of this Project Agreement) and served by sending the same by registered mail, facsimile or by hand, as follows:

If to Project Co: Rideau Transit Group General Partnership

If to the City:	City of Ottawa Finance Department, Supply Branch 100 Constellation Crescent 4th Floor West Tower Ottawa, ON K2G 6J8 Fax: (613) 580-9688 Attn.: Director, Rail Implementation
With a copy to:	Ontario Infrastructure and Lands Corporation 777 Bay Street, 6th Floor Toronto, ON M5G 2C8 Fax: (416) 327-6387 Attn.: Vice President, Civil Infrastructure

61.2 Notices to Representatives

(a) In addition to the notice requirements set out in Section 61.1, where any Notice is to be provided or submitted to the City Representative or the Project Co Representative it shall be provided or submitted by sending the same by registered mail, facsimile or by hand, as follows:

If to Project Co Representative:

If to the City Representative:	City of Ottawa Finance Department, Supply Branch 100 Constellation Crescent 4th Floor West Tower Ottawa, ON K2G 6J8 Fax: (613) 580-9688 Attn.: Director, Rail Implementation
With a copy to:	Ontario Infrastructure and Lands Corporation 777 Bay Street, 6th Floor Toronto, ON M5G 2C8

Fax: (416) 327-6387

Attn.: Vice President, Civil Infrastructure

61.2(A) Notice to Consultant

(a) In addition to the notice requirements set out in Section 61.1, where any Notice is to be provided or submitted to the Consultant, it shall be provided or submitted by sending the same by registered mail, facsimile or by hand, as follows:

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road
Carp, ON K0A 1L0

Fax: (613) 836-3742

Attn.: Gord Perry

61.3 Facsimile

(a) Where any Notice is provided or submitted to a Party via facsimile, an original of the Notice sent via facsimile shall promptly be sent by regular mail or registered mail. For greater certainty, a Notice given via facsimile shall not be invalid by reason only of a Party's failure to comply with this Section 61.3.

61.4 Change of Address

(a) Either Party to this Project Agreement may, from time to time, change any of its contact information set forth in Section 61.1 or 61.2 by prior Notice to the other Party, and such change shall be effective on the Business Day that next follows the recipient Party's receipt of such Notice unless a later effective date is given in such Notice.

61.5 Deemed Receipt of Notices

(a) Subject to Sections 61.5(b), 61.5(c) and 61.5(d):

(i) a Notice given by registered mail shall be deemed to have been received on the third Business Day after mailing;

(ii) a Notice given by hand delivery shall be deemed to have been received on the day it is delivered; and

(iii) a Notice given by facsimile shall be deemed to have been received on the day it is transmitted by facsimile.

(b) If the Party giving the Notice knows or ought reasonably to know of difficulties with the postal system which might affect negatively the delivery of mail, any such Notice shall

not be mailed but shall be made or given by personal delivery or by facsimile transmission in accordance with this Section 61.

(c) If any Notice delivered by hand or transmitted by facsimile is so delivered or transmitted, as the case may be, either on a day that is not a Business Day or on a Business Day after 4:00 p.m. (recipient's local time), then such Notice shall be deemed to have been received by such recipient on the next Business Day.

(d) A Notice given by facsimile shall be deemed to have been received by the recipient on the day it is transmitted only if a facsimile transmission report (maintained by the sender) indicates that the transmission of such Notice was successful.

61.6 Service on the City

(a) Where any Notice is required to be served on the City, the obligation to serve such Notice shall be fulfilled by serving it on the City in accordance with the provisions of this Section 61.

62. EMERGENCY MATTERS

62.1 Emergency

(a) During the Project Term, upon the occurrence of an Emergency, Project Co shall comply with Part 1, Article 9.2(vi) and Article 11.2 of Schedule 15-2 – Design and Construction Requirements (subject to any adjustments required in respect of the Stage 2 System to reflect the Emergency Response Plan referred to in Section 62.1(b) below) and with Schedule 15-4 – Regulatory Standards.

(b) During the Project Term, upon the occurrence of an Emergency, Project Co shall comply with its Emergency Response Plan in accordance with Part 1, Article 11.2 of Schedule 15-2 – Design and Construction Requirements (as subsequently updated in respect of the Stage 2 System to reflect DB Co's Emergency Response Plan prepared under Schedule 15-2, Part 1 Article 8 of the DB Co Works Agreement) and with Schedule 15-4 – Regulatory Standards.

(c) If, in respect of any Emergency, the City notifies Project Co that it requires compliance with any additional or overriding procedures as may be determined by the City or any other statutory body, then Project Co shall, subject to Schedule 22 – Variation Procedure (if compliance with such procedures constitutes a Variation), comply with such procedures (whether such procedures are specific to the particular Emergency or of general application) and on the basis that such procedures shall take precedence to the extent that they overlap with the procedures mentioned in Section 62.1(a) or Section 62.1(b).

(d) Project Co shall develop emergency procedures for both the Construction Period and the Maintenance Term in accordance with all legal obligations. Project Co shall amend all emergency procedures throughout the Construction Period and Maintenance Term on an as needed basis to reflect changes in law or safety obligations. Project Co shall develop

the emergency procedures in line with best safety practices and shall be guided by the results of the ongoing Safety Management Plan, Safety and Security Certification and Emergency Response Plan detailed in Part 1 of Schedule 15-2 – Design and Construction Requirements and with Schedule 15-4 – Regulatory Standards.

63. THE CITY DESIGNATE

[Intentionally deleted]

64. GENERAL

64.1 Amendments

(a) This Project Agreement may not be varied, amended or supplemented except by an agreement in writing signed by duly authorized representatives of the Parties and stating on its face that it is intended to be an amendment, restatement or other modification, as the case may be, to this Project Agreement.

64.2 Waiver

(a) No waiver made or given by a Party under or in connection with this Project Agreement shall be binding or effective unless the waiver is in writing, signed by an authorized representative of the Party giving such waiver, and delivered by such Party to the other Party. No waiver made with respect to any right, power or remedy in one instance will be deemed to be a waiver with respect to any other instance involving the exercise of such right, power, or remedy or with respect to any other right, power, or remedy.

(b) Failure by either Party to exercise any of its rights, powers or remedies hereunder or its delay to do so shall not constitute a waiver of those rights, powers or remedies. The single or partial exercise of a right, power or remedy shall not prevent its subsequent exercise or the exercise of any other right, power or remedy.

64.3 Relationship Between the Parties

(a) The Parties are independent contractors. This Project Agreement is not intended to and does not create or establish between the Parties, or between the City and any Project Co Party, any relationship as partners, joint venturers, employer and employee, master and servant, or (except as provided in this Project Agreement), of principal and agent, and does not create or establish any relationship whatsoever between the City and any representative or employee of Project Co or the Project Co Parties.

(b) The Parties further agree that:

(i) except as expressly provided in this Project Agreement, neither Party shall be, or be deemed to be, an agent of the other Party, and neither Party shall have authority hereunder to represent that it is an agent of the other Party, or to accept any order, or enter into any contract or agreement, or make any representations or warranties of any kind to any person, or to assume or create any obligation,

express or deemed, on behalf of or binding, or purportedly binding upon, the other Party;

(ii) neither Party shall be required to make or pay employment benefits, contributions for Employment Insurance, Canada Pension Plan, WSIB or other similar levies with respect to any persons employed or engaged by the other Party;

(iii) except as otherwise expressly provided in this Project Agreement, each Party shall be free from the control of the other Party as to the manner in which it shall perform its obligations, or cause same to be performed, under this Project Agreement; and

(iv) any person which a Party may engage as an agent, employee, subcontractor or otherwise, to perform such Party's obligations under this Project Agreement, as permitted hereby, shall, unless the Parties otherwise agree in writing, be engaged by such Party to act solely on behalf of such Party, and such person shall not act, or be deemed to act, on behalf of the Party that did not engage its services.

(c) Nothing in this Agreement shall be construed as authorizing any person to contract for, to incur any obligation on behalf of, or to act as agent for a Contribution Agreement Party.

64.4 City as Municipality and Planning Authority

Project Co acknowledges that although the City is a party to this Agreement, nevertheless, the City is and shall remain an independent planning authority and municipality with all requisite powers and discretion provided under Applicable Law, including the *Planning Act* (Ontario) and the *Municipal Act, 2001* (Ontario).

64.5 General Duty to Mitigate

(a) The City and Project Co shall at all times take commercially reasonable steps to minimize and mitigate any loss for which the relevant Party is entitled to bring a claim against the other Party pursuant to this Project Agreement.

64.6 [Intentionally deleted]

64.7 Entire Agreement

(a) Except where provided otherwise in this Project Agreement, this Project Agreement constitutes the entire agreement between the Parties in connection with its subject matter and supersedes all prior representations, communications, negotiations and understandings, whether oral, written, express or implied, concerning the subject matter of this Project Agreement.

64.8 No Reliance

(a) Each of the Parties acknowledges that:

(i) it has not entered into this Project Agreement on the basis of and does not rely, and has not relied, upon any statement or representation, whether negligent or innocent, or warranty or other provision, whether oral, written, express or implied, made or agreed to by any person, whether a Party to this Project Agreement or not, except those expressly made, given or repeated in this Project Agreement and the only remedy or remedies available in respect of any misrepresentation or untrue statement made to it shall be those expressly provided for in this Project Agreement; and

(ii) this Section 64.8 shall not apply to any statement, representation or warranty made fraudulently, or to any provision of this Project Agreement which was induced by fraud, for which the remedies available shall be all those available under the law governing this Project Agreement.

64.9 Severability

(a) Each provision of this Project Agreement shall be valid and enforceable to the fullest extent permitted by law. If any provision of this Project Agreement is declared invalid, unenforceable or illegal by the courts of a competent jurisdiction, such provision may be severed and such invalidity, unenforceability or illegality shall not prejudice or affect the validity, enforceability and legality of the remaining provisions of this Project Agreement. If any such provision of this Project Agreement is invalid, unenforceable or illegal, the Parties shall, acting in good faith, promptly negotiate new provisions to eliminate such invalidity, unenforceability or illegality and to restore this Project Agreement as near as possible to its original intent and effect.

64.10 Enurement

(a) This Project Agreement and any other agreement entered into in connection with the Project to which both the City and Project Co are parties shall enure to the benefit of, and be binding on, the City and Project Co and their respective successors and permitted transferees and assigns.

64.11 Governing Law and Jurisdiction

(a) This Project Agreement, and each of the documents contemplated by or delivered under or in connection with this Project Agreement, shall be governed by and construed in accordance with the laws of Ontario and the laws of Canada applicable therein and shall be treated in all respects as an Ontario contract, without regard to conflict of laws principles.

(b) Subject to Schedule 27 – Dispute Resolution Procedure, both Parties hereby irrevocably attorn to the exclusive jurisdiction of the courts of the Province of Ontario and all courts competent to hear appeals therefrom.

64.12 Cumulative Remedies

(a) Except as otherwise set forth in this Project Agreement, the rights, powers and remedies of each Party set forth in this Project Agreement are cumulative and are in addition to and without prejudice to any other right, power or remedy that may be available to such Party under this Project Agreement.

64.13 Further Assurance

(a) Each Party shall do all things, from time to time, and execute all further documents necessary to give full effect to this Project Agreement.

64.14 Costs

(a) Each Party shall be responsible for paying its own costs and expenses incurred in connection with the negotiation, preparation and execution and delivery of this Project Agreement.

64.15 Language of Agreement

(a) Each of the parties acknowledges having requested and being satisfied that this Project Agreement and related documents be drawn in English. Chacune des parties reconnaît avoir demandé que ce document et ses annexes soient rédigés en anglais et s'en déclare satisfaite.

(b) For greater certainty, all correspondence, notices, drawings, test reports, certificates, specifications, information, operating and maintenance instructions, name plates, identification labels, and instructions to staff and all other written, printed or electronically readable matter required in accordance with, or for purposes envisaged by, this Project Agreement shall be in English.

64.16 Proof of Authority

(a) The City and Project Co each reserve the right to require any person executing this Project Agreement on behalf of the other Party to provide proof, in a form acceptable to the City or Project Co, as applicable, that they have the requisite authority to execute this Project Agreement on behalf of and to bind the City or Project Co, as applicable.

64.17 Counterparts

(a) This Project Agreement may be executed in one or more counterparts. Any single counterpart or a set of counterparts executed, in either case, by all the Parties shall constitute a full, original and binding agreement for all purposes. Counterparts may be executed either in original or faxed form provided that any Party providing its signature in faxed form shall promptly forward to the other Party an original signed copy of this Project Agreement which was so faxed.

64.18 City Parties as Third Party Beneficiaries

(a) The provisions of Sections 6.1, 6.2(a), 6.3(a), 8.1(b), 9.2(a)(i), 9.2(a)(ii), 9.4(b), 9.5(a)(v), 16.1(a), 20.3(j), 21.1, 35.6, 36.2(e), 56.1 and 57.2(a), and each other provision of this Project Agreement which is expressed to be for the benefit of a City Party, are:

(i) intended for the benefit of each City Party (unless otherwise stated with respect to DB Co and DB Co Parties), and, if so set out in the relevant Section, each City Party's directors, officers employees, board appointees, agents and representatives, and shall be enforceable by each of such persons and his or her heirs, executors, administrators and other legal representatives (collectively, in respect of each City Party, the "**City Third Party Beneficiaries**"); and

(ii) are in addition to, and not in substitution for, any other rights that the City Party Beneficiaries may have in contract or otherwise.

(b) The City shall hold the rights and benefits of Sections 6.1, 6.2(a), 6.3(a), 8.1(b), 9.2(a)(i), 9.2(a)(ii), 9.4(b), 9.5(a)(v), 16.1(a), 20.3(j), 21.1, 35.6, 36.2(e), 56.1 and 57.2(a), and each other provision of this Project Agreement which is to the benefit of a City Party (unless otherwise stated with respect to DB Co and DB Co Parties), in trust for and on behalf of the City Third Party Beneficiaries, and the City hereby accepts such trust and agrees to hold the benefit of and enforce performance of such covenants on behalf of the City Third Party Beneficiaries.

[***This section intentionally left blank***]

IN WITNESS WHEREOF the Parties have executed this Project Agreement as of the date first above written.

CITY OF OTTAWA

Per: _____
Name: Kent Kirkpatrick
Title: City Manager

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP, by its partners, ACS RTG PARTNER INC., SNC RTG PARTNER INC. and ELLISDON RTG PARTNER INC.

ACS RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

SNC RTG PARTNER INC.

Per: _____
Name:
Title:

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

ELLISDON RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

SCHEDULE 1

DEFINITIONS AND INTERPRETATION

1. DEFINITIONS

In the Project Agreement, unless the context otherwise requires:

1.1 "**417**" means the King's Highway in Ontario known and designated as "Highway 417".

1.2 "**2017 Readiness Date**" means June 1st, 2017, on which day that the 2017 Readiness is achieved.

1.3 "**2017 Readiness**" means that Project Co has achieved the 2017 Readiness milestone identified in Schedule 36 – Milestones, as evidenced by a certificate issued by an independent certifier in accordance with the process set out in Schedule 6 – Independent Certifier Agreement.

1.4 "**2017 Readiness Work**" means all workmanship, materials and anything and everything required to achieve 2017 Readiness in accordance with the Project Agreement.

1.5 "**6-Month Works Schedule**" means the schedule to be prepared and submitted by Project Co in accordance with Section 22.2 of the Project Agreement.

1.6 "**Account Trustee**" has the meaning given in Schedule 30 – Insurance Trust Agreement.

1.7 "**Addenda**" means Addendum No. 1 Contract No. 2012-4007 June 19, 2012, Addendum No. 2 Contract No. 2012-4007 June 27, 2012, and Addendum No. 3 Contract No. 2012-4007 August 15, 2012 issued by the MTO in respect of the Highway Work as attached as Part B of Annex G to Schedule 40 – Highway Work.

1.8 "**Additional Contractors**" means any independent contractor (not being, for the avoidance of doubt, Project Co or any of the Contractors) or the City's own forces, engaged by the City to carry out the Additional Works (but for the avoidance of doubt excluding DB Co in its capacity as the City's contractor for the DB Co Works).

1.9 "**Additional Works**" means those works or services in relation to the System or Highway which are not Design and Construction Works, Highway Work or Maintenance Services and which are to be carried out by an Additional Contractor, including works or services to be performed either before or after Substantial Completion.

1.10 "**Adjacent Structures**" means every structure, building, utility road, transportation interface on, under, affixed or adjacent to the Alignment.

1.11 "**Adjusted Estimated Fair Value**" has the meaning given in Schedule 23 – Compensation on Termination.

1.12 "**Adjusted for Inflation**" means, for any amount at any time, that amount multiplied by the Inflation Index for the first day of the calendar year during which the calculation is made, divided by the Inflation Index on the Financial Close.

1.13 "**Adjusted Highest Qualifying Tender Price**" has the meaning given in Schedule 23 – Compensation on Termination.

1.14 "**Advanced Environmental Reports**" means any and all environmental reports prepared to support the preliminary engineering design including but not limited to the phase I and phase II environmental site assessments, the designated substances surveys and other reports, assessments and or memos prepared in respect of the Lands, as set forth in Appendix 6 – Environmental Reports to this Schedule 1 – Definitions and Interpretation.

1.15 "**Affiliate**" means an "**affiliate**" as that term is used in the *Securities Act* (Ontario) and any successor legislation thereto, and, in the case of Project Co, shall include each of its unitholders, shareholders, partners or owners as the case may be.

1.16 "**After-Acquired Lands**" means Real Property Interests, including Real Property Interests in Crown Lands, to be acquired by the City after Financial Close and on or before the possession dates described in the Real Property Schedule.

1.17 "**Aggregate Actual Consumption**" has the meaning given in Schedule 8 – Energy Matters.

1.18 "**Aggregate Energy Model**" has the meaning given in Schedule 8 – Energy Matters.

1.19 "**Albert Street Work**" has the meaning given in the definition of "Civic Works".

1.20 "**Alignment**" means the area of land as described in Appendix 2 – Lands – After-Acquired Lands – Crown Lands to this Schedule 1 – Definitions and Interpretation, as revised from time to time as permitted under the Project Agreement.

1.21 "**Ancillary Documents**" means all of the Contracts and the Implementing Agreements.

1.22 "**Annex**" means an annex to Schedule 40 – Highway Work.

1.23 "**Annual Driver Hours Measurement and Verification Plan**" means the plan contemplated in Section 4.2 of Schedule 39 – Operations Matters.

1.24 "**Annual Review Meeting**" has the meaning given in Schedule 8 – Energy Matters.

1.25 "**Annual Service Payment**" has the meaning given in Schedule 20 – Payment Mechanism.

1.26 "**Anticipated Milestone Acceptance Date**" has the meaning given in Section 26.3(a) of the Project Agreement.

1.27 "**Anticipated Substantial Completion Date**" has the meaning given in Section 26.3(b) of the Project Agreement.

1.28 "**Applicable Law**" means:

(a) any statute or proclamation or any delegated or subordinate legislation including the OLRT Regulations and, for the purposes of this Project Agreement, includes the *Accessibility for Ontarians with Disabilities Act, 2005* (Ontario);

(b) any Authority Requirement; and

(c) any judgment of a relevant court of law, board, arbitrator or administrative agency which is a binding precedent in the Province of Ontario,

in each case, in force in the Province of Ontario, or otherwise binding on Project Co, any Project Co Party, the City, any City Party or any City Person.

1.29 "**Appointed Representative**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.30 "**Appointed Representative Notice**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.31 "**Approved Purposes**" means:

(a) the performance of Governmental Activities (and operations relating to such performance), the obligations of the City under the Project Agreement and/or any other activities of the City or a Governmental Authority in connection with the System, the Lands, and any System Extension;

(b) following termination of the Project Agreement, the design, construction and/or maintenance of the System, and/or the performance of any other operations the same as, or similar to, the Project Scope; and

(c) the development by the City of transportation standards, policies and procedures.

1.32 "**Approved Highway Subcontractor Highway Work**" means the work to be performed by each of the Approved Highway Subcontractors set out in Annex D – List of Project Co Parties to Schedule 40 – Highway Work.

1.33 "**Approved Highway Subcontractors**" means a subcontractor which is on the list of Subcontractors approved by the City pursuant to the Request for Proposals process and included in the list of Project Co Parties set out in Annex D – List of Project Co Parties to Schedule 40 – Highway Work.

1.34 "**Archaeological Reports**" means the document(s) described in Appendix 5 – Archaeological Reports to this Schedule 1 – Definitions and Interpretation.

1.35 "**As Built Drawings**" means marked-up "**as built**" drawings prepared by Project Co that show all differences, design changes, and variations from the issued for construction drawings in a digital "PDF" format and two (2) bound hardcopies, or as the City, acting reasonably, considers appropriate.

1.36 "**As-Built Highway Drawings**" means a set of Contract Documents marked-up by Project Co or a Project Co Party during construction, to record changes in the Highway Work from the design documents and to illustrate actual locations of hidden utilities or concealed elements, and shall include plans approved by the Consultant showing the as-constructed location of the Highway Work. The term may also be interpreted to mean a set of Contract Documents containing Project Co's annotations. The As-Built Highway Drawings shall be prepared by Project Co in bound hardcopies and a digital "PDF" format.

1.37 "**Asset Management Plan**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.38 "**Associated Liabilities**" has the meaning given in Section 35.6(b) of the Project Agreement.

1.39 "**Authority Requirement**" means any order, direction, directive, request for information, policy, administrative interpretation, guideline or rule of or by any Governmental Authority.

1.40 "**Availability Failure**" has the meaning given in Schedule 20 – Payment Mechanism.

1.41 "**Availability Failure Deduction**" has the meaning given in Schedule 20 – Payment Mechanism.

1.42 "**Average Unit Rate Price**" has the meaning given in Schedule 8 – Energy Matters.

1.43 "**Background Information**" means any and all drawings, reports (including the Environmental Reports, the Archaeological Reports, the Geotechnical Data Reports, the Environmental Assessments and the Highway Site Information), studies, data, documents, or other information, given or made available to Project Co or any Project Co Party by the City or any City Party, or which was obtained from or through any other sources prior to Commercial Close, including without limitation, all data contained in the file entitled "Background Information" in the Data Room and that was accessible to Project Co during the Request for Proposals process.

1.44 "**Bank**" has the meaning given in Schedule 30 – Insurance Trust Agreement.

1.45 "**Base Case Equity IRR**" means 9.99%.

1.46 "**Belfast MSF**" means the MSF described in Schedule 15-2, Part 6 - Design and Construction Requirements MSF, as expanded by the Belfast MSF Expansion Works, and located at 805 Belfast Road, Ottawa, Ontario, K1G 0Z4.

1.47 "**Belfast MSF Expansion Lands**" means the lands described as No. 100 on Appendix 2 to this Schedule 1 - Definitions.

1.48 "**Belfast MSF Expansion Substantial Completion**" has the meaning given to it in Schedule 45 - Belfast MSF Expansion.

1.49 "**Belfast MSF Expansion Variation**" means, collectively, the Belfast MSF Expansion Variation Confirmation and Schedule 45 – Belfast MSF Expansion Variation and the rights and obligations of the Parties set out therein.

1.50 "**Belfast MSF Expansion Variation Confirmation**" means the agreement between the City and Project Co with such title and dated September 26, 2017.

1.51 "**Belfast MSF Expansion Works**" has the meaning given to it in Schedule 45 - Belfast MSF Expansion.

1.52 "**Beneficiary**" has the meaning given in Section 56.3(a) of the Project Agreement.

1.53 "**Bridge**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.54 "**Bus Rapid Transit or BRT**" means the existing network of transit traffic lanes including the existing Transitway system (i: East Bus Rapid Transitway from Blair Road to Hurdman Station; ii: Central Bus Rapid Transitway from Hurdman Station to Empress Avenue; iii: West Bus Rapid Transitway Albert Street/Empress Avenue to Tunney's Pasture Station; and iv: Southeast Transitway (Hurdman Station)), as well as the dedicated transit lanes on Albert Street/Slater Street from Nicholas Street to Empress Avenue. The BRT shall also include any other routes that are being used for the purpose of the BRT during a detour implemented for the purpose of constructing the Work.

1.55 "**Business Day**" means any day other than Saturday, Sunday, a statutory holiday in the Province of Ontario or any day on which banks are not open for business in the City of Ottawa, Ontario.

1.56 "**Business Entity**" means a partnership, limited partnership, co-owners arrangement or other business entity, other than a corporation with share capital.

1.57 "**Business Opportunities**" has the meaning given in Section 4.1(a) of the Project Agreement.

1.58 "**CaGBC**" means Canadian Green Building Council.

1.59 "**Canadian Content Certificate**" means the certificate attached hereto as Appendix 7 – Canadian Content Certificate to this Schedule 1 – Definitions and Interpretation.

1.60 "**Canadian Content Policy**" means the *Canadian Content for Transit Vehicle Procurement Policy*, as issued by the Province of Ontario's Ministry of Transportation in September of 2008.

1.61 "**Canadian Content Requirements**" means the requirements for compliance with the Canadian Content Policy in respect of Vehicles, including achievement of a minimum twenty-five percent (25%) Canadian content (calculated in compliance with the Canadian Content Policy).

1.62 "**Canadian GAAP**" shall be deemed to be the generally accepted accounting principles from time to time approved by the Canadian Institute of Chartered Accountants, or any successor institute, applicable as at the date on which such calculation is made or required to be made in accordance with generally accepted accounting principles, as such principles may be amended or varied by International Financial Reporting Standards then in effect in Canada, in any case consistently applied from one period to the next.

1.63 "**Capital Expenditure**" means capital expenditure as interpreted in accordance with Canadian GAAP.

1.64 "**Cash Allowance Account**" means account number , transit .

1.65 "**Cash Allowance Amount**" means $.

1.66 "**CCTV**" means closed circuit television.

1.67 "**CEAA**" means the *Canadian Environmental Assessment Act*.

1.68 "**Certification Services**" has the meaning given in Schedule 6 – Independent Certifier Agreement.

1.69 "**Certification Services Variation**" has the meaning given in Schedule 6 – Independent Certifier Agreement.

1.70 "**Change in Control**" means, with respect to a Person:

(a) in the case of a corporation:

(i) the issuance, sale, transfer, assignment, transmission on death or other disposition of any Securities of the corporation or of a holding body corporate (as that term is used in the *Business Corporations Act* (Ontario)) of the corporation; or

(ii) the entering into of an agreement or arrangement,

in each case which results in a change in the Person who Control the corporation in fact or in law; or

(iii) the amalgamation or merger of the corporation or of a holding body corporate (as that term is used in the *Business Corporations Act* (Ontario)) of the corporation with any other corporate entity, if the Person who Control the amalgamated or merged corporation in fact or in law are

different from the Person who Control the corporation in fact or in law prior to the amalgamation or merger;

(b) in the case of a Business Entity that is not a limited partnership:

(i) the issuance, sale, transfer, assignment, transmission on death or other disposition of any Securities of the Business Entity; or

(ii) the entering into of an agreement or arrangement,

in each case which results in a change in the Person who Control the Business Entity in fact or in law; or

(iii) a Change in Control (as defined in subparagraph (a), above) of any corporation comprising the Business Entity, if such corporation Controls the Business Entity; or

(c) in the case of a Business Entity that is a limited partnership, the Change in Control (as defined in subparagraph (a), above) of a general partner of the limited partnership or the occurrence of a circumstance set out in any of subparagraphs (b)(i), (ii) or (iii) above.

For greater certainty, a Change in Control may arise from a single transaction, a series of related transactions or more than one transaction in which the transactions are unrelated and/or occur at different times.

1.71 "**Change in Law**" means the coming into effect or repeal (without re-enactment or consolidation) in Ontario of any Applicable Law, or any amendment or variation of any Applicable Law, including any judgment of a relevant court of law which changes binding precedent in Ontario in each case:

(a) except as provided for in subparagraph (b) below, after the Commercial Close; and

(b) notwithstanding subparagraph (a) above, after the Submission Date with respect to any prospective change in any Applicable Law as a result of any bill entered into federal or provincial legislature in Ontario after the Submission Date which is subsequently enacted as Applicable Law.

1.72 "**Change in Ownership**" means, with respect to a Person, any change in ownership, whether beneficial or otherwise, of any of the Securities of ownership of such Person, or in the direct or indirect power to vote or transfer any of the Securities of ownership of such Person.

1.73 "**Change of Authorization Event**" has the meaning given in Schedule 30 – Insurance Trust Agreement.

1.74 "**Change of Authorization Notice**" has the meaning given in Schedule 30 – Insurance Trust Agreement.

1.75 "**Checking Team**" means Hatch Mott Macdonald, MMM Group Limited, Fast + Epp, and SNC-Lavalin Inc.

1.76 "**City**" means City of Ottawa.

1.77 "**City Activities**" includes the provision of all governmental services and the conduct of all activities performed in or associated with light rail transit and other services of a similar nature.

1.78 "**City Closing Documents**" means the documents delivered by the City as more particularly enumerated in Schedule 2 – Completion Documents.

1.79 "**City Default Termination Sum**" has the meaning given in Schedule 23 – Compensation on Termination.

1.80 "**City Design Team**" means any of the City, its agents, contractors and subcontractors of any tier and its or their directors, officers and employees, and other persons engaged in respect of design reviews, design evaluation, or design consultation processes with respect to the System or the City Activities, but excluding Project Co and any Project Co Party.

1.81 "**City Event of Default**" has the meaning given in Section 46.1(a) of the Project Agreement.

1.82 "**City Indemnified Hazardous Substances Claims**" has the meaning given in Section 56.2(a)(iv) of the Project Agreement.

1.83 "**City Indemnified Parties**" means the City, IO, and any of their respective directors, officers, employees, agents or advisors, including the Consultant, the City's Representative and any delegate of the City's Representative.

1.84 "**City Party**" means any of the City's agents, contractors and subcontractors of any tier engaged with respect to the Project Scope, including the Consultant, its or their respective directors, officers and employees, IO and its directors, officers and employees, and including (without prejudice to the provisions of Section 9.12 of the Project Agreement, to the extent applicable, and without prejudice to Project Co's rights against DB Co under the Interface Agreement) DB Co and any DB Co Party where engaged in connection with the DB Co Works, but excluding Project Co and any Project Co Party, and the "**City Parties**" shall be construed accordingly.

1.85 "**City Permits, Licences and Approvals**" means those permissions, consents, approvals, certificates, permits, licences, agreements and authorizations, including Railway Approvals, Railway Orders, Utility Agreements, and Development Approvals which are the responsibility of the City to obtain as set out in Appendix 1 – Permits, Licences and Approvals to this Schedule 1 – Definitions and Interpretation but for greater certainty

shall not include any permission, consent, approval, certificate, permit, licence, agreement or authorization not set out in such appendix but required by the terms of any such item set out in such appendix.

1.86 "**City Project Documents**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.87 "**City Rail Office**" means City of Ottawa Rail Implementation Office, or any office or department of the City with responsibility for or authority over the System from time to time.

1.88 "**City Representative**" means the person designated as such by City on or prior to Commercial Close and any permitted replacement.

1.89 "**City Taxes**" means taxes, or payments in lieu of taxes, imposed on the City and HST and property taxes for which the City is responsible pursuant to Section 35 of the Project Agreement.

1.90 "**City Third Party Beneficiaries**" has the meaning given in Section 64.18(a)(i) of the Project Agreement.

1.91 "**City Trade-Marks**" means any and all Trade-Marks used by the City in any manner whatsoever.

1.92 "**City Work**" has the meaning given in Schedule 22 – Variation Procedure.

1.93 "**City's Project Manager**" means the Person appointed by City to assist City in the implementation of the Highway Work.

1.94 "**Civic Works**" means the construction, installation, testing and completion, in accordance with the applicable Civic Works Specifications, of each of:

(a) the Queen Street road, sewer and watermain construction work in respect of Queen Street from Bronson Avenue to Elgin Street as further described in Article 28 – Schedule 15-2, Part 1 of the Output Specifications as may be amended pursuant to Section 20.13(b) (the "**Queen Street Work**");

(b) the Albert Street road, sewer and watermain construction work in respect of Albert Street (Brickhill Street to Bayview Road), Scott Street (Bayview Road to Smirle Avenue), Booth Street (Primrose Avenue to north of Albert Street), Empress Avenue (Albert Street to dead-end), Perkins Street (Albert Street to dead-end) and Lorne Avenue (Albert Street to Primrose Avenue) as further described in Article 27 – Schedule 15-2, Part 1 of the Output Specifications as may be amended pursuant to Section 20.13(b) (the "**Albert Street Work**");

(c) the West Transitway rock face stabilization and retaining walls renewal work as further described in Article 31 – Schedule 15-2, Part 1 of the Output

Specifications as may be amended pursuant to Section 20.13(b) (the "**Rock Stabilization Work**");

(d) a multi-use (pedestrian and cyclist) pathway structure from the Ottawa Baseball Stadium parking lot near Coventry Road to the south side of Highway 417 adjacent to Tremblay Road, including works, superstructure, embankments, ramps and multi use pathway connections, and as further described in Article 32 – Schedule 15-2, Part 1 of the Output Specifications as may be amended pursuant to Section 20.13(b) (the "**Coventry Bridge Work**");

(e) the design and / or installation, relocation (temporary or permanent), labour and materials associated with the Utilities Work as further described in Article 6, Section 6.5(b) – Schedule 15-2, Part 1 of the Output Specifications as may be amended pursuant to Section 20.13(b) (the "**Utilities Work**"); and

(f) the civic works for the Combined Sewage Storage Tunnel Components in Lebreton Flats as further described in Article 30 – Schedule 15-2, Part 1 of the Output Specifications as may be amended pursuant to Section 20.13(b) (the "**CSST Work**"),

including in each case rectification of any minor deficiencies to such work, and any other activities relating thereto required pursuant to the provisions of this Project Agreement.

1.95 "**Civic Works Completion Dates**" means each respective date Substantial Completion of the Civic Works is achieved as certified by the Independent Certifier or by the Consultant (in respect of the Coventry Bridge Work only).

1.96 "**Civic Works Specifications**" means those specifications comprising the Queen Street Work, the Albert Street Work, the Rock Stabilization Work, the Coventry Bridge Work, the Utilities Work and the CSST Work respectively, each of which, for greater certainty, may be amended in detail or in scope by the final specifications provided pursuant to Section 20.13(b).

1.97 "**CLA**" means the *Construction Lien Act* (Ontario).

1.98 "**Claim**" means any claim, demand, action, proceeding or liability.

1.99 "**Commencement of Construction**" means the date on which Project Co commences, in a bona fide manner, Construction on the Alignment following receipt by Project Co of Notice to Commence Construction from the City, which Notice to Commence Construction shall be consistent with the Works Schedule; and "**Commenced Construction**" shall have a corresponding meaning.

1.100 "**Commercial Close**" means the date of the Project Agreement.

1.101 "**Commissioning Manuals**" has the meaning given in Schedule 14 – Commissioning.

1.102 "**Commissioning Schedule**" has the meaning given in Schedule 14 – Commissioning.

1.103 "**Commissioning Team**" has the meaning given in Schedule 14 – Commissioning.

1.104 "**Compensation Date**" has the meaning given in Schedule 23 – Compensation on Termination.

1.105 "**Compensation Event**" has the meaning given in Section 41.1(a) of the Project Agreement.

1.106 "**Component**" means either of the Fixed Component or the Vehicle Component.

1.107 "**Confidant**" has the meaning given in Section 52.6(a)(i) of the Project Agreement.

1.108 "**Confidential Information**" means all confidential and proprietary information which is supplied by or on behalf of a Party, whether before or after Commercial Close.

1.109 "**Construction**" means the construction, manufacture and creation of the System (as distinct from a Correction, a Repair, Maintenance or a Renovation) as required by this Agreement, including all labour, materials and the supply and installation of Equipment and Construction Activities; and "**Constructed**" and "**Construct**" shall have a corresponding meaning. For clarity, "**Construction**" includes both the Fixed Component and the Vehicle Component.

1.110 "**Construction Activities**" means construction, Reinstatement Work, rectification work, and any other aspect of the Works that:

(a) comprises the alteration, augmenting, upgrading, construction, completion, testing or commissioning of any part of the System Infrastructure;

(b) comprises the assessment of any System Infrastructure; or

(c) may affect the structural integrity of any System Infrastructure, and including any such aspect of the Works carried out as part of any Force Majeure event, Relief Event, Variation, or Innovation Proposal accepted by the City.

1.111 "**Construction Clearing and Grubbing**" means the stage of Design and Construction Work in which vegetation and debris is cleared from the Lands (clearing) and a root rake or similar device is employed to remove roots remaining in the soil (grubbing).

1.112 "**Construction Contractor**" means OLRT Constructors, an unincorporated joint venture consisting of Dragados Canada, Inc., a corporation organized under the laws of Canada, EllisDon Corporation, a corporation organized under the laws of Ontario, and SNC-Lavalin Constructors (Pacific) Inc., a corporation organized under the laws of Canada.

1.113 "**Construction Contract**" means the construction contract between the Construction Contractor and Project Co dated on or about the date of the Project Agreement, as amended, supplemented or restated from time to time.

1.114 "**Construction Document Submittals**" has the meaning given in Section 20.3(d)(iii) of the Project Agreement.

1.115 "**Construction Easements**" means all temporary or permanent easements or licences required to Construct the Fixed Component as shall be proposed by notice in writing by the Construction Contractor to the City and approved by the City.

1.116 "**Construction Guarantors**" means Dragados S.A., SNC-Lavalin Group Inc. and EllisDon Inc.

1.117 "**Construction Manager**" means Pedro Luis Gomez Escribano.

1.118 "**Construction Period**" means the period of time commencing upon the Financial Close to and including the Revenue Service Availability Date.

1.119 "**Construction Safety Plan**" means the plan contemplated in Section 2.3(a)(iv) of Appendix B to Schedule 10 – Review Procedures as part of the Project Management Plan.

1.120 "**Consultant**" means McIntosh Perry Consulting Engineers Ltd., or such other RAQS qualified engineer or entity licensed to practice in the Province of Ontario, as may be appointed from time to time by City. The term Consultant means the Consultant or the Consultant's representative.

1.121 "**Contamination**" means the presence of any Hazardous Substance, chemical compound, mineral, gas, metal, carbon, radioactive isotope, organic material or other substance in the environment, including naturally occurring substances, where the presence of any of the foregoing substances in the environment is at concentrations which exceed applicable standards as set by Applicable Laws or where monitoring, remediation or removal of such any of the foregoing substances is otherwise required pursuant to Applicable Laws. If Contamination is present in soil, rock, surface water or groundwater, then the soil, rock, surface water or groundwater, as applicable, containing the Contamination shall also be deemed to be Contamination for the purposes of the Project Agreement.

1.122 "**Contract Documents**" means the Project Agreement as applicable to the Highway Work, Schedule 40 – Highway Work, the Construction Contract as applicable to the Highway Work, the Highway Drawings and Highway Specifications, the Addenda and the Highway Site Information.

1.123 "**Contract Material**" has the meaning given in Schedule 6 – Independent Certifier Agreement.

1.124 "**Contract Month**" has the meaning given in Schedule 20 – Payment Mechanism.

1.125 "**Contract Year**" has the meaning given in Schedule 20 – Payment Mechanism.

1.126 "**Contractor's Direct Agreement**" means the direct agreement amongst the City, Project Co, and each of the Construction Contractor and the Maintenance Contractor, in the form set out in Schedule 5 – Contractor's Direct Agreement.

1.127 "**Contracts**" means the Construction Contract and the Maintenance Contract.

1.128 "**Contractors**" means the Construction Contractor and the Maintenance Contractor, and "**Contractor**" means either one of them.

1.129 "**Contribution Agreement Parties**" means HMQ, represented by the Ministry of Transportation and/or the Auditor General of Ontario and their authorized agents and the Government of Canada, represented by the Ministry of Transport, Infrastructure and Communities and/or the Auditor General of Canada and their authorized agents.

1.130 "**Contribution Agreements**" means the Contribution Agreement dated September 1, 2011 between HMQ, represented by the Ministry of Transportation and the City in respect of the Project and the Contribution Agreement dated December 19, 2012 between the Government of Canada, represented by the Ministry of Transport, Infrastructure and Communities and the City in respect of the Project, each as may be amended, restated or replaced from time to time.

1.131 "**Control**" means:

(a) with respect to a corporation, as defined and determined in accordance with the *Income Tax Act* (Canada); and

(b) with respect to a Business Entity:

(i) ownership or control of more than 50% of the beneficial interest in such Business Entity; or

(ii) a Person whose vote is required for the making of decisions on behalf of the Business Entity; or

(iii) having the right to vote or determine the voting of interests in such Business Entity which are sufficient, if exercised, to make, or being a person whose approval is required to make, major decisions or significant decisions on behalf of the Business Entity.

1.132 "**Coordination Fee**" means a fee in the amount of ($) payable by Project Co to each unsuccessful Proponent (as defined in the Request for Proposals) on and subject to the terms and conditions of this Project Agreement and of the Request for Proposals, including Section 10.3.5 thereof.

1.133 "**Corrected Aggregate Energy Consumption**" has the meaning given in Schedule 8 – Energy Matters.

1.134 "**Corrected Discrete Energy Consumption**" has the meaning given in Schedule 8 – Energy Matters.

1.135 "**Correction**" means correction of any error or Defect in the System that is discovered and undertaken after the Revenue Service Availability Date.

1.136 "**Corrective Maintenance**" has the meaning given to such term in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.137 "**Cost of the Highway Financing**" means all costs and expenses incurred in connection with the financing in respect of the Highway Work pursuant to the indicative financing term sheet included in the Response and Lending Agreements, including all interest, fees, expense reimbursements, pre-payment and breakage costs and all other costs and expenses, as set out in the Financial Model.

1.138 "**Cost of the Highway Work**" means the cost to Project Co of performing the Highway Work as set out in the Financial Model and shall include all amounts to be included in the Cost of the Highway Work set out in the Contract Documents, including, for greater certainty, the Project Co Design Contingency.

1.139 "**Countdown Notice**" has the meaning given in Section 26.3(a) of the Project Agreement.

1.140 "**Coventry Bridge Work**" has the meaning given in the definition of "Civic Works".

1.141 "**CPI**" means CPI (or the Consumer Price Index), as published by Statistics Canada from time to time, or failing such publication, such other index as the Parties may agree, or as may be determined in accordance with Schedule 27 – Dispute Resolution Procedure, which most closely resembles such index.

1.142 "**CPIo**" is the value of CPI on the Base Date, to be determined by reference to the relevant index in the month immediately preceding the Base Date.

1.143 "**CPM**" has the meaning given in Section 12.1(a)(ii) of Schedule 40 – Highway Work.

1.144 "**Credit Agreement**" means the credit agreement dated on or about the date hereof between, among others, Project Co, as borrower, certain Senior Lenders party thereto, as lenders and the Lenders' Agent, as collateral agent.

1.145 "**Crown Lands**" means lands which are owned or controlled by the Crown in right of Canada, the Crown in right of Ontario or any department or agency thereof

1.146 "**CSA**" means the Canadian Standards Association.

1.147 "**CSA Standards**" means, at the applicable time, the standards of the CSA.

1.148 "**CSST Work**" has the meaning given in the definition of "Civic Works".

1.149 "**CTA**" means the *Canadian Transportation Act*, S.C. 1996 c.10.

1.150 "**Culvert**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.151 "**Custodial Maintenance**" has the meaning given to such term in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.152 "**Custodian**" means the person appointed as Custodian pursuant to the Custody Agreement and as may be permitted pursuant to the Project Agreement.

1.153 "**Custody Agreement**" means the custody agreement between Project Co, the City, the Custodian and the Lenders' Agent in the form set out in Schedule 3 – Custody Agreement.

1.154 "**Data Room**" has the meaning given in the Request for Proposals.

1.155 "**DB Co**" means East West Connectors GP, a general partnership formed under the laws of Ontario, and defined as "DB Co" in the DB Co Works Agreement.

1.156 "**DB Co Compensation Event**" has the meaning given to the term "Compensation Event" in the DB Co Works Agreement.

1.157 "**DB Co Delay Event**" has the meaning given to the term "Delay Event" in the DB Co Works Agreement.

1.158 "**DB Co-Derived Project Co Entitlements**" has the meaning given to it in Section 9.12(b)(ii).

1.159 "**DB Co Direct Claim Entitlements**" has the meaning given to it in Section 9.12(b)(i).

1.160 "**DB Co Interface Agreement**" means the interface agreement to be entered into by DB Co, the City and Project Co on or around the date of execution of the DB Co Works Agreement, and defined therein as the "Interface Agreement".

1.161 "**DB Co Party**" has the meaning given to it in the DB Co Works Agreement.

1.162 "**DB Co Works**" means the Works as defined in the DB Co Works Agreement.

1.163 "**DB Co Works Agreement**" means the agreement entered into between City and DB Co in relation to the design, construction and financing of certain works in respect of the Confederation Line extension which will form part of the Stage 2 System dated April 25, 2019.

1.164 "**DB Co Works Schedule**" has the meaning given to the term "Works Schedules" in the DB Co Works Agreement.

1.165 "**DBF Defect**" has the meaning given to it in the DB Co Interface Agreement.

1.166 "**Deduction**" has the meaning given in Schedule 20 – Payment Mechanism.

1.167 "**Default Notice**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.168 "**Default Period**" has the meaning given in Schedule 30 – Insurance Trust Agreement.

1.169 "**Defect**" means any defect, deficiency, error or fault in the Design, Construction or Work, or a failure to comply with the Project Scope and Output Specifications.

1.170 "**Deficiency**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.171 "**Delay Events**" has the meaning given in Section 40.1(a) of the Project Agreement.

1.172 "**Delegation Agreement**" means the agreement dated with effect as of October 1, 2011 between Her Majesty the Queen in Right of Canada and the City relating to the regulation of the design, construction, operation, safety and security of light rail systems owned or operated by the City, including the System.

1.173 "**Delivery Date**" has the meaning given to it in Schedule 44 – Stage 2 Additional Vehicles.

1.174 "**Design**" means the entire process for the design of the System as required by this Project Agreement.

1.175 "**Design and Bid Fee**" means a fee in the amount of dollars ($) payable by the City to each unsuccessful Proponent (as defined in the Request for Proposals) on and subject to the terms and conditions of the Request for Proposals, including Section 10.3.2 thereof.

1.176 "**Design and Certification Procedure**" means the procedure for design and certification of the System set forth in the Design and Construction Specifications and Section 20 of the Project Agreement.

1.177 "**Design and Construction Performance Requirements**" means the provisions respecting the Fixed Facilities, E&M and Vehicles set out in Schedule 15-2 – Output Specifications – Design and Construction Requirements.

1.178 "**Design and Construction Specifications**" means Schedule 15-2 – Output Specifications – Design and Construction Requirements.

1.179 "**Design and Construction Works**" means the design, construction, installation, testing, commissioning and completion of the Stage 1 System, including rectification of any Minor Deficiencies, and any other activities required to enable or facilitate the commencement of the Maintenance Services for the Stage 1 System, and all work under the Permits, Licences and Approvals, together with the related construction-period operations and maintenance services described in Sections 1.1(b)(i) and (iii) of Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements.

1.180 "**Design and Construction Works Commencement Date**" means February 12, 2013.

1.181 "**Design-Build Director**" means David Weatherby.

1.182 "**Design Data**" means all drawings, reports, documents, plans, software, formulae, calculations, and other data:

(a) prepared by Project Co or any Project Co Party in respect of the Stage 1 System; or

(b) (in connection with the Maintenance Services in relation to the Stage 2 System only) prepared by DB Co and delivered to Project Co in relation to the Stage 2 System,

relating to the design, construction or testing of the System, but excluding Intellectual Property Rights of third parties, such as CAD software, that is used only in the process of design and construction.

1.183 "**Design Development Submittals**" has the meaning given in Section 20.3(d)(i) of the Project Agreement.

1.184 "**Design Manager**" means Roger Woodhead.

1.185 "**Design Period**" means the period of time commencing upon the Design and Construction Works Commencement Date to and including the date on which the Design is completed.

1.186 "**Design Review Meetings**" has the meaning given in Section 20.5(a) of the Project Agreement.

1.187 "**Design Team**" means SNC-Lavalin Inc. and MMM Group Limited (which have entered into an unincorporated joint venture referred to as RTGE Joint Venture), engaged by the Construction Contractors to design the System and any substitute design team engaged by the Construction Contractor as may be permitted by the Project Agreement.

1.188 "**Development Approval**" means development permits, building permits, zoning approvals and any other planning or development permit, consent or applicable Permits, Licences and Approvals required from time to time for construction of the System.

1.189 "**Direct Agreement**" means the Contractor's Direct Agreement.

1.190 "**Direct Cost**" has the meaning given in Schedule 22 – Variation Procedure.

1.191 "**Direct Losses**" means all damage, losses, liabilities, penalties, fines, assessments, claims, actions, costs, expenses (including costs incurred in respect of fuel, OC Transpo labour costs, vehicle wear and tear, and the cost of legal or professional services, legal costs being on a substantial indemnity basis), proceedings, demands, judgements and charges whether arising under statute, contract or at common law, except Indirect Losses.

1.192 "**Direct or Indirect Power or Control**" means the direct or indirect power or control over the decisions, management, actions or policies of a person, including through the direct or indirect power or control over the decisions, management, actions or policies of any Persons having direct or indirect power or control over the decisions, management, actions or policies of any other person, whether through:

(a) ownership, beneficial or otherwise, of any of the shares, units or equity interest of a Person;

(b) the direct or indirect power to vote any of the shares, units or equity interests of a Person; or

(c) the direct or indirect power or authority to influence or direct the approval of a decision, the management, actions or policies of a person or to prevent the approval of a decision, the management, actions or policies of a Person through any contractual right or other power or interest with or over a Person.

1.193 "**Disclosed Hazardous Substances**" has the meaning given in Section 14.1(c) of Schedule 40 – Highway Work.

1.194 "**Discount Rate**" has the meaning given in Schedule 23 – Compensation on Termination.

1.195 "**Discrete Energy Service Actual Consumption**" has the meaning given in Schedule 8 – Energy Matters.

1.196 "**Discrete Energy Targets**" or "**DET**" has the meaning given in Schedule 8 – Energy Matters.

1.197 "**Discretion**" means, with respect to any consent, approval or decision required to be made by a Party, that any such approval, consent or decision may be made in the sole and absolute discretion of the relevant Party.

1.198 "**Discriminatory Change in Law**" means any Change in Law the effect of which is to discriminate directly against or impose additional Taxes which apply specifically to:

(a) transit systems, including light rail transit systems whose design, construction, financing, operations, maintenance, rehabilitation, safety and security are procured by a contract similar to the original Project Agreement in relation to other similar transit systems;

(b) the System in relation to other transit systems, including light rail transit systems;

(c) the Highway in relation to other public highways;

(d) Project Co in relation to other persons; or

(e) Persons undertaking projects for design, construction, financing, operations and maintenance that are procured by a contract similar to the Project Agreement in

relation to other persons undertaking similar projects procured on a different basis,

except that such Change in Law shall not be a Discriminatory Change in Law:

(f) where it is in response to any act or omission on the part of Project Co which contravenes Applicable Law (other than an act or omission rendered illegal by virtue of the Discriminatory Change in Law itself);

(g) solely on the basis that its effect on Project Co is greater than its effect on other Persons;

(h) where such Change in Law is a change in Taxes that affects Persons generally; or

(i) in the case of a change to an OLRT Regulation that falls within the exception circumstances described in subparagraphs (a) and (b) of Section 38.4.

1.199 "**Dispute**" has the meaning given in Schedule 27 – Dispute Resolution Procedure.

1.200 "**Dispute Resolution Procedure**" means the procedure set out in Schedule 27 – Dispute Resolution Procedure.

1.201 "**Distribution**" has the meaning given in Schedule 28 – Refinancing.

1.202 "**Downtown Area**" means that portion of the Alignment between Booth Street and Elgin Street, in the City of Ottawa.

1.203 "**Drivers**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.204 "**E&M**" means all electrical and mechanical equipment, machinery, computer hardware and systems included in the System together with all Project Intellectual Property as provided for in the Project Scope and Output Specifications.

1.205 "**EA Approvals**" means the approvals for the Project issued pursuant to EAA and CEAA, excluding those approvals or reviews relating to designs relating to the Project required to be submitted in accordance with EAA or CEAA, which designs shall be submitted by Project Co.

1.206 "**EAA**" means the *Environmental Assessment Act* (Ontario).

1.207 "**East Trial Running Period**" has the meaning given in Schedule 20 – Payment Mechanism.

1.208 "**Economic Interest**" means any right to receive, directly or indirectly and whether in cash or in kind, a payment, repayment, fee, interest, dividend, distribution, redemption or any other consideration of benefit or value to the recipient of any nature whatsoever.

1.209 "**EMC**" means electro magnetic compatibility.

1.210 "**Emergency**" means any situation, event, occurrence, multiple occurrences or circumstances:

(a) that:

(i) any condition which exists with respect to any aspect of the System that adversely affects Safety or has the potential to adversely affect Safety or materially interfere with or prevent Operations;

(ii) causes or may cause damage or harm to property, buildings and/or equipment;

(iii) constitutes a hostage situation or state of emergency declared as such by the City Representative or the City;

(iv) materially interferes with or prejudices or may materially interfere with or prejudice the safe operation of the System, the Highway, any part of the Lands or Highway Site, the conduct of Project Scope, or the conduct of Governmental Activities; or

(v) constitutes a period of transition to or from war;

and which, in the Discretion of the City requires immediate action to prevent and/or mitigate the occurrence (or risk of the occurrence) of the foregoing;

(b) which gives rise to an emergency, as determined by any statutory body including (notwithstanding the generality of the foregoing) an Emergency Service Provider; or

(c) which gives rise to an emergency as determined by the Minister of Transport under the Railway Delegation Agreement dated October 1st, 2011.

1.211 "**Emergency Response Plan**" means the plan to be prepared, submitted and implemented by Project Co in accordance with Part 1 of Schedule 15-2 – Output Specifications – Design and Construction Requirements.

1.212 "**Emergency Service Providers**" means any Police Service, City Rail Office, fire fighting service, ambulance service, armed forces or other authority with emergency service authority pursuant to Applicable Law which may require access to the System or Highway from time to time.

1.213 "**Employees**" means employees of Project Co, a Contractor or any Subcontractor with respect to Maintenance.

1.214 "**Employee Payments**" means all amounts which Project Co at law, under the common law or pursuant to employment agreements (provided the terms are reasonable) is required to pay to its employees engaged in Maintenance Service, as a direct result of the termination of its Employees on the termination of this Project Agreement.

1.215 "**Employee Termination Payments**" has the meaning given in Schedule 23 – Compensation on Termination.

1.216 "**Encumbrance**" means, with respect to the Lands and the System and the Highway Site and Highway, any mortgage, lien, pledge, judgment, execution, charge, security interest, restriction, claim or encumbrance of any nature whatsoever, including claims of the Workplace Safety and Insurance Board, Canada Revenue Agency, and other Governmental Authorities, provided that any such item shall not be an Encumbrance for the purposes of the Project Agreement until such time as the relevant part of the Lands or the System to which it relates forms part of the Lands or the System for the purposes of the Project Agreement.

1.217 "**Energy Analysis Report**" has the meaning given in Schedule 8 – Energy Matters.

1.218 "**Energy Service**" has the meaning given in Schedule 8 – Energy Matters.

1.219 "**Energy Target Letter**" has the meaning given in Schedule 8 – Energy Matters.

1.220 "**Energy Utilities**" means energy/power including electricity, natural gas, fuel, oil and any other energy source used to carry out the Project Scope or otherwise consumed by the System, including renewable and alternative sources of energy.

1.221 "**Enforcement Event**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.222 "**Environmental Approvals**" means:

(a) the Environmental Assessments and the Stage 2 Environmental Assessments; and

(b) any Permits, Licences and Approvals relating to environmental matters,

provided that this definition shall be read in accordance with the Timing Principle.

1.223 "**Environmental Assessments**" means the documents listed in Appendix "A" to Schedule 17 - Environmental Obligations.

1.224 "**Environmental Laws**" means all Applicable Laws relating to public health or the protection of the environment or Species-at-Risk.

1.225 "**Environmental Management System**" means a comprehensive system that enables the management of Project Co's Environmental Obligations detailed in Schedule 17 - Environmental Obligations, in a comprehensive, systematic, planned manner and which is documented in an Environmental Management Plan.

1.226 "**Environmental Management Plan**" has the meaning given in Schedule 17 – Environmental Obligations.

1.227 "**Environmental Quality Management Plan**" has the meaning given in Schedule 11 – Quality Management.

1.228 "**Environmental Reports**" means the Advanced Environmental Reports.

1.229 "**Environmental Site Assessment**" means an investigation in relation to land to determine the environmental condition of property, and includes a phase one environmental site assessment and a phase two environmental site assessment.

1.230 "**EPR Claim**" has the meaning given in Section 9.12 of the Project Agreement.

1.231 "**EPR Claim Notice**" has the meaning given in Section 9.12 of the Project Agreement.

1.232 "**Equipment**" means Fixed Equipment and Vehicle Equipment.

1.233 "**Equity Capital**" means the aggregate (without double counting) of all subscribed share capital, shareholder loans and other contributed capital of Project Co, excluding, for greater certainty, any amounts advanced to Project Co under the Lending Agreements which has a fixed return without equity participation, step-up rights or rights to share in Project Co's excess cash flow and a coupon equal to or less than 150 % of the coupon payable to the Senior Lenders.

1.234 "**Equity IRR**" has the meaning given in Schedule 28 – Refinancing.

1.235 "**Equity Provider**" means each of the Partners.

1.236 "**Equity Sale IRR**" means the Equity IRR calculated to the date of any sale of Equity Capital and calculated by taking into account the full Implied Equity Value, together with all Distributions paid in respect of the Equity Capital, and the actual timing of payment of all such amounts.

1.237 "**Equivalent Project Relief**" has the meaning given in Section 9.12 of the Project Agreement.

1.238 "**Escalation Factor**" has the meaning given in Schedule 20 – Payment Mechanism.

1.239 "**Escrow Account**" has the meaning given in Schedule 24 – Expiry Transition Procedure.

1.240 "**Estimate**" has the meaning given in Schedule 22 – Variation Procedure.

1.241 "**Estimated Fair Value**" has the meaning given in Schedule 23 – Compensation on Termination.

1.242 "**Excess Equity Gain**" means an amount equal to the greater of zero and the difference between:

(a) the amount paid in consideration of the percentage of Equity Capital (as at Financial Close) sold in a particular sale of Equity Capital; and

(b) the Threshold Equity Sale Amount.

1.243 "**Excluded Permits**" means any permissions, consents, approvals, registrations, exemptions, delegations and agreements and/or permits required for Design and/or Construction in accordance with the *Canada Transportation Act or the Railway Safety Act* (Canada), or required by Transport Canada or the Canadian Transportation Agency.

1.244 "**Excusing Cause**" has the meaning given in Section 42.1(a) of the Project Agreement.

1.245 "**Exempt Refinancing**" has the meaning given in Schedule 28 – Refinancing.

1.246 "**Exercise Date**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.247 "**Existing Contamination**" has the meaning given in Section 16.2(a).

1.248 "**Existing Highway Infrastructure**" means Highway Infrastructure situated in, on, over or under any part of the Highway Site at Commercial Close that in accordance with the Highway Specifications is to form part of the completed Highway, but excluding Infrastructure and other property of Utility Companies.

1.249 "**Expanded Belfast MSF**" means the Belfast MSF following the Belfast MSF Expansion Substantial Completion Date.

1.250 "**Expanded System**" means the System (as it is defined in this Agreement as of March 16, 2017), as expanded by the Stage 2 East System and the Stage 2 West System.

1.251 "**Expanded Design and Construction Performance Requirements**" means the provisions respecting the Fixed Facilities, E&M and Vehicles set out in:

(a) Schedule 15-2 – Output Specifications – Design and Construction Requirements;

(b) Appendix 15-2 to Schedule 45 - Belfast MSF Expansion; and

(c) Schedule 15-2 to the DB Co Works Agreement.

1.252 "**Expanded Design and Construction Specifications**" means:

(a) Schedule 15-2 – Output Specifications – Design and Construction Requirements;

(b) Appendix 15-2 to Schedule 45 - Belfast MSF Expansion; and

(c) Schedule 15-2 to the DB Co Works Agreement.

1.253 "**Expanded Output Specifications**" means:

(a) the Output Specifications;

(b) Appendix 15-2 to Schedule 45 - Belfast MSF Expansion; and

(c) Schedule 15-2 to the DB Co Works Agreement.

1.254 "**Expert**" has the meaning given in Schedule 27 – Dispute Resolution Procedure.

1.255 "**Expiry Date**" means the 30th anniversary of the original Required Revenue Service Availability Date, without taking into account any extensions to such date pursuant to Section 40 of the Project Agreement.

1.256 "**Expiry Transition Amount**" has the meaning given in Schedule 24 – Expiry Transition Procedure.

1.257 "**Expiry Transition Procedure**" means the procedure for Expiry Transition described in Schedule 24 – Expiry Transition Procedure.

1.258 "**Expiry Transition Requirements**" has the meaning given in Schedule 24 – Expiry Transition Procedure.

1.259 "**Expiry Transition Security**" has the meaning given in Schedule 24 – Expiry Transition Procedure.

1.260 "**Expiry Transition Works**" has the meaning given in Schedule 24 – Expiry Transition Procedure.

1.261 "**Expiry Transition Works Costs**" has the meaning given in Schedule 24 – Expiry Transition Procedure.

1.262 "**Failure Points**" has the meaning given in Schedule 20 – Payment Mechanism.

1.263 "**FCLC**" means the Federal Canada Labour Code – Part 2.

1.264 "**Final Completion**" means the completion of the Design and Construction Works in accordance with the Project Agreement, including rectification of all Minor Deficiencies; for greater certainty, Final Completion shall not occur until Final Completion has occurred in respect of each Component.

1.265 "**Final Completion Certificate**" means the certificate to be issued by the Independent Certifier in accordance with Section 26.8 of the Project Agreement.

1.266 "**Final Completion Date**" means the date on which Final Completion is achieved as evidenced by the Final Completion Certificate, as such date shall be stated therein.

1.267 "**Final Completion Notice**" has the meaning given in Section 26.8(b) of the Project Agreement.

1.268 "**Final Design Development Submittals**" has the meaning given in Section 20.3(d)(ii)(B) of the Project Agreement.

1.269 "**Final System Condition Report**" has the meaning given in Schedule 24 – Expiry Transition Procedure.

1.270 "**Financial Close**" means the first date that funding is available under the Lending Agreements.

1.271 "**Financial Close Target Date**" means February 12, 2013, as such date may be extended in accordance with the provisions of the Project Agreement.

1.272 "**Financial Model**" means the computer spreadsheet model for the Project agreed by City and Project Co incorporating statements of Project Co's cashflows including all expenditure, revenues, financing and taxation of the Project Scope together with the profit and loss accounts and balance sheets for Project Co throughout the Project Term accompanied by details of all assumptions, calculations and methodology used in their compilation and any other documentation necessary or desirable to operate the model.

1.273 "**Financial Obligations**" means the obligation to pay any application fees, third party fees, costs or charges (including all applicable taxes thereon), the provision of any letters of credit, instruments of guarantee, bonds or security deposits, or any other financial security obligations.

1.274 "**FIPPA**" means the *Freedom of Information and Protection of Privacy Act* (Ontario).

1.275 "**First Pre-final Design Development Submittals**" has the meaning given in Section 20.3(d)(i) of the Project Agreement.

1.276 "**Fixed Component**" means the Fixed Facilities and the Fixed Equipment (and includes the MSFs), provided that this definition will be interpreted in accordance with the Ring Fencing Principle and the Timing Principle.

1.277 "**Fixed Equipment**" means all E&M comprising or used in the System, other than Vehicle Equipment, provided that this definition will be interpreted in accordance with the Ring Fencing Principle and the Timing Principle.

1.278 "**Fixed Facilities**" means those improvements described as such in the Project Scope and Expanded Output Specifications (which for clarity, includes the MSFs and the Tunnel), provided that this definition will be interpreted in accordance with the Ring Fencing Principle and the Timing Principle.

1.279 "**Force Majeure**" has the meaning given in Section 44.1(a) of the Project Agreement.

1.280 "**Gainshare Adjustment**" has the meaning given in Schedule 8 – Energy Matters.

1.281 "**Geotechnical Data Reports**" means the following reports:

(a) Report entitled "Geotechnical Data Report, Geotechnical and Hydrogeological Investigation, Ottawa Light Rail Transit (OLRT), West At-Grade (Segment 1), Ottawa, Ontario" dated October 2011;

(b) Report entitled "Geotechnical Data Report, Geotechnical and Hydrogeological Investigation, Ottawa Light Rail Transit (OLRT) Tunnel (Segment 2), Ottawa, Ontario" dated December 2011;

(c) Report entitled "Geotechnical Data Report, Geotechnical and Hydrogeological Investigation, Ottawa Light Rail Transit (OLRT), East At-Grade (Segments 3, 4 & 5), Ottawa, Ontario" dated October 2011;

(d) Amendment entitled "Geotechnical Data Report, West At-Grade (Segment 1), Amendment No. 3, Geotechnical and Hydrogeological Investigation, Ottawa Light Rail Transit (OLRT), Ottawa, Ontario" dated July 2012;

(e) Amendment entitled "Geotechnical Data Report, East At-Grade (Segments 3, 4, & 5), Amendment No. 5, Geotechnical and Hydrogeological Investigation, Ottawa Light Rail Transit (OLRT), Ottawa, Ontario" dated July 2012;

(f) Amendment entitled "Geotechnical Data Report, Tunnel (Segment 2), Amendment No. 7, Geotechnical and Hydrogeological Investigation, Ottawa Light Rail Transit (OLRT), Ottawa, Ontario" dated July 2012;

(g) Amendment entitled "Memorandum, Amendment No. 8 to the Tunnel Geotechnical Data Report (GDR), OLRT Project, Ottawa, Ontario" dated August 1, 2012;

(h) Amendment entitled "Memorandum, Amendment No. 9 to the Tunnel Geotechnical Data Report (GDR), OLRT Project, Ottawa, Ontario" dated August 14, 2012; and

(i) Amendment entitled "Memorandum, Amendment No. 10 to the Tunnel Geotechnical Data Report (GDR), OLRT Project, Ottawa, Ontario" dated August 24, 2012.

1.282 "**Good Industry Practice (Highway)**" means using standards, practices, methods and procedures to a good commercial standard, in conformity with Applicable Law and having regard to the standard of care set out in Section 11.2(a)(viii) of Schedule 40 – Highway Work, provided that this definition applies only to the Highway and the Highway Work.

1.283 "**Good Industry Practice (Works)**" or "**Good Engineering Practice (Works)**" or "**Good Practice (Works)**" or "**Best Practices (Works)**" means using standards, practices, methods and procedures to a good commercial standard, conforming to Applicable Law and exercising that degree of skill and care, diligence, prudence and foresight which would reasonably and ordinarily be expected from a qualified, skilled and experienced person engaged in a similar type of undertaking under the same or similar circumstances, provided that this definition applies throughout the Project Scope excluding the Highway and the Highway Work.

1.284 "**Government Sensitive Information**" means any information which is designated as such by City from time to time, or which a reasonable person, having regard to the circumstances, would regard as sensitive, including (i) all confidential information that is designated as such by Applicable Law, and (ii) any record, the disclosure of which could be injurious to the interests of City.

1.285 "**Governmental Activities**" means the provision of all governmental services and the conduct of all activities provided in connection or otherwise associated with the Lands and the System by any Governmental Authority or Emergency Service Provider, and includes the City Activities.

1.286 "**Governmental Authority**" means any federal, provincial, territorial, regional, municipal or local governmental authority, quasi-governmental authority, court, government or self-regulatory organization, commission, board, tribunal, organization, or any regulatory, administrative or other agency, or any political or other subdivision, department, or branch of any of the foregoing, having legal jurisdiction in any way over the City, any aspect of the performance of the Project Agreement, the operation of the System or the Governmental Activities, in each case to the extent it has or performs legislative, judicial, regulatory, administrative or other functions within its jurisdiction.

1.287 "**Guarantors**" means the Construction Guarantors and the Maintenance Guarantors.

1.288 "**Guideway**" means the bed for the Tracks, whether elevated, at grade or below grade, included in the System, provided that this definition will be interpreted in accordance with the Ring Fencing Principle and the Timing Principle.

1.289 "**H&S Conviction**" has the meaning given in Section 45.1(a)(xix) of the Project Agreement.

1.290 "**Handover Maintenance**" has the meaning given to such term in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.291 "**Has Knowledge**" or "**Have Knowledge**" means:

(a) a natural person knows or has knowledge when information is received or acquired by the person under the circumstances in which a reasonable person would take cognizance of it; and

(b) corporation knows or has knowledge when information has been received or has come to the attention of:

(i) a director or officer of the corporation; or

(ii) a senior employee of the corporation with responsibility for matters to which the information relates,

(c) the City knows or has knowledge when information has been received or has come to the attention of:

(i) Director, Rail Implementation Office;

(ii) Deputy City Manager – Infrastructure Services and Community Sustainability; or

(iii) the City Manager of the City;

under circumstances in which a reasonable person would take cognizance of it and, in the case of Project Co, shall include matters referred to in subparagraph (a) or (b) above with respect to the Contractors, and "**Knowledge**" has a corresponding meaning.

1.292 "**Hazardous Substances**" means any contaminant, pollutant, dangerous substance, toxic substance, liquid waste, industrial waste, gaseous waste, hauled liquid waste, hazardous material, or hazardous substance as defined or identified pursuant to any Applicable Law.

1.293 "**Headway**" means the amount of time which elapses between the arrival of Trains at Stations travelling in a specific direction.

1.294 "**Heritage Guidelines and Protocols**" means the Government of Ontario's Best Practice Guidelines for the Treatment of Human Skeletal Remains Discovered Outside a Licensed Cemetery and the Cultural Heritage Protocol Agreement between the Ministry of Government Services and the Ministry of Culture and Communications.

1.295 "**High Cost Measures**" has the meaning given in Schedule 8 – Energy Matters.

1.296 "**Highway**" means, in respect of 417, all Highway Infrastructure, supporting systems, utilities and improvements required by the Contract Documents and whether or not in the course of construction, installation or completion. This description does not in any manner limit the scope of the Highway Work as set out in the Contract Documents.

1.297 "**Highway CLA Certificate**" has the meaning given in Section 16.1(c) of Schedule 40 – Highway Work.

1.298 "**Highway Commissioning**" shall mean the process of:

(a) preparing a public highway, or a system for its intended use; and

(b) the management of testing, verifying, recording and documenting and the training of users of the systems in respect of the Highway Work,

and shall include, for greater certainty but without limitation, the requirement that all active systems and technologies forming part of the Highway Work perform in accordance with the design intent, manufacturer's performance specifications and the Contract Documents, including the items set out in the "Commissioning Requirements and Sign Off" form attached as Exhibit 1 to Annex B of Schedule 40 – Highway Work.

1.299 "**Highway Commissioning Agent**" shall mean the person or entity chosen by City, if any, to assist with Highway Commissioning.

1.300 "**Highway Construction Schedule**" means the detailed computerized schedule prepared by Project Co in accordance with the terms and conditions of the Contract Documents, as updated from time to time in accordance with Section 12.1 of Schedule 40 – Highway Work.

1.301 "**Highway Contract Time**" is the time stipulated in Section 11.1(a)(ii) of Schedule 40 – Highway Work from commencement of the Highway Work to the Highway Substantial Completion Date and to Highway Final Completion Date.

1.302 "**Highway Design Issue**" means any matter arising under, with respect to, or in connection with the Contract Documents, and in particular, the Highway Drawings and Highway Specifications, which requires clarification in order to complete the Highway Work.

1.303 "**Highway Drawings**" means the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location, and dimensions of the Highway Work, and generally including plans, elevations, sections, details, schedules and diagrams and includes those Highway Drawings listed in Schedule 40 – Highway Work - Annex A – List of Highway Drawings and Highway Specifications.

1.304 "**Highway Final Completion**" shall occur when the Highway Work, except those items arising from the provisions of Article 35 of Schedule 40 – Highway Work, has been deemed to have been completed in accordance with the applicable provisions of the CLA and is so certified by the Consultant in accordance with Schedule 40 – Highway Work, including satisfying the requirements of Sections 16.1(k) and (l) of Schedule 40 – Highway Work.

1.305 "**Highway Final Completion Certificate**" has the meaning given in Section 16.1(o) of Schedule 40 – Highway Work.

1.306 "**Highway Final Completion Date**" means the date on which Highway Final Completion is achieved as evidenced by the Highway Final Completion Certificate, as such date shall be stated therein.

1.307 "**Highway Final Completion Notice**" has the meaning given in Section 16.1(m) of Schedule 40 – Highway Work.

1.308 "**Highway Final Payment**" means $.

1.309 "**Highway Final Payment Date**" means the date specified in Section 16.1(p) of Schedule 40 – Highway Work.

1.310 "**Highway Infrastructure**" means all road, highway and park infrastructure including roadways, hard shoulders, slip roads, side roads, access roads, pavement, bridges, tunnels and other highway structures whether over or under the travelled surface, together with all related supporting infrastructure, buildings, improvements and amenities, including all intelligent traffic systems and equipment, fences and barriers, curbs, culverts, drainage

systems including outfalls and balancing ponds, grassed areas, sidewalks, hedges and trees, planted areas, footways, recreational paths, walking and cycling trails, recreational equipment and facilities, road markings, road traffic signs, road traffic signals, road lighting, communications installations, weigh stations, washrooms and rest areas, picnic sites, pullouts, embankments, retaining walls and cuttings.

1.311 "**Highway Milestone Payment**" means $.

1.312 "**Highway Milestone Payment Date**" means ten Business Days following the Highway Substantial Completion Date.

1.313 "**Highway Minimum Subsequent Time**" has the meaning given in Section 15.1(c) of Schedule 40 – Highway Work.

1.314 "**Highway Minor Deficiencies**" means any defects, deficiencies and items of outstanding Highway Work (including in relation to seasonal work), which would not materially impair City's use and enjoyment of the Highway Work and includes any damage to the Highway Work of Additional Contractors caused by Project Co.

1.315 "**Highway Minor Deficiencies Holdback**" has the meaning given in Section 16.1(h) of Schedule 40 – Highway Work.

1.316 "**Highway Minor Deficiencies List**" has the meaning given in Section 16.1(b) of Schedule 40 – Highway Work.

1.317 "**Highway Post Substantial Completion Maintenance**" has the meaning given in Section 11.23(b) of Schedule 40 – Highway Work.

1.318 "**Highway Proposed Date**" has the meaning given in Section 15.1(c) of Schedule 40 – Highway Work.

1.319 "**Highway Release**" has the meaning given in Section 14.1(c) of Schedule 40 – Highway Work.

1.320 "**Highway Scheduled Final Completion Date**" means November 16, 2015, as such date may be extended pursuant to Section 40 of the Project Agreement.

1.321 "**Highway Scheduled Substantial Completion Date**" means September 16, 2015, as such date may be extended pursuant to Section 40 of the Project Agreement.

1.322 "**Highway Shop Drawings**" means drawings, diagrams, illustrations, schedules, performance charts, brochures, samples, Product data, and other data which Project Co provides to illustrate details of a portion of the Highway Work.

1.323 "**Highway Shop Drawing Schedule**" means the schedule for the submission of shop drawings described in Section 11.11(c) of Schedule 40 – Highway Work.

1.324 "**Highway Site**" means the lands, site and property located in the City of Ottawa, Ontario and described in Schedule 40 – Highway Work - Annex F – Legal Description of Highway Site. Notwithstanding the foregoing, prior to April 1, 2013, the Highway Site shall not include the locations specified below except to the extent authorized by the City in its Discretion:

(a) NW Quadrant of the Hurdman Bridge

(i) PIN # 04207-0396

(ii) PIN # 04207-0630

(b) NE Quadrant of the Hurdman Bridge

(i) PIN # 04207-0410

(ii) PIN # 04207-0409

(c) SW Quadrant of the Hurdman Bridge

(i) PIN # 04203-0732

(d) Island south of the Hurdman Bridge

(i) PIN # 04203-0244

(e) SE Quadrant of the Hurdman Bridge

(i) PIN 04203-0633

1.325 "**Highway Site Background Reports**" means the reports listed in Appendix 8 to this Schedule 1.

1.326 "**Highway Site Information**" means:

(a) the Highway Site Background Reports; and

(b) other information respecting the Highway Site in the Contract Documents, including infrastructure drawings and other reports, information or plans.

1.327 "**Highway Specific Change in Law**" means any Change in Law which principally affects or principally relates only to the design, construction and maintenance of public highways.

1.328 "**Highway Specifications**" means that portion of the Contract Documents, wherever located and whenever issued, consisting of written requirements and standards for Products, systems, workmanship, maintenance and the services necessary for the performance of the Highway Work and includes those Highway Specifications listed in

Schedule 40 – Highway Work - Annex A – List of Highway Drawings and Highway Specifications.

1.329 "**Highway Substantial Completion Certificate**" has the meaning given in Section 16.1(e) of Schedule 40 – Highway Work.

1.330 "**Highway Substantial Completion Countdown Notice**" has the meaning given in Section 15.1(a) of Schedule 40 – Highway Work.

1.331 "**Highway Substantial Completion Date**" means the date on which Substantial Completion of the Highway Work is achieved as evidenced by the Highway Substantial Completion Certificate, as such date shall be stated therein.

1.332 "**Highway Substantial Completion Notice**" has the meaning given in Section 16.1(a) of Schedule 40 – Highway Work.

1.333 "**Highway Traffic Control Plan**" means the plan prepared in accordance with the Contract Documents, including:

(a) provision for Highway lane and ramp closure times, where applicable;

(b) directions for all existing Highway traffic lanes which shall be open to Highway Users at the end of each working day; and

(c) the detour routes approved by the City and the MTO in accordance with the Contract Documents.

1.334 "**Highway User**" means any member of the travelling public, any City Person, MTO and any other person that is on or about the Highway right of way or is otherwise making use of the Highway Infrastructure for any purpose.

1.335 "**Highway Warranty**" has the meaning given in Section 35.1(a) of Schedule 40 – Highway Work.

1.336 "**Highway Work**" means the construction, installation, testing, Highway Commissioning and completion of the Highway, including rectification of any Highway Minor Deficiencies, maintenance and any other activities required pursuant to the provisions of this Project Agreement.

1.337 "**Highway Work Deliverables**" has the meaning given in Section 16.1(i) of Schedule 40 – Highway Work.

1.338 "**HMQ**" means Her Majesty the Queen in Right of Ontario.

1.339 "**HST**" means the value-added tax imposed pursuant to Part IX of the *Excise Tax Act* (Canada), and any successor legislation thereto.

1.340 "**HST Acceleration Event**" has the meaning given to it in Section 35.1(c).

1.341 "**Implementing Agreements**" means the Construction Contract as it relates to the Highway Work, the Lenders' Direct Agreement and all other documents and agreements delivered by the Parties at Financial Close under the Project Agreement, excluding the Project Agreement and the Lending Agreements.

1.342 "**Implied Equity Value**" means the amount paid in consideration of a percentage of Equity Capital divided by the percentage of Equity Capital (as at Financial Close) sold in a particular sale of Equity Capital.

1.343 "**Indebtedness Notice**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.344 "**Indemnifiable Taxes**" has the meaning given in Section 35.6(b) of the Project Agreement.

1.345 "**Indemnifier**" has the meaning given in Section 56.3(a) of the Project Agreement.

1.346 "**Independent Certifier**" means the person appointed as the Independent Certifier pursuant to the Independent Certifier Agreement and as may be permitted pursuant to the Project Agreement.

1.347 "**Independent Certifier Agreement**" means the contract entered into between Project Co, the City and the Independent Certifier in substantially the form attached hereto as Schedule 6 – Independent Certifier Agreement and includes all renewals, amendments, supplements, extensions, restatements, modifications, replacements or consolidations thereof.

1.348 "**Independent Inspector**" has the meaning given in Schedule 24 – Expiry Transition Procedure.

1.349 "**Indirect Losses**" has the meaning given in Section 57.1(a) of the Project Agreement.

1.350 "**Inflation Base Date**" has the meaning given in Schedule 20 – Payment Mechanism.

1.351 "**Inflation Index**" means the Consumer Price Index, for All-items in Ontario, as published by Statistics Canada or, if such Consumer Price Index in its present form becomes unavailable, such similar index as may be agreed by the Parties, acting reasonably, and if such agreement cannot be reached, pursuant to Schedule 27 – Dispute Resolution Procedure.

1.352 "**Infrastructure**" means all transit and park infrastructure including roadways, hard shoulders, slip roads, side roads, access roads, pavement, bridges, tunnels and other highway structures whether over or under the travelled surface, together with all related supporting infrastructure, buildings, improvements and amenities, including all intelligent traffic systems and equipment and other elements of a LRT System, fences and barriers, curbs, culverts, drainage systems including outfalls and balancing ponds, grassed areas, sidewalks, hedges and trees, planted areas, footways, recreational paths, walking and cycling trails, recreational equipment and facilities, road markings, road traffic signs,

road traffic signals, road lighting, communications installations, washrooms and rest areas, embankments, retaining walls and cuttings, but excluding Highway Infrastructure.

1.353 "**Innovation Proposal**" has the meaning given in Section 39.2(b) of the Project Agreement.

1.354 "**Inspection and Test Plan**" has the meaning given in Schedule 11 – Quality Management.

1.355 "**Insurance Payment**" has the meaning given in Section 7.1(a) of Schedule 25 - Insurance and Performance Security Requirements.

1.356 "**Insurance Policies**" has the meaning given in Schedule 30 – Insurance Trust Agreement.

1.357 "**Insurance Proceeds**" has the meaning given in Schedule 30 – Insurance Trust Agreement.

1.358 "**Insurance Review Date**" has the meaning given in Section 7.1(b) of Schedule 25 – Insurance and Performance Security Requirements.

1.359 "**Insurance Review Period**" has the meaning given in Section 7.1(c) of Schedule 25 – Insurance and Performance Security Requirements.

1.360 "**Insurance Trust Agreement**" means the insurance trust agreement to be entered into between the City, Lenders' Agent, Project Co and the Account Trustee in the form set out in Schedule 30 – Insurance Trust Agreement, as such document may be amended and restated from time to time.

1.361 "**Integration**" means the Design, Construction, testing and commissioning of all elements of the System, in part and as a whole, including the Fixed Facilities, the Vehicles, the MSF, and the E&M, such that all components of the System function together as one coherent system, notwithstanding the creation of the System as separate components, in accordance with the Output Specifications and otherwise as required in accordance with this Project Agreement, and "**Integrated**" shall have a corresponding meaning.

1.362 "**Intellectual Property**" means discoveries, research, developments, designs, industrial designs, improvements, innovations, inventions, software, computer programs and code of all types, layouts, interfaces, applications, tools, databases, hardware, methods, concepts, processes, know-how, formulae, mask works, works subject to copyright, and other technologies, works and creations now existing or developed in the future, whether or not registered or registrable, patentable or non-patentable, or confidential or non confidential.

1.363 "**Intellectual Property Rights**" means all intellectual property rights of any kind whatsoever, whether or not registered or registrable, including copyright, patents and patent applications, database rights, industrial design registrations, rights in respect of

trademarks, trade names, domain names, mask works, trade secrets and confidential information, and all applications, registrations, renewals, extensions, continuations, divisions, reissues, and restorations relating to any such rights (where applicable) now or hereafter in force and effect throughout all or any part of the universe.

1.364 "**Invoice Date**" has the meaning given in Schedule 23 – Compensation on Termination.

1.365 "**IO**" means Ontario Infrastructure and Lands Corporation, a non-share capital corporation continued under the *Ontario Infrastructure and Lands Corporation Act*, S.O. 2011, c.9, Schedule 32, as amended.

1.366 "**Irrecoverable Tax**" has the meaning given in Section 35.2(b) of the Project Agreement.

1.367 "**Joint Insurance Cost Report**" has the meaning given in Section 7.2 of Schedule 25 – Insurance and Performance Security Requirements.

1.368 "**Junior Debt Service Amount**" means, for any period, the principal and interest payable by Project Co or any Project Co Party to the Junior Lenders in the normal course under the Lending Agreements.

1.369 "**Junior Lenders**" means [NOT APPLICABLE].

1.370 "**Key Individual**" means those Project Co Parties listed in Schedule 9 – Key Individuals.

1.371 "**Lands**" means Real Property Interests, including Real Property Interests in Crown Lands, described in the Real Property Schedule provided that the After-Acquired Lands shall not constitute part of the Lands until the City acquires possession of any Real Property Interests in the After-Acquired Lands specified in the Real Property Schedule and Notice of possession of such Real Property Interest has been delivered to Project Co, and provided further that:

(a) the Belfast MSF Expansion Lands shall only form part of the Lands from the Belfast MSF Expansion Substantial Completion Date (provided that, from such date, the City shall be deemed to have provided written Notice of the possession of Real Property Interests in such lands for the purposes of the Licence referred to in Section 14.1(b), if such Notice has not already been issued by such date);

(b) the Stage 2 East Lands shall only form part of the Lands from the Stage 2 East Substantial Completion Date; and

(c) the Stage 2 West Lands shall only form part of the Lands from the Stage 2 West Substantial Completion Date.

1.372 "**Landscape Plan**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.373 "**Latent Defect**" means a Defect not disclosed, properly inferable, readily apparent or readily discoverable in the Background Information and not ascertainable upon the performance of reasonable due diligence without intrusive testing.

1.374 "**Lead Architect**" means an individual with a minimum of 20 years of experience in the design and construction of large scale private and public facilities, including 10 years of experience specifically related to the design and construction of public transportation facilities, with a focus on above ground and underground passenger rail stations. The individual shall hold a current Architectural license in the Province of Ontario and have experience in similar type projects where new stations were constructed and existing stations were renovated.

1.375 "**LEED**" means Leadership in Energy and Environmental Design.

1.376 "**LEED Certification**" means LEED certification level under the LEED Rating System, including any addenda or updates thereto issued prior to Commercial Close.

1.377 "**LEED Compliance Certificate**" has the meaning given in Section 24.5(d) of the Project Agreement.

1.378 "**LEED Rating System**" means a rating system for the design, construction and operation of high performance green buildings, homes and neighbourhoods.

1.379 "**Lender Representative**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.380 "**Lenders' Agent**" means BNY Trust Company of Canada, acting as collateral agent for and on behalf of the Lenders.

1.381 "**Lenders' Direct Agreement**" means the direct agreement to be entered into between the City, the Lenders' Agent and Project Co in the form set out in Schedule 4 – Lenders' Direct Agreement.

1.382 "**Lenders**" means all or any of the persons who provide financing to Project Co in respect of the Project Scope under the Lending Agreements, including without limitation, the Senior Lenders, and, where the context so permits, prospective financiers or lenders.

1.383 "**Lending Agreements**" has the meaning given in Schedule 23 – Compensation on Termination.

1.384 "**Letter of Credit**" means a letter of credit issued by a bank listed in Schedule I to the *Bank Act* (Canada) substantially in the form set out in Schedule 29 – Standby Letter of Credit.

1.385 "**Liquid Market**" has the meaning given in Schedule 23 – Compensation on Termination.

1.386 "**Liquidated Damages**" means the damages that will be suffered by the City if the Revenue Service Availability Date does not occur by the Required Revenue Service Availability Date or if Substantial Completion of the Highway Work does not occur by the Highway Scheduled Substantial Completion Date, which damages are as agreed upon by the Parties and described in Section 26.7 and Section 15.1 of Schedule 40 – Highway Work, respectively, and which damages are a genuine pre-estimate of the damages that will be suffered by the City in such event and are not a penalty.

1.387 "**Longstop Date**" has the meaning given in Section 45.1(a)(ii).

1.388 "**Low Cost Measures**" has the meaning given in Schedule 8 – Energy Matters.

1.389 "**LRT Systems**" has the meaning given to in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.390 "**LRT Systems and Integration Manager**" means Keven Taggart.

1.391 "**Maintain**" has the meaning given to such term in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.392 "**Maintenance**" has the meaning given to such term in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.393 "**Maintenance and Rehabilitation Requirements**" means the Maintenance and Rehabilitation Requirements contained in Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements.

1.394 "**Maintenance Committee**" has the meaning given in Section 12.1(a) of the Project Agreement.

1.395 "**Maintenance Construction**" means all demolition and construction work carried out by or on behalf of Project Co forming part of, required by or in connection with the Maintenance Services or the other Project Scope, but not including the Design and Construction Works or the Belfast MSF Expansion Works.

1.396 "**Maintenance Contract**" means the agreement between Project Co and the Maintenance Contractor or such other party as shall be approved by the City to perform the Maintenance Services with respect to the System.

1.397 "**Maintenance Contractor's Direct Agreement**" means the direct agreement to be entered into amongst the City, Project Co, and the Maintenance Contractor, in the form set out in Schedule 5 – Contractor's Direct Agreement.

1.398 "**Maintenance Contractor**" means Rideau Transit Maintenance General Partnership.

1.399 "**Maintenance Director**" means Grant Bailey.

1.400 "**Maintenance Guarantor**" means ACS Servicios y Concesiones, S.L., SNC-Lavalin Group Inc. and EllisDon Inc.

1.401 "**Maintenance Manager**" means Robert Chappell.

1.402 "**Maintenance Services**" means the maintenance and other work to be performed and services to be provided by Project Co as described in Section 1.2 of Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements, as such work and services may from time to time be varied in accordance with the Project Agreement, but specifically excluding the Governmental Activities.

1.403 "**Maintenance Submittal**" has the meaning given in Section 11.1 of Schedule 10 – Review Procedure.

1.404 "**Maintenance Term**" means the period commencing upon the Revenue Service Commencement Date to and including the Termination Date, provided that:

(a) the Maintenance Term for the Belfast MSF Expansion shall commence on the Belfast MSF Expansion Substantial Completion Date;

(b) the Maintenance Term for the Stage 2 East System shall commence on the Stage 2 East Substantial Completion Date;

(c) the Maintenance Term for the Stage 2 West System shall commence on the Stage 2 Substantial Completion Date; and

(d) the Maintenance Term for each Stage 2 Additional Vehicle shall commence on Delivery of such Stage 2 Additional Vehicle in accordance with Schedule 44.

1.405 "**Maintenance Term Commencement Date**" means the date on which the Maintenance Term commences.

1.406 "**Make Good**", "**Made Good**" and derivatives thereof, means repairing, restoring, refurbishing, rehabilitating or performing filling operation on the Highway Work as required under the Contract Documents or any existing components disturbed due to the Highway Work, to at least the condition existing at the commencement of the Highway Work, in terms of construction integrity, finishes, alignment with existing adjoining surfaces, and compatibility of materials.

1.407 "**Mandatory Refinancing**" has the meaning given in Schedule 28 – Refinancing.

1.408 "**Market Value Availability Deduction Amount**" has the meaning given in Schedule 23 – Compensation on Termination.

1.409 "**Maximum Monthly Service Payment**" has the meaning given in Schedule 23 – Compensation on Termination.

1.410 "**Medical Contamination**" means a disease carrying agent which cleaning and prevention of infection or contamination techniques in use in accordance with Good Industry Practice and the Project Agreement cannot substantially prevent or cannot substantially remove with the result that:

(a) it is unsafe to admit System Users to the System or to use the System; and

(b) the System cannot be made safe for the admission of System Users.

1.411 "**MFIPPA**" means the *Municipal Freedom of Information and Protection of Privacy Act* (Ontario) R.S.O. 1990, c.M.56, as amended from time to time.

1.412 "**Milestone**" means any subcomponent of a Component described as a "**Milestone**" as shall be mutually agreed upon between the Parties as described in Schedule 36 – Milestones.

1.413 "**Milestone Acceptance**" means with respect to any Milestone, the point at which the Milestone Acceptance Criteria for such Milestone have been attained in accordance with the Project Agreement subject only to Minor Deficiencies, a Milestone Acceptance Certificate has been issued evidencing Milestone Acceptance in respect of that Milestone, and all requirements for Milestone Acceptance for such Milestone described in Schedule 36 – Milestones, other than in respect of Minor Deficiencies, have been satisfied in respect of that Milestone.

1.414 "**Milestone Acceptance Certificate**" means with respect to any Milestone, the certificate to be issued the by the Independent Certifier in accordance with Section 26.2 of the Project Agreement.

1.415 "**Milestone Acceptance Criteria**" means the various technical aspects in respect of which the Independent Certifier is to certify attainment for a particular Milestone as set out in Schedule 36 Milestones.

1.416 "**Milestone Acceptance Date**" means, with respect to any Milestone, the date on which Milestone Acceptance is achieved with respect to that Milestone, as evidenced by a Milestone Acceptance Certificate with respect to that Milestone, as such date shall be stated therein.

1.417 "**Milestone Acceptance Notice**" has the meaning given in Section 26.2 (b) of the Project Agreement.

1.418 "**Milestone Payment**" means a payment in respect of the relevant Milestone as enumerated in Schedule 19 – Milestone Payments.

1.419 "**Milestone Payment Date**" means with respect to any Milestone, the date that is the later of:

(a) five Business Days following the relevant Milestone Acceptance Date has been certified by the Independent Certifier; and

(b) five days following the receipt of the invoice in respect of the relevant Milestone.

1.420 "**Minimum Subsequent Time**" has the meaning given in Section 26.7 of the Project Agreement.

1.421 "**Mini-Perm Financing**" has the meaning given in Schedule 28 – Refinancing.

1.422 "**Minor Deficiencies**" means any defects, deficiencies and items of outstanding work (including in relation to seasonal work) arising from or related to the work required to achieve Final Completion or Milestone Acceptance in the case of any Milestone, and which would not materially impair:

(a) the public's or the City's use and enjoyment of the System;

(b) the performance of the Governmental Activities;

(c) the performance of the Maintenance Services by Project Co; or

(d) safety or traffic flow on the System in any relevant respect,

but, for the avoidance of doubt, not including the MSF Deferred Completion Elements and the MSF Reconfiguration Elements.

1.423 "**Minor Deficiencies List**" has the meaning given in Section 26.4(a) of the Project Agreement.

1.424 "**Mobility Matters Deductions**" means the sum of:

(a) Any amounts for BRT Lane Closure Adjustment calculated pursuant to Section 5 of Part A to Schedule 37;

(b) Any amounts for Peak Hour BRT Interruptions calculated pursuant to Section 6 of Part A to Schedule 37;

(c) Any amounts for Lane Closure Adjustments calculated pursuant to Section 5 of Part B to Schedule 37; and

(d) Any amounts for Peak Hour Lane Interruption calculated pursuant to Section 6 of Part B to Schedule 37.

1.425 "**MOE**" means Her Majesty The Queen in Right of Ontario as represented by the Minister of the Environment, and includes any successors thereto or persons exercising delegated power under the Minister of the Environment's authority.

1.426 "**Monitoring Notice**" has the meaning given in Section 31.4(a) of the Project Agreement.

1.427 "**Monthly Service Payments**" means payments required to be made by the City on account of Maintenance pursuant to Schedule 20 – Payment Mechanism.

1.428 "**Moodie Maintenance and Storage Facility**" means the Moodie maintenance and storage facility described in Schedule 15-2 of the DB Co Works Agreement.

1.429 "**MSFs**" means:

(a) prior to the Belfast MSF Expansion Substantial Completion Date, MSF or MSFs shall refer only to the Original Belfast MSF;

(b) from the Belfast MSF Expansion Substantial Completion Date until the Stage 2 West Substantial Completion Date, MSF or MSFs shall refer only to the Belfast MSF; and

(c) from the Stage 2 West Substantial Completion Date, MSFs shall mean the Belfast MSF and the Moodie Maintenance and Storage Facility and MSF shall mean any of the MSFs.

1.430 "**MSF Deferred Completion Elements**" means those components of the Belfast MSF which the parties have agreed to remove from the Design and Construction Specifications and to defer and complete as part of the Belfast MSF Expansion, as set out in Part A of Schedule A to the Belfast MSF Expansion Variation Confirmation.

1.431 "**MSF Excluded Elements**" means those components of the Belfast MSF which the parties have agreed to remove from the Design and Construction Specifications and that will not be completed at all either under the Project Agreement or as part of the Belfast MSF Expansion as set out in Part C of Schedule A to the Belfast MSF Expansion Variation Confirmation.

1.432 "**MSF Reconfiguration Elements**" means those components of the Belfast MSF which the parties have agreed to remove from the Design and Construction Specifications and to defer and complete following Belfast MSF Substantial Completion as part of the reconfiguration of the Belfast MSF once the manufacture of rolling stock vehicles has ceased at the Belfast MSF as set out in Part B of Schedule A to the Belfast MSF Expansion Variation Confirmation.

1.433 "**MTO**" means Her Majesty The Queen in Right of Ontario as represented by the Minister of the Transportation, and includes any successors thereto or persons exercising delegated power under the Minister of the Transportation's authority.

1.434 "**MTO Base Staging Requirements**" means the following items set out in the Highway Drawings or Highway Specifications:

(a) Design Criteria and Design Construction Report (GWP 4091-07-00 & 4320-06-00);

(b) Vanier Parkway, Belfast Road, and Lees Avenue bridges to be replaced no later than September 30, 2014;

(c) Traffic Management and Incident Management Requirements; and

(d) Interim completion date of August 23, 2013 from Split to St. Laurent to fix the split and weave from 417 to St. Laurent.

1.435 "**MTO Highway Acceptance**" has the meaning given in Section 17.1(a) of Schedule 40 – Highway Work.

1.436 "**MTO Winter Maintenance Work**" has the meaning set out in Section 40.4(a) of the Project Agreement.

1.437 "**NCC**" means National Capital Commission.

1.438 "**NCC FLUA**" means the federal land use, design, and transaction approval of the NCC under section 12 of the *National Capital Act* required in respect of the change of use of, or erection, alteration, extension or demolition of a building or other work on, Crown Lands which are "public lands" within the "National Capital Region" (as such terms are defined in the NCC Act), as indicated in Appendix 2 – Lands – After – Acquired Lands – Crown Lands to this Schedule 1, which approval may include and be subject to conditions.

1.439 "**NCC Stations**" means the five (5) LRT stations within the Project, namely, Tunney's Pasture, Bayview, Lebreton, Hurdman and Train, which stations are subject to the NCC FLUA.

1.440 "**NCC Act**" means the *National Capital Act (*Canada).

1.441 "**Net Highway Maintenance Adjustment**" has the meaning given in paragraph 28 of Annex G to Schedule 40 – Highway Work.

1.442 "**Net Highway Payment Adjustment**" has the meaning given in paragraph 28 of Annex G to Schedule 40 – Highway Work.

1.443 "**New Agreement**" has the meaning given in Schedule 23 – Compensation on Termination.

1.444 "**New Highway Substantial Completion Date**" has the meaning given in Section 15.1(c) of Schedule 40 – Highway Work, as such date may be amended pursuant to Section 40 of the Project Agreement.

1.445 "**New Project Co**" has the meaning given in Schedule 23 – Compensation on Termination.

1.446 "**New Required Revenue Service Availability Date**" has the meaning given in Section 26.7, as such date may be extended pursuant to Section 40 of the Project Agreement.

1.447 "**New System Infrastructure**" at any time means Infrastructure constructed in, on, over or under any part of the Lands as part of the Design and Construction Works, but

excluding Third Party Facilities and Infrastructure and other property of Utility Companies.

1.448 "**No Cost Measures**" has the meaning given in Schedule 8 – Energy Matters.

1.449 "**No Default Payment Compensation Amount**" means, with respect to an amount and a specified period of time, such amount multiplied by (i) such period of time in days divided by the actual number of days in the current year multiplied by (ii) the rate of interest per annum in effect on each such day quoted by National Bank of Canada from time to time as its reference rate for Canadian Dollar demand loans made to its commercial customers in Canada and which it refers to as its "prime rate", as such rate may be changed by it from time to time.

1.450 "**Non-Conformance**" has the same meaning as Quality Failure.

1.451 "**Non-Default Termination Sum**" has the meaning given in Schedule 23 – Compensation on Termination.

1.452 "**Non Regulated Utilities**" means utilities such as utilities for the provision of water and sanitary and storm sewers wherein the sole Relevant Authority is the City.

1.453 "**Non-Resident**" means a person that is, at the relevant time, a non-resident of Canada for the purposes of the *Income Tax Act* (Canada).

1.454 "**Notice**" has the meaning given in Section 61.1(a) of the Project Agreement.

1.455 "**Notice of Dispute**" has the meaning given in Schedule 27 – Dispute Resolution Procedure.

1.456 "**Notice Period**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.457 "**Novation Date**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.458 "**Novation Notice**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.459 "**OHSA**" means the *Occupational Health and Safety Act* (Ontario).

1.460 "**OLRT**" means Ottawa Light Rail Transit.

1.461 "**OLRT Regulations**" means the bylaws, guidelines, policies, regulations, rules, standards, safety management system requirements and security management system requirements, or similar instruments or requirements, adopted by the City from time to time in relation to the regulation of the design, construction, operation, maintenance, safety and security of, as well as the rates and conditions of service of, the System.

1.462 "**Operating Hours**" means for a Station for a day, the number of operating hours (including portions of an hour) for that Station for that day set out in Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements.

1.463 "**Operation**" or "**Operations**" means operation of the System commencing upon the Revenue Service Commencement Date in accordance with the Operation Requirements and Specifications, and shall specifically exclude Maintenance.

1.464 "**Operation Requirements and Specifications**" means the minimum requirements for Operation of the System, including the Operating Hours, in accordance with the Operations Service Plan and the provisions of Section 2.1(a)(vii) of Appendix A of Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements.

1.465 "**Operations Service Plan**" means the plan referred to in Attachment 2 of Appendix A to Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements, as amended from time to time in accordance with such Schedule.

1.466 "**Order**" has the meaning given in Schedule 30 – Insurance Trust Agreement.

1.467 "**Original Belfast MSF**" means the MSF described in Schedule 15-2, Part 6 - Design and Construction Requirements MSF, not including the Belfast MSF Expansion Works, and located at 805 Belfast Road, Ottawa, Ontario, K1G 0Z4.

1.468 "**Other Contractor**" means an Additional Contractor or a Third Party Contractor.

1.469 "**Other Existing Infrastructure**" means all existing works and infrastructure on, over or under the Lands at Commercial Close.

1.470 "**Other Works**" means the Additional Works and the Third Party Works.

1.471 "**Output Specifications**" means Schedule 15 – Output Specifications, and includes Schedule 15-1 – Technical Definitions and Reference Documents (as amended by the Stage 2 Maintenance Services Variation and subject to the Timing Principle), Schedule 15-2 – Design, Construction Requirements, and Schedule 15-3 – Maintenance and Rehabilitation Requirements (as amended by the Stage 2 Maintenance Services Variation and subject to the Timing Principle) and Annex B – List of Highway Drawings and Highway Specifications to Schedule 40 – Highway Work and the Civic Work Specifications.

1.472 "**PA Parties**" or "**PA Party**" has the meaning given in Schedule 6 – Independent Certifier Agreement.

1.473 "**Painshare Adjustment**" has the meaning given in Schedule 8 – Energy Matters.

1.474 "**Partners**" means ACS RTG Partner Inc., SNC RTG Partner Inc. and EllisDon RTG Partner Inc.

1.475 "**Party Representative**" and "**Party Representatives**" have the meanings given in Schedule 27 – Dispute Resolution Procedure.

1.476 "**Party**" means either the City or Project Co, and "**Parties**" means both the City and Project Co.

1.477 "**Passenger**" means a natural person using any segment of the System.

1.478 "**Pavement**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.479 "**Payment Adjustment Report**" has the meaning given in Section 34.6 of the Project Agreement.

1.480 "**Payment Compensation Amount**" means, with respect to an amount and a specified period of time, such amount multiplied by (i) such period of time in days divided by the actual number of days in the current year multiplied by (ii) the rate of interest per annum in effect on each such day equal to 2 % over the rate of interest per annum quoted by National Bank of Canada from time to time as its reference rate for Canadian Dollar demand loans made to its commercial customers in Canada and which it refers to as its "prime rate", as such rate may be changed by it from time to time.

1.481 "**Payment Mechanism**" means the payment mechanism set out in Schedule 20 – Payment Mechanism.

1.482 "**Performance Guarantees**" means the guarantees to Project Co in respect of the Construction Contract provided by the Construction Guarantors and in respect of the Maintenance Contract provided by the Maintenance Guarantors.

1.483 "**Performance Monitoring Program**" means the monitoring of performance of the Maintenance Services by Project Co through the Nonconformity reporting process detailed in Part 7 of Schedule 11 – Quality Management and the Performance Monitoring Reports prepared and submitted in accordance with Part 8 of Schedule 11 – Quality Management.

1.484 "**Performance Monitoring Report**" has the meaning given in Schedule 11 – Quality Management.

1.485 "**Permanent Easements**" means easements (other than the Construction Easements) providing for rights of way necessary for the Construction, Operation and Maintenance of the System, as provided by the City in its Discretion.

1.486 "**Permits**" means all permissions, consents, approvals, certificates, permits, licences, statutory agreements and authorizations required from any Relevant Authority, Regulated Utilities, Non Regulated Utilities and all necessary consents and agreements from any third parties or otherwise to Construct the System and the Highway Work, to effect the Revenue Service Availability and Substantial Completion of the Highway Work, and otherwise to carry out the Project in accordance with this Agreement, but excluding Excluded Permits.

1.487 "**Permits, Licences and Approvals**" means the City Permits, Licences and Approvals and Project Co Permits, Licences and Approvals.

1.488 "**Permitted Borrowing**" means:

(a) any advance to Project Co under the Lending Agreements;

(b) any additional financing approved by the City in accordance with Section 1.9 of Schedule 22 – Variation Procedure to the Project Agreement; and

(c) any amendment, waiver or exercise of a right under the Lending Agreements made during the Step-In Period that does not increase the City's liabilities under the Project Agreement whether actual or contingent, present or future, known or unknown.

1.489 "**Person**" means an individual, legal personal representative, corporation, body corporate, firm, partnership, trust, trustee, syndicate, joint venture, unincorporated organization, other Business Entity or Relevant Authority;

1.490 "**Personal Information**" means all personal information (as the term "personal information" is defined in the *Personal Information Protection and Electronic Documents Act* (Canada)) in the custody or control of Project Co or any Project Co Party other than personal information of the employees of Project Co or the Project Co Parties and other than personal information that is wholly unrelated to the Project Scope and not derived directly or indirectly from the City in respect of the Project.

1.491 "**Planned Mini-Perm Refinancing Date**" has the meaning given in Schedule 28 – Refinancing.

1.492 "**Police Service**" means the Royal Canadian Mounted Police, the Ontario Provincial Police, the Ottawa Police and any other law enforcement agency with jurisdiction pursuant to Applicable Law, as applicable.

1.493 "**Post Termination Maintenance Amount**" has the meaning given in Schedule 23 – Compensation on Termination.

1.494 "**Post-Warranty Delay Period**" has the meaning given in Section 42.1(a)(xx) of the Project Agreement.

1.495 "**Pre-Existing Environmental Site Conditions**" means the environmental conditions of the Lands as set out in the Environmental Reports.

1.496 "**Pre-Final Design Development Submittals**" has the meaning given in Section 20.3(d)(i) of the Project Agreement and shall include First Pre-Final and Second Pre-Final Submissions where required by Schedule 10 – Review Procedure.

1.497 "**Preventive Maintenance**" has the meaning given to such term in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.498 "**Previously Paid Monthly HST Amount**" means an HST amount to be determined as provided for below which in the aggregate is equal to the amount of the Section 35.1(c) Payment. The amount of each Previously Paid Monthly HST Amount shall be:

(a) the amount of the Section 35.1(c) Payment amortized on a straight line basis over the Monthly Service Payments due over the remainder of the Maintenance Term following the payment of the Section 35.1(c) Payment subject to an alternative basis on which to amortize the remaining unapplied Section 35.1(c) Payment as provided for by Applicable Law in which case the City shall determine the Previously Paid Monthly HST Amount in accordance with such Applicable Law, provided that the City may, at any time, proceed to obtain an advance ruling under the *Excise Tax Act* (Canada) (or rely upon an existing advance ruling under the *Excise Tax Act* (Canada)) in respect to some other basis for amortizing the remaining unapplied Section 35.1(c) Payment over the Monthly Service Payments due over the remainder of the Maintenance Term, and in such event, the remaining unapplied Section 35.1(c) Payment may be amortized over the Monthly Service Payments in a manner provided for in the advance ruling if the City so determines in its Discretion;

(b) communicated by the City to Project Co in writing at the same time that the City pays Project Co the Section 35.1(c) Payment; and

(c) credited to the City in each Monthly Service Payment invoice sent by Project Co to the City following the payment of the Section 35.1(c) Payment.

1.499 "**Procurement Support Services**" has the meaning given in Schedule 43 to the Project Agreement.

1.500 "**Product**" or "**Products**" means material, machinery, equipment and fixtures forming the Highway Work but does not include machinery and equipment used to prepare, fabricate, convey or erect the Highway Work, which is referred to as construction machinery and equipment.

1.501 "**Professional Engineer**" means a professional engineer licensed by Professional Engineers Ontario to practice in the Province of Ontario.

1.502 "**Prohibited Act**" has the meaning given in Section 60.1(a) of the Project Agreement.

1.503 "**Prohibited Acts Termination Sum**" has the meaning given in Schedule 23 – Compensation on Termination.

1.504 "**Project**" has the meaning given in the recitals to the Project Agreement.

1.505 "**Project Agreement**" has the meaning given in the recitals to the Project Agreement and includes all renewals, amendments, supplements, extensions, restatements, modifications, replacements or consolidations thereof and Variation Confirmations thereto, but not, despite the provisions of Section 2.12 of this Schedule 1, the Belfast MSF Expansion Variation Confirmation.

1.506 "**Project Agreement Arbitration**" has the meaning given in Schedule 27 – Dispute Resolution Procedure.

1.507 "**Project Co**" means Rideau Transit Group General Partnership.

1.508 "**Project Co Certificate**" has the same meaning given to it in Section 2.5(a)(ii).

1.509 "**Project Co Closing Documents**" means the documents delivered by Project Co as more particularly enumerated in Schedule 2 – Completion Documents.

1.510 "**Project Co Commissioning**" means the commissioning activities to be carried out by Project Co in order to achieve Revenue Service Availability as set forth in Schedule 14 – Commissioning.

1.511 "**Project Co Commissioning Coordinator**" has the meaning given in Schedule 14 – Commissioning.

1.512 "**Project Co Event of Default**" has the meaning given in Section 45.1(a) of the Project Agreement and shall exclude any Project Co Belfast MSF Expansion Event of Default.

1.513 "**Project Co Hazardous Substances**" has the meaning given in Schedule 40.

1.514 "**Project Co Highway Design Contingency**" or "PDC" is the portion of the Highway Milestone Payment which comprises all the costs to implement an acceptable resolution to any and all Highway Design Issues that are properly characterized as Project Co Highway Design Issues.

1.515 "**Project Co Highway Design Issue**" has the meaning given in Section 11.17(b) of Schedule 40 – Highway Work.

1.516 "**Project Co Indemnified Hazardous Substances Claims**" has the meaning given in Section 56.1(a)(vii) of the Project Agreement.

1.517 "**Project Co Group**" means Project Co and its Partners together with any person or group of persons, who, either individually or collectively, have Direct or Indirect Power or Control of Project Co or its Partners.

1.518 "**Project Co Party**" means:

(a) the Construction Contractor;

(b) the Maintenance Contractor;

(c) any person engaged by Project Co, any of the Contractors, from time to time as may be permitted by the Project Agreement to procure or manage the provision of the Project Scope (or any of them); and

(d) in respect of each of the above, their subcontractors of any tier, agents, employees, officers and directors,

and "**Project Co Parties**" shall be construed accordingly.

1.519 "**Project Co Permits, Licences and Approvals**" means all permissions, consents, approvals, certificates, permits, licences, agreements and authorizations required to perform the Project Scope in accordance with the Project Agreement and as required by Applicable Law, and all necessary consents, approvals, certificates, permits, licences, agreements and authorizations from and with any third parties (including, to the extent applicable, all Development Approvals, Railway Approvals and Utility Agreements, and the approval of the Fire Marshal of Ontario), needed to perform the activities within the Project Scope in accordance with the Project Agreement and as required by Applicable Law, but other than the City Permits, Licences and Approvals, provided that this definition will be interpreted in accordance with the Ring Fencing Principle and the Timing Principle.

1.520 "**Project Co Preliminary Highway Minor Deficiencies List**" has the meaning given to it in Section 16.1(a) of Schedule 40 – Highway Work.

1.521 "**Project Co Proposal Extracts**" means the documents attached as Schedule 13 – Project Co Proposal Extracts.

1.522 "**Project Co Representative**" means the person designated as such by Project Co on or prior to Commercial Close and any permitted replacement.

1.523 "**Project Co Variation Notice**" has the meaning given in Schedule 22 – Variation Procedure.

1.524 "**Project Data**" subject to the exclusionary items in c), means:

(a) all Design Data;

(b) all drawings, reports, documents, plans, software, formulae, calculations and other data relating to the performance of the Maintenance Services;

(c) any other materials, documents and or data acquired, brought into existence or used in relation to the Project Scope or the Project Agreement, with the exclusion of the Background Information and other than Intellectual Property Rights of third parties, such as CAD software, that is used only in the process of design and construction; and

(d) any other drawings, reports, documents, plans, software, formulae, calculations and all other materials, data, or information relating to the Project, prepared by or on behalf of Project Co or any of the Contractors and Subcontractors.

1.525 "**Project Data and Drawings**" has the meaning given in Schedule 41 – Intellectual Property.

1.526 "**Project Documents**" means the Ancillary Documents, the Contract Documents, and the Lending Agreements.

1.527 "**Project Insurance Change**" has the meaning given in Section 7.1(d) of Schedule 25 – Insurance and Performance Security Requirements.

1.528 "**Project Know-How**" means all ideas, concepts, alternatives, methodologies, processes, recommendations and suggestions developed by or through Project Co or any Project Co Party and revealed to or discovered by the City, whether before or after Commercial Close, which may be connected in any way to:

(a) the Design and Design and Construction Works, including the design and construction of the System;

(b) the Maintenance Services, including the operation, maintenance, rehabilitation, improvement and testing of the System;

(c) any other activities within the Project Scope; or

(d) the Project Agreement.

1.529 "**Project Management Plan**" means the plan contemplated in Section 2.3 of Appendix B to Schedule 10 – Review Procedure.

1.530 "**Project Scope**" means:

(a) the performance of the Design and Construction Works, but not, for the avoidance of doubt, the Belfast MSF Expansion Works;

(b) the performance of the Highway Work;

(c) the performance of the Civic Works;

(d) the performance of the Maintenance Services in accordance with the Timing Principle;

all in accordance with the Output Specifications; and

(e) the performance of the Financial Obligations save and except those Financial Obligations that relate to the Belfast MSF Expansion, and, all other obligations of Project Co under the Project Agreement save and except the obligations of Project Co under Schedules 43, 44, 45 and 46 which shall each be implemented out in accordance with their respective terms.

1.531 "**Project Term**" means the period commencing on Commercial Close and expiring at midnight on the Termination Date.

1.532 "**Property Request Plan**" or "**PRP**" means a diagram defining the extent, limits and approximate boundaries of Real Property Interests forming part of the Lands or the After-Acquired Lands.

1.533 "**Proposed Date**" has the meaning given in Section 26.7.

1.534 "**Proprietor**" has the meaning given in Section 52.6(a) of the Project Agreement.

1.535 "**Protester**" has the meaning given in Section 9.6(a) of the Project Agreement.

1.536 "**Qualification Criteria**" has the meaning given in Schedule 23 – Compensation on Termination.

1.537 "**Qualifying Bank**" has the meaning in Schedule 28 – Refinancing.

1.538 "**Qualifying Bank Transaction**" has the meaning in Schedule 28 – Refinancing.

1.539 "**Qualifying Refinancing**" has the meaning given in Schedule 28 – Refinancing.

1.540 "**Qualifying Tender**" has the meaning given in Schedule 23 – Compensation on Termination.

1.541 "**Qualifying Tenderer**" has the meaning given in Schedule 23 – Compensation on Termination.

1.542 "**Quality Documentation**" means all documentation to be prepared, submitted (where applicable) and implemented by Project Co in accordance with Schedule 11 – Quality Management.

1.543 "**Quality Failure**" has the meaning given in Schedule 20 – Payment Mechanism.

1.544 "**Quality Failure Deduction**" has the meaning given in Schedule 20 – Payment Mechanism.

1.545 "**Quality Management System**" has the meaning given in Schedule 11 – Quality Management.

1.546 "**Quality Plans**" means the Quality Manual, Quality Management Plans and Quality Audit Plans (all as defined in Schedule 11 – Quality Management) to be prepared, submitted and implemented by Project Co in accordance with Schedule 11 – Quality Management.

1.547 "**Queen Street Work**" has the meaning given in the definition of "Civic Works".

1.548 "**Railway Approvals**" means all consent, approvals, permissions and agreements, and amendments thereto, required to be obtained pursuant to a Railway Order or Applicable Law, for the carrying out of Works, but does not include any Railway Orders.

1.549 "**Railway Order**" means any order of the City in its capacity as the Governmental Authority generally having railway regulatory jurisdiction over the System and the Project and any order of any other Governmental Authority also having railway regulatory jurisdiction over aspects of the System, Project, Works or Infrastructure and all amendments thereto.

1.550 "**Real Property Interest**" or "**Real Property Interests**" means any fee simple interest, lease, licence, right of way, under surface right, easement, including Construction Easements and Permanent Easements, or other interest in real property.

1.551 "**Real Property Schedule**" means Appendix 2 to this Schedule 1 – Definitions and Interpretation, as amended.

1.552 "**Record Documents**" means a collection of construction documents, including Shop Drawings, Product data sheets, reports, operation and maintenance information, as well as a revised set of the Contract Documents, recording the actual placement, configuration and nature of the various Products used in the construction of the Highway Work and shall include record drawings prepared pursuant to Section 11.11(h) of Schedule 40 – Highway Work. Record Documents shall include, where available, pre-start health and safety review reports, and shall include in an electronic format system acceptable to the Consultant, As-Built Highway Drawings on diskette or recordable CD, maintenance and operating instructions manual, 6 sets of prints of record drawings and miscellaneous closeout submittals required by the Contract Documents.

1.553 "**Recoverable Tax**" has the meaning given in Section 35.2(c) of the Project Agreement.

1.554 "**Recovery Amount**" has the meaning given in Section 56.3(g) of the Project Agreement.

1.555 "**Rectification Costs**" has the meaning given in Schedule 23 – Compensation on Termination.

1.556 "**Reference Concept**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.557 "**Refinancing**" has the meaning given in Schedule 28 – Refinancing.

1.558 "**Refinancing Financial Model**" has the meaning given in Schedule 28 – Refinancing.

1.559 "**Refinancing Gain**" has the meaning given in Schedule 28 – Refinancing.

1.560 "**Regulated Utilities**" means utilities which are not Non Regulated Utilities, including, natural gas, electricity, telecommunications and cable.

1.561 "**Regulations Timetable**" has the meaning set out in Section 2(d) of Schedule 15-4.

1.562 "**Reimbursement Event**" has the meaning given in Section 32.5(a) of the Project Agreement.

1.563 "**Reinstatement Plan**" has the meaning given in Section 30.2(a) of the Project Agreement.

1.564 "**Reinstatement Work**" has the meaning given in Section 30.1(a) of the Project Agreement.

1.565 "**Release**", "**Released**" or "**Releasing**" have the meaning of a discharge as defined in the Ontario *Environmental Protection Act* (1990), provided that for the purposes of Schedule 40 – Highway Work, "**Release**" has the meaning given in Section 14.1(c) of Schedule 40 – Highway Work.

1.566 "**Relevant Authority**" means any Canadian government, including any federal, provincial or municipal government (including the City), and any Canadian government agency, tribunal, commission or other authority exercising executive, legislative, judicial, regulatory or administrative functions of, or pertaining to, government;

1.567 "**Relevant Change in Law**" means a Discriminatory Change in Law or a System Specific Change in Law or a Highway Specific Change in Law.

1.568 "**Relevant Insurance**" has the meaning given in Section 7.1(e) of Schedule 25 – Insurance and Performance Security Requirements.

1.569 "**Relevant Insurance Cost**" has the meaning given in Section 7.1(f) of Schedule 25 – Insurance and Performance Security Requirements.

1.570 "**Relevant Insurance Inception Date**" has the meaning given in Section 7.1(g) of Schedule 25 – Insurance and Performance Security Requirements.

1.571 "**Reliability Acceptance Test**" has the same meaning given to it in 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.572 "**Relief Event**" has the same meaning given to it in Section 43.1.

1.573 "**Renovation**" means an alteration of the System, or any component of the System, undertaken at any time after the Revenue Service Availability Date.

1.574 "**Repair**" means a repair to the System, or any component of the System, undertaken at any time after the Revenue Service Availability Date.

1.575 "**Request for Civic Works Payment Approval**" has the meaning given in Section 20.13(l).

1.576 "**Request for Proposals**" or "**RFP**" means the request for proposals issued in respect of the Project on October 27, 2011.

1.577 "**Required Highway Substantial Completion Notification Date**" has the meaning given in Section 15.1(a) of Schedule 40 – Highway Work.

1.578 "**Required Notification Date**" has the same meaning given to it in Section 26.7.

1.579 "**Required Revenue Service Availability Date**" means May 24, 2018, as such date may be extended pursuant to Section 40 of the Project Agreement.

1.580 "**Rescue Refinancing**" has the meaning given in Schedule 28 – Refinancing.

1.581 "**Response**" or "**Reponses**" means the response to the RFP submitted by Project Co, including without limitation Response Drawings and Response Vehicle Drawings.

1.582 "**Response Drawings**" means plans and specifications for the System included within the Response.

1.583 "**Response Vehicle Drawings**" means the drawings with respect to the Vehicle Component submitted with the Response.

1.584 "**Responsibility Dispute**" has the meaning given in Section 33.1

1.585 "**Responsibility Notice**" has the meaning given in Section 33.1

1.586 "**Responsible Contractor**" has the meaning given in Section 33.1.

1.587 "**Restricted Person**" means any person who, or any member of a group of persons acting together, any one of which:

(a) has, directly or indirectly, its principal or controlling office in a country that is subject to any economic or political sanctions imposed by Canada or Ontario;

(b) has as its primary business the illegal manufacture, sale, distribution or promotion of narcotics substances or arms, or is or has been involved in terrorism;

(c) in the case of an individual, he or she (or in the case of a legal entity, any of the members of its board of directors or its senior executive managers) has been sentenced to imprisonment or otherwise given a custodial sentence, other than a suspended sentence, for any criminal offence or for any offence under Provincial statute, other than offences under the *Highway Traffic Act* or corresponding legislation in any other jurisdiction, or under any municipal laws, less than five years prior to the date at which the consideration of whether such individual is a "**Restricted Person**" is made hereunder;

(d) has as its primary business the acquisition of distressed assets or investments in companies or organizations which are or are believed to be insolvent or in a financial standstill situation or potentially insolvent;

(e) is subject to a material claim of the City or otherwise under any proceedings (including regulatory proceedings) which have been concluded or are pending at the time at which the consideration of whether such person is a "**Restricted Person**" is made hereunder, and which (in respect of any such pending claim, if it were to be successful) would, in the City's view, in either case, be reasonably likely materially to affect the ability of Project Co to perform its obligations under the Project Agreement; or

(f) has a material interest in the production of tobacco products.

1.588 "**Revenue Service**" has the meaning given to such term in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.589 "**Revenue Service Availability**" means following the following conditions in respect of the System are achieved:

(a) the Substantial Completion in accordance with Schedule 15-2 – Output Specifications– Design and Construction Requirements, and Schedule 15-3 – Output Specifications –Maintenance and Rehabilitation Requirements;

(b) the commissioning and preliminary Operation of the System to ensure Integration and ability for the Operation of the System as contemplated in the Output Specifications;

(c) compliance with the test and commissioning requirements as provided for in Part 4 of Schedule 15-2 – Output Specifications– Design and Construction Requirements and Schedule 14 – Commissioning.

(d) compliance at that time with the Safety Requirements, as approved by the Safety Auditor;

(e) the receipt by the City of the Bill of Sale respecting the Vehicles and the Vehicle and Fixed Equipment Warranties referred to in Section 29.5 of the Project Agreement;

(f) staff training of staff provided by the City with respect to the Operation of the System has been completed and the requisite number of staff have been certified as required in accordance with "Training Plan" provided in Article 26 of Part 1 of Schedule 15-2 – Output Specifications– Design and Construction Requirements; and

(g) the Substantial Completion of the Civic Works;

as evidenced by the issuance by the Independent Certifier of a certificate acknowledging Revenue Service Availability (the "**Revenue Service Availability Certificate**").

1.590 "**Revenue Service Availability Certificate**" has the meaning provided for in the definition of "Revenue Service Availability" in this Schedule 1 – Definitions and Interpretation.

1.591 "**Revenue Service Availability Notice**" means the Notice by Project Co to the City respecting Revenue Service Availability pursuant to Section 26.7(a).

1.592 "**Revenue Service Availability Date**" means the date on which the Revenue Service Availability is achieved.

1.593 "**Revenue Service Availability Payment**" means $.

1.594 "**Revenue Service Availability Payment Date**" means the date that is the later of:

(a) five Business Days following the Revenue Service Availability has been certified by the Independent Certifier; and

(b) five days following the receipt of the invoice in respect of the Revenue Service Availability.

1.595 "**Revenue Service Commencement**" means the commencement of Passenger service to the public on the System by the City on the Revenue Service Commencement Date.

1.596 "**Revenue Service Commencement Date**" means the 1st day following the Revenue Service Availability Date.

1.597 "**Review Procedure**" means the procedure set out in Schedule 10 – Review Procedure.

1.598 "**Revised System Condition Report**" has the meaning given in Schedule 24 – Expiry Transition Procedure.

1.599 "**Ring Fencing Principle**" has the meaning given in Section 1.5 of the Project Agreement.

1.600 "**Risk Assessment Guidelines**" means the Risk Assessment Guidelines for the Project set out in Schedule 40 – Highway Work - Annex C – Risk Assessment Guidelines.

1.601 "**Risk Management Plan**" means the plan contemplated in Section 2.4 of Appendix B to Schedule 10 – Review Procedure.

1.602 "**Risk to Human Health or the Environment**" has the meaning in relation to Contamination of an adverse effect as defined in the *Ontario Environmental Protection Act* (1990).

1.603 "**Rock Stabilization Work**" has the meaning given in the definition of "Civic Works".

1.604 "**RSA**" means the *Railway Safety Act*, S.C. 1996 c.

1.605 "**Safety**" means the absence of unacceptable risk of harm to the Alignment, the System, the public, Passengers and Drivers or other employees of the City or Project Co.

1.606 "**Safety Auditor**" means an independent, qualified safety auditor appointed by the City, acting reasonably.

1.607 "**Safety Case**" has the meaning given to such term in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.608 "**Safety Management Plan**" or "**SMP**" means the safety management plan prepared and submitted by Project Co in accordance with Article 9 of Schedule 15-2 – Output Specifications –Design and Construction Requirements.

1.609 "**Safety Management System**" has the meaning given to such term in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.610 "**Safety Requirements**" means requirements of Applicable Law relating to health and Safety matters respecting the Design, Construction, Maintenance and Operation of the System and the Safety Case and Safety Management System.

1.611 "**Schedule**" means a schedule to the Project Agreement.

1.612 "**Schedule Cushion**" means a schedule contingency added to the last activity on the critical path of the Highway Construction Schedule and consisting of 30 days duration. The Schedule Cushion shall be included in the Highway Construction Schedule and, for greater certainty, the Schedule Cushion shall not extend the Highway Contract Time. The City has ownership of the Schedule Cushion and can elect to use it at any time in respect of a City initiated Variation Confirmation, or upon the occurrence of a Delay Event which would otherwise grant to Project Co an extension of the Highway Contract Time, provided any portion of the Schedule Cushion which has not been used by the City prior to the Highway Substantial Completion Date will be given to Project Co. Use of the Schedule Cushion by the City shall not result in any right of Project Co to a claim for an increase in the Cost of the Highway Financing.

1.613 "**Scheduled Final Completion Date**" means November 24, 2018, as such date may be amended pursuant to Section 40 of the Project Agreement.

1.614 "**Scheduled Milestone Acceptance Date**" means, with respect to any Milestone, the dates set out in Schedule 36– Milestones, as each such date may be amended pursuant to Section 40 of the Project Agreement.

1.615 "**Scheduled Substantial Completion Date**" means May 7, 2018.

1.616 "**Scotiabank Building**" means the building bearing the municipal address of 117 Rideau Street in Ottawa, Ontario (PIN 04215-0175), located at the north east corner of the intersection of Rideau Street and William Street.

1.617 "**Second Pre-final Design Development Submittals**" has the meaning given in Section 20.3(d)(ii)(A) of the Project Agreement.

1.618 "**Section 35.1(c) Payment**" means payment of the HST payable by the City to Project Co under Section 35.1(c) of the Project Agreement (pursuant to paragraph 168(3)(c) of the *Excise Tax Act* (Canada)).

1.619 "**Securities**" means any document constituting evidence of title to or interest in (other than by way of security only) the capital, assets, property, profits, earnings, royalties or voting rights of any corporation or Business Entity or any document including within its entitlements, provisions constituting evidence of a conversion privilege into, an option or right to acquire or subscription for any of the foregoing and includes a share, stock, unit, unit certificate, participation certificate, certificate of share or interest, certificate or other entitlement to a convertible debenture, preorganization certificate or subscription.

1.620 "**Security**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.621 "**Security Documents**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.622 "**Security Management System**" has the meaning given to it in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.623 "**Senior Debt Amount**" has the meaning given in Schedule 23 – Compensation on Termination.

1.624 "**Senior Debt Makewhole**" has the meaning given in Schedule 23 – Compensation on Termination.

1.625 "**Senior Debt Service Amount**" means, for any period, the principal and interest payable by Project Co or any Project Co Party to the Senior Lenders in the normal course under the Lending Agreements.

1.626 "**Senior Lenders**" means all or any of the Persons who provide financing in respect of the Project Scope pursuant to the Credit Agreement and the other Lending Agreements, including their respective permitted successors and assigns, and for greater clarity excludes any hedge providers and their respective permitted successors and assigns.

1.627 "**Sensitive Information**" means financial or commercial information which would, if disclosed to a competitor of Project Co or any Project Co Party, give that competitor a competitive advantage over Project Co or such Project Co Party and thereby prejudice the business of Project Co or such Project Co Party; for greater certainty, "Sensitive Information" does not extend to Intellectual Property.

1.628 "**Severe Market Disruption**" means any occurrence of exceptional circumstances in financial markets in Europe, the United States of America, Japan/Asia and/or Canada which:

(a) results in the suspension or cessation of all or substantially all lending activity in national or relevant international capital or interbank markets; and

(b) adversely affect access by Project Co to such markets.

1.629 "**Shareholders Agreement**" means the agreement or agreements between the shareholders (including holders of securities convertible into shares of Project Co) relating to Project Co including any agreement relating to the subscription of equity (or other shareholder funding) by the Shareholders, Project Co or any holding company of Project Co.

1.630 "**Simple Payback**" has the meaning given in Schedule 8 – Energy Matters.

1.631 "**Site**" means, at any time and from time to time, that portion of the Lands on which Project Co or any Project Co Party is engaged in any construction or demolition activities

or is otherwise engaged in completing the Works or on which any of the Works have been commenced but not completed in their entirety or that is otherwise within the active construction footprint of the Works.

1.632 "**Site Conditions**" means the condition of the Stage 1 Lands, including the physical, geophysical, climatic, ecological, environmental, geotechnical and archaeological conditions.

1.633 "**Small Works**" means any works, including facilities and equipment, of a minor nature that are requested by the City to be performed having an individual cost or aggregate cost with other linked works, including facilities and equipment, of a minor nature, not exceeding $100,000 (index linked), or as otherwise agreed from time to time, but excluding any works, including facilities and equipment, which will increase the likelihood of an Availability Failure or Quality Failure, will increase the cost to Project Co of carrying out the Project Scope or will materially hinder Project Co in the performance of the Maintenance Services.

1.634 "**Special Purpose Vehicle**" or "**SPV**" means a corporation or partnership with no assets or liabilities other than those related directly to the Project, and carrying on no activities of any nature or kind, except as contemplated in this Project Agreement.

1.635 "**Stage 1**" means the Project as it was prior to the implementation of the Stage 2 Variation Schedules and the Stage 2 Maintenance Services Variation.

1.636 "**Stage 1 E&M**" means all electrical and mechanical equipment, machinery, computer hardware and systems included in the Stage 1 System together with all Project Intellectual Property as provided for in the Project Scope and Output Specifications.

1.637 "**Stage 1 Fixed Facilities**" means those improvements described as such in the Project Scope and Output Specifications (which for clarity includes the Original Belfast MSF and the Tunnel).

1.638 "**Stage 1 Lands**" means the Lands, as such term is interpreted immediately prior to the entry into of the Stage 2 Maintenance Services Variation.

1.639 "**Stage 1 System**" means the light rail rapid transit system to be Designed, Constructed, supplied, tested, commissioned and Maintained by Project Co in accordance with this Project Agreement, being the Stage 1 Fixed Facilities, the Stage 1 Vehicles and the Stage 1 E&M, but, for greater certainty, including without limitation:

(a) all Infrastructure;

(b) all site services, utilities, roadways and parking areas required to support such Infrastructure;

(c) all supporting systems and improvements; and

(d) all other works, improvements, and demolitions to occur on the Stage 1 Lands or the Site,

in each case required to meet the Output Specifications and the requirements under the Permits, Licences and Approvals and whether or not in the course of construction, installation or completion, and does not include any part of the Stage 2 System.

1.640 "**Stage 1 Vehicles**" means all light rail transit vehicles used to carry Passengers on the Stage 1 System including all Stage 1 Vehicle Equipment contained therein, and all spare Stage 1 Vehicles as required in accordance with the Vehicle Design and Construction Requirements and Operation Requirements and Specifications; and "**Stage 1 Vehicle**" has a corresponding meaning.

1.641 "**Stage 2 Additional Vehicles**" has the meaning given in Schedule 44 - Stage 2 Additional Vehicles.

1.642 "**Stage 2 Additional Vehicles Variation**" means collectively, the variation confirmation dated June 21, 2017 and Schedule 44 – Stage 2 Additional Vehicles and the rights and obligations of the parties set out therein.

1.643 "**Stage 2 Background Information**" means the "Background Information" as defined in the DB Co Works Agreement.

1.644 "**Stage 2 East Lands**" means that portion of the Lands identified as such in Appendix 2 to this Schedule 1 - Real Property Schedule.

1.645 "**Stage 2 East Revenue Service Availability Date**" means the date on which the Stage 2 East System is ready to commence Passenger service to the public, the determination of which shall be subject to the procedure anticipated in Section 27.4(b).

1.646 "**Stage 2 East Revenue Service Commencement Date**" means the first day following the Stage 2 East Revenue Service Availability Date.

1.647 "**Stage 2 East Substantial Completion Date**" has the meaning given to the term "East Substantial Completion Date" in the DB Co Works Agreement.

1.648 "**Stage 2 East System**" means the light rail rapid transit system to be designed, constructed, supplied, tested, commissioned by DB Co in accordance with the DB Co Works Agreement on the Stage 2 East Lands and to be Maintained by Project Co in accordance with this Project Agreement, being the Fixed Facilities, the Vehicles (to the extent in service and operating on such system) and the E&M, but, for greater certainty, including without limitation:

(a) all Infrastructure;

(b) all site services, utilities, roadways and parking areas required to support such Infrastructure;

(c) all supporting systems and improvements; and

(d) all other works, improvements, and demolitions to occur on the Stage 2 East Lands.

in each case required to meet the Expanded Output Specifications and the requirements under the Permits, Licences and Approvals (in so far as they relate to the Project Scope in respect of the Stage 2 East System).

1.649 "**Stage 2 Environmental Assessments**" means the Environmental Assessments as defined in the DB Co Works Agreement.

1.650 "**Stage 2 Existing Contamination**" has the meaning given to it in Section 16,2(a1).

1.651 "**Stage 2 Interface and Design Management Variation**" means, collectively, the Stage 2 Interface and Design Management Variation Confirmation and Schedule 46 – Stage 2 Interface and Design Management Services and the rights and obligations of the Parties set out therein.

1.652 **"Stage 2 Interface and Design Management Variation Confirmation"** means the agreement between the City and Project Co with such title and dated April 24, 2019.

1.653 **"Stage 2 Latent Defects**" has the meaning given in Section 16.5(a1) of the Project Agreement.

1.654 "**Stage 2 Lands**" means, collectively, the Stage 2 East Lands and the Stage 2 West Lands.

1.655 "**Stage 2 Maintenance Services Variation**" means, collectively, the Stage 2 Services Variation Confirmation and the amendments to this Project Agreement effected by such document.

1.656 "**Stage 2 Maintenance Services Variation Confirmation**" means the agreement between the City and Project Co with such title and dated September 16, 2019.

1.657 "**Stage 2 Major Existing Third Party Infrastructure**" has the meaning given to Major Existing Third Party Infrastructure in the DB Co Works Agreement.

1.658 "**Stage 2 MOU**" means the agreement set out in the Memorandum of Understanding dated 16 March 2017 made between the City and Project Co.

1.659 "**Stage 2 Project Co Delivery Scope**" means those parts of the physical delivery of the Stage 2 System which are the responsibility of Project Co through the Stage 2 Variations, being the Belfast MSF Expansion Variation and the Stage 2 Additional Vehicles Variation.

1.660 "**Stage 2 Site Conditions**" means the condition of the Stage 2 Lands, including the physical, geophysical, climatic, ecological, environmental, geotechnical and archaeological conditions.

1.661 "**Stage 2 System**" means, collectively, the Stage 2 East System and the Stage 2 West System.

1.662 "**Stage 2 System Integration Activities**" has the meaning given to in Section 27.4(b).

1.663 "**Stage 2 Technical Reports**" has the meaning given to the term "Technical Reports" in the DB Co Works Agreement.

1.664 **"Stage 2 Variation Schedules"** means Schedules 43, 44, 45 and 46 to this Project Agreement.

1.665 "**Stage 2 West Lands**" means that portion of the Lands identified as such in Appendix 2 to this Schedule 1 - Real Property Schedule.

1.666 "**Stage 2 West Revenue Service Availability Date**" means the date on which the Stage 2 West System is ready to commence Passenger service to the public, the determination of which shall be subject to the procedure anticipated in Section 27.4(b).

1.667 "**Stage 2 West Revenue Service Commencement Date**" means the first day following the Stage 2 West Revenue Service Availability Date.

1.668 "**Stage 2 West Substantial Completion Date**" has the meaning given to the term "West Substantial Completion Date" in the DB Co Works Agreement.

1.669 "**Stage 2 West System**" means the light rail rapid transit system to be designed, constructed, supplied, tested, commissioned by DB Co in accordance with the DB Co Works Agreement on the Stage 2 West Lands and to be Maintained by Project Co in accordance with this Project Agreement, being the Fixed Facilities, the Vehicles (to the extent in service and operating on such system) and the E&M, but, for greater certainty, including without limitation:

(a) all Infrastructure;

(b) all site services, utilities, roadways and parking areas required to support such Infrastructure;

(c) all supporting systems and improvements; and

(d) all other works, improvements, and demolitions to occur on the Stage 2 West Lands.

in each case required to meet the Expanded Output Specifications and the requirements under the Permits, Licences and Approvals (in so far as they relate to the Project Scope in respect of the Stage 2 West System).

1.670 "**Stakeholders**" means individuals and organizations with an interest in the Project, including those listed in Section 4.1(c) of Schedule 17 – Environmental Obligations, but excluding any Governmental Authority or the City.

1.671 "**Standby Letter of Credit**" has the meaning given in Section 2.2(a) of the Project Agreement.

1.672 "**Start-Up Meeting**" has the meaning given in Section 20.4(a) of the Project Agreement.

1.673 "**Step-In Period**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.674 "**Structural Culvert**" means a Structure that forms an opening through soil and has:

(a) a span of 3 meters or greater, or

(b) the sum of the individual spans of 3 metres or greater, for adjacent multiple cell culverts, or

(c) the sum of the individual spans of 3 metres or greater, for multiple cell culverts (each with spans at least 2m) separated by soil (a width not more than the span of smallest individual cell).

1.675 "**Structure**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.676 "**Subcontractor**" means any subcontractor of Project Co engaged by or through Project Co to perform any of the activities within the Project Scope, including any of the Contractors, any Supplier or consultant, and any subcontractor of any other subcontractor at any tier.

1.677 "**Subcontractor Losses**" has the meaning given in Schedule 23 – Compensation on Termination.

1.678 "**Subcontracts**" means the contracts entered into by or between Project Co and any Subcontractor or between any Subcontractor at any tier, including any of the Contractors, and any other Subcontractor at any tier in relation to any aspect of the Project Scope.

1.679 "**Submission Date**" means October 1, 2012.

1.680 "**Submittal**" means either a Works Submittal or a Maintenance Submittal.

1.681 "**Subsequent Highway Notice**" has the meaning given in Section 15.1(a) of Schedule 40 – Highway Work.

1.682 "**Subsequent Indebtedness Notice**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.683 "**Subsequent Notice**" has the same meaning given to it in Section 26.7.1(a).

1.684 "**Substantial Completion**" means Substantial Completion of the Fixed Component and Substantial Completion of the Vehicle Component.

1.685 "**Substantial Completion Certificate**" means the substantial completion certificate to be issued by the Independent Certifier in accordance with Section 26.2 of the Project Agreement.

1.686 "**Substantial Completion Date**" means the date on which Substantial Completion is achieved as evidenced by the Substantial Completion Certificate, as such date shall be stated therein.

1.687 "**Substantial Completion of the Civic Works**" means: (i) in each case, as certified by the Independent Certifier, the point at which the Queen Street Work, the Albert Street Work, the Rock Stabilization Work, the Utilities Work and the CSST Work respectively has been completed in accordance with the Project Agreement, including the Civic Works Specifications in respect of the Queen Street Work, the Albert Street Work, the Rock Stabilization Work, the Utilities Work and the CSST Work respectively and (ii) as certified by the Consultant, the point at which the Coventry Bridge Work has been completed in accordance with the Project Agreement, including the Civic Works Specifications in respect of the Coventry Bridge Work.

1.688 "**Substantial Completion of the Fixed Component**" means the point at which the Fixed Component (including the Belfast MSF but excluding the MSF Deferred Completion Elements, the MSF Reconfiguration Elements and the MSF Excluded Elements) shall be completed to the same extent as a "contract" being "substantially performed" in accordance with the CLA; a certificate of substantial performance of the Design and Construction Works in respect of the Fixed Component (including the Belfast MSF but excluding the MSF Deferred Completion Elements, the MSF Reconfiguration Elements and the MSF Excluded Elements and other than the construction-period operations and maintenance services described in the Output Specifications) is published in respect of the Construction Contract as if Section 32(1) of the CLA applied to the Fixed Component as if it were a separate contract; and all requirements of Substantial Completion described in Schedule 14 – Commissioning, have been satisfied in respect of the Fixed Component (including the Belfast MSF but excluding the MSF Deferred Completion Elements, the MSF Reconfiguration Elements and the MSF Excluded Elements).

1.689 "**Substantial Completion of the Highway Work**" means the completion of all of the following:

(a) Project Co has performed all of its obligations under Article 16 of Schedule 40 – Highway Work;

(b) the Highway Commissioning of the Highway Work has been completed in accordance with the Contract Documents to the extent required to meet the requirements for use of the Highway by Highway Users set out in Annex G to Schedule 40 – Highway Work and the services required for City to carry out its

Highway Commissioning activities are available in accordance with the Highway Specifications;

(c) the Highway Work is available for use by Highway Users in accordance with the standards set out in Annex G to Schedule 40 – Highway Work;

(d) the Consultant has issued the Highway CLA Certificate and Project Co has published such certificate in accordance with Section 16.1(c) of Schedule 40 – Highway Work;

(e) the Consultant has issued the Highway Substantial Completion Certificate in accordance with Sections 16.1(d) and (e) of Schedule 40 – Highway Work; and

(f) all Highway Work Deliverables, other than those included as Highway Minor Deficiencies in accordance with Section 16.1(i) of Schedule 40 – Highway Work, have been assigned and provided to City.

1.690 "**Substantial Completion of the Vehicle Component**" means:

(a) that all of the "Vehicles" required by this Project Agreement have been delivered at the location designated by the City in accordance with this Project Agreement and have been completed to the same extent as the Fixed Component, as referred to in the definition of Substantial Completion of the Fixed Component, but for clarity, there shall be no requirement for the publication of a certificate of substantial performance; and

(b) Project Co shall have caused compliance with "SAT 3" level of testing as described in the Integrated Test Plan outlined in Schedule 15 – Output Specifications.

(c) Project Co shall have demonstrated compliance with the test and commissioning requirements as provided for in Part 4 of Schedule 15 2 – Output Specifications– Design and Construction Requirements and Schedule 14 – Commissioning.

1.691 "**Substantial Completion of the Vehicle Component Date**" means the date on which Substantial Completion of the Vehicle Component is achieved as evidenced by the Substantial Completion Certificate, as such date shall be stated therein.

1.692 "**Substantial Completion Notice**" has the meaning given in Section 26.2(b) of the Project Agreement.

1.693 "**Suitable Substitute**" has the meaning given in Schedule 4 – Lenders' Direct Agreement.

1.694 "**Supplemental Instruction**" means an instruction, including a field or site instruction, issued for recording any clarifications or interpretation of the Contract Documents or giving direction on field conditions and not involving adjustment in the Highway Milestone Payment or Highway Contract Time, in the form of Highway Specifications,

Highway Drawings, schedules, samples, models, or written instructions, consistent with the intent of the Contract Documents. A Supplemental Instruction is to be issued by the Consultant to supplement the Contract Documents as required for the performance of the Highway Work.

1.695 "**Supplier**" means a person who supplies to Project Co, or to any Subcontractor, any equipment, materials, supplies or services as part of, or for, the Project Scope.

1.696 "**Support Documentation**" has the meaning set out in Section 1(b) of Schedule 15-4.

1.697 "**Sustainability Plan**" means the plan contemplated in Section 3.10 of Schedule 17 – Environmental Obligations.

1.698 "**Sustainable Energy**" means energy is that derived from non-fossil fuels is non-polluting and is from renewable sources.

1.699 "**System**" means:

(a) from the date of this Project Agreement until the Belfast MSF Expansion Substantial Completion Date, the Stage 1 System;

(b) from the Belfast MSF Expansion Substantial Completion Date until Stage 2 East Substantial Completion Date, the Stage 1 System and the Belfast MSF Expansion;

(c) from the Stage 2 East Substantial Completion Date until Stage 2 West Substantial Completion Date, the Stage 1 System, the Belfast MSF Expansion and the Stage 2 East System;

(d) from the Stage 2 West Substantial Completion Date, the Stage 1 System, the Belfast MSF Expansion, the Stage 2 East System and the Stage 2 West System; and

(e) in respect of each of the above matters, the System shall be deemed to include any Stage 2 Additional Vehicles from their Delivery Date in accordance with Schedule 44 – Stage 2 Additional Vehicles.

1.700 "**System Condition Report**" has the meaning given in Schedule 24 – Expiry Transition Procedure.

1.701 "**System Design Functionality**" means the ability of the System to enable the City to carry out the Operation of the System in a manner that meets the City's Operation Requirements and Specifications as set out in the Output Specifications.

1.702 "**System Design Functionality Report**" has the meaning given in Section 20.7(b).

1.703 "**System Extension**" has the meaning given in Schedule 38 – Extension and Additional Phases.

1.704 "**System Infrastructure**" at any time means Infrastructure constructed in, on, over or under any part of the Lands as part of Design and Construction Works, but excluding Third Party Facilities and Infrastructure and Utility Companies and:

(a) with effect from the Belfast MSF Expansion Substantial Completion Date, includes the Expanded Belfast MSF;

(b) with effect from the Stage 2 East Substantial Completion Date, includes the Stage 2 East System Infrastructure; and

(c) with effect from the Stage 2 West Substantial Completion Date, includes the Stage 2 West System Infrastructure.

1.705 "**System Specific Change in Law**" means any Change in Law which principally affects or principally relates only to the design, construction, operation, maintenance, safety and security of rail transit systems or the Vehicles.

1.706 "**System User**" means any member of the public, any City Person and any other person that is on or about the System or is otherwise making use of the System Infrastructure for any purpose.

1.707 "**Taxes**" means any and all taxes, levies, imposts, duties, fees, withholdings, assessments, deductions or charges whatsoever, imposed, assessed, levied or collected by any Governmental Authority, together with interest thereon and penalties with respect thereto, and includes all HST except where stated to the contrary, provided however that "Taxes" shall not include the City Taxes.

1.708 "**Technical Appraisal Form**" or "**TAF**" means a form substantially in the format attached as Attachment 1 – Sample Contents for a Structural TAF to Appendix A of Schedule 10 – Review Procedure.

1.709 "**Technical Reports**" means the Environmental Reports, the Geotechnical Data Reports and the Archaeological Reports.

1.710 "**Temporary Works**" means works that are performed to serve a specific temporary function in the execution of the Works and in respect of which any resulting Infrastructure is removed at such time when its temporary use is no longer required.

1.711 "**Tender Costs**" has the meaning given in Schedule 23 – Compensation on Termination.

1.712 "**Tender Process**" has the meaning given in Schedule 23 – Compensation on Termination.

1.713 "**Tender Process Monitor**" has the meaning given in Schedule 23 – Compensation on Termination.

1.714 "**Termination Date**" means the earlier of the Expiry Date and such other date, if any, on which termination of the Project Agreement takes effect in accordance with its terms.

1.715 "**Third Party Arbitration**" has the meaning given in Schedule 27 – Dispute Resolution Procedure.

1.716 "**Third Party Contractors**" means any person (not being, for the avoidance of doubt, Project Co or any Project Co Party or Additional Contractors) that carries out any Third Party Works.

1.717 "**Third Party Facilities**" means transit shelters, telephone facilities, Infrastructure and other property of Utility Companies and other public facilities and associated equipment, plant, materials and apparatus installed and operated or to be installed and operated on the Lands by any transit authority, communications provider, Utility Company, or other third party (not including, for the avoidance of doubt, Project Co or any Project Co Party).

1.718 "**Third Party Litigation**" has the meaning given in Schedule 27 – Dispute Resolution Procedure.

1.719 "**Third Party Works**" means works in relation to the Third Party Facilities and includes Utility Work and work pursuant to a Utility Agreement, Railway Order or an encroachment permit or other permitting authority of any Governmental Authority under Applicable Law.

1.720 "**Threshold Equity Sale Amount**" means the amount which, if paid in consideration of the percentage of Equity Capital (as at Financial Close) sold in a particular sale of Equity Capital, would result in an Implied Equity Value that, if received in full on the day of the sale of Equity Capital, taken together with all Distributions paid in respect of the Equity Capital, and taking account of the actual timing of payment of all such amounts, would result in an Equity Sale IRR equal to the Threshold Equity Sale IRR.

1.721 "**Threshold Equity Sale IRR**" means 14.99%.

1.722 "**Timing Principle**" has the meaning given in Section 1.5 of the Project Agreement.

1.723 "**Title Encumbrances**" means the Encumbrances listed in Schedule 16 – Title Encumbrances and any other Encumbrance consented to by the City and reasonably required in connection with the development of the System and the Project Scope, provided that any such Encumbrance shall not be a Title Encumbrance for the purposes of the Project Agreement until such time as the relevant part of the Lands or the System to which it relates forms part of the Lands or the System for the purposes of the Project Agreement.

1.724 "**Tracks**" means the track supported by the Guideway on which the Vehicles operate, provided that this definition will be interpreted in accordance with the Ring Fencing Principle and the Timing Principle.

1.725 "**Trade-Marks**" means any registered or unregistered mark, trade-mark, service mark, distinguishing guise, logo, insignia, seal, design or symbol.

1.726 "**Traffic Control Plan**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.727 "**Traffic Control Supervisor**" means Kimberley Hunton.

1.728 "**Traffic and Transit Management Plan**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.729 "**Traffic Quality Management Plan**" has the meaning given in Schedule 11 – Quality Management.

1.730 "**Train**" means a Vehicle or Vehicles operating as one unit on the System.

1.731 "**Train Control System**" means the train control system, where and if necessary, that provides one or all of automatic train protection, automatic train operation and automatic train supervision.

1.732 "**Transportation Master Plan**" means the comprehensive plan that supports the City of Ottawa's Official Plan, in terms of the City's approach to managing and meeting the demand for transportation facilities, including walking, cycling, transit and roads.

1.733 "**Trespasser**" has the meaning given in Section 9.6(a) of the Project Agreement.

1.734 "**Tunnel**" has the meaning given in Schedule 15-1 – Output Specifications – Technical Definitions and Reference Documents.

1.735 "**Tunnel Construction Manager**" means Roger Scoda Estelrich.

1.736 "**Tunnel Design Manager**" means Brian Garrod.

1.737 "**Tunnel Work**" means all workmanship, materials and anything and everything required to be done to achieve the Milestone Acceptance in respect of the Tunnel and includes the design, construction, testing, and completion of the Tunnel to be performed by Project Co in accordance with this Project Agreement as may be varied, amended or supplemented from time to time in accordance with this Project Agreement.

1.738 "**TVM**" means ticket vending machine.

1.739 "**Undisclosed Hazardous Substances**" has the meaning given in Section 14.1(e) of Schedule 40 – Highway Work.

1.740 "**Uninsurable Risk**" has the meaning given in Section 8.1 of Schedule 25 – Insurance and Performance Security Requirements to the Project Agreement.

1.741 "**Utilities**" means energy/power supplies and waste recovery, including electricity, natural gas/fuel oil, water, sanitary waste and storm water.

1.742 "**Utilities Work**" has the meaning given in the definition of "Civic Works".

1.743 "**Utility Agreements**" means any agreement entered into by Project Co with a Utility Company in connection with the construction, installation, operation, repair, preservation, relocation or maintenance of Utility Infrastructure in, on, under, over or adjacent to the Lands, and includes any site or other permits issued thereunder or pursuant thereto, all as amended, supplemented or replaced from time to time.

1.744 "**Utility Company**" means the owner or operator of any Utility Infrastructure.

1.745 "**Utility Infrastructure**" means privately, publicly or cooperatively owned lines, facilities or systems for transmitting or distributing electricity, data, communications, gas, oil and petroleum products, water, storm water or sewage or other similar commodity or substance which serve the public directly or indirectly, including underground, surface and overhead facilities as well as facilities which use common poles, ducts or conduits on a shared basis, and all related Infrastructure.

1.746 "**Utility Work**" means temporary and permanent installation, protection, removal and relocation works relating to Utility Infrastructure carried out in connection with or as part of the Project Scope, including installation, protection, removal and relocation of poles, pole lines, conduits, gas pipes, oil pipes, sewers and tile lines, and related and ancillary works.

1.747 "**Variation**" has the meaning given in Schedule 22 – Variation Procedure.

1.748 "**Variation Confirmation**" has the meaning given in Schedule 22 – Variation Procedure.

1.749 "**Variation Directive**" has the meaning given in Schedule 22 – Variation Procedure.

1.750 "**Variation Enquiry**" has the meaning given in Schedule 22 – Variation Procedure.

1.751 "**Variation in the Scope of the Highway Work or Scope Variation**" shall mean any change in the scope of the Highway Work from that shown in or which is properly inferable, readily apparent or readily discoverable from the Contract Documents and relating to the quantity or quality of Products or materials, components or equipment to be incorporated into the Highway Work, or any specified method of installation of materials or equipment into the Highway Work, including changes arising from Highway Design Issues falling within categories "B" and "D" in the Risk Assessment Guidelines, but does not include a Project Co Highway Design Contingency expenditure. It is agreed that refinements and detailing will be accomplished from time to time with respect to the Contract Documents, including the addition of items or materials which may have been omitted from the Contract Documents but which are necessary to complete a detail shown, specified or readily apparent or properly inferable therefrom. Such refinements and detailing shall not constitute a Variation in the Scope of the Highway Work and will not result in any adjustment of the Highway Milestone Payment, but will be treated as a Project Co Highway Design Contingency expenditure in accordance with Section 11.17 of Schedule 40 – Highway Work. For greater certainty, it is understood and agreed that where Project Co is entitled to any extension of time or compensation for additional costs or expenses pursuant to the express provisions of the Contract Documents, the matter giving rise to such extension of time or additional costs or expenses shall be deemed to be

a Variation in the Scope of the Highway Work and shall be processed as a Variation Confirmation pursuant to Schedule 22 – Variation Procedure.

1.752 "**Variation Procedure**" means the procedure set out in Schedule 22 – Variation Procedure.

1.753 "**Vehicle and Fixed Equipment Warranties**" means the warranties respecting the Vehicles and the Fixed Equipment set out in Schedule 34 – Vehicle and Fixed Equipment Warranties.

1.754 "**Vehicle Component**" means the Vehicles and the Vehicle Equipment, provided that this definition will be interpreted in accordance with the Ring Fencing Principle and the Timing Principle.

1.755 "**Vehicle Design**" means the provisions respecting the Stage 1 Vehicles set out in the Project Scope and Output Specifications.

1.756 "**Vehicle Equipment**" means all E&M and other equipment comprised or contained within the Vehicles, provided that this definition will be interpreted in accordance with the Ring Fencing Principle and the Timing Principle.

1.757 "**Vehicle Maintenance Manager**" means an individual with a minimum of 10 years of relevant experience in a similar role. The individual shall have either a P.Eng. or CET designation and shall have managed fleets of 50 or more vehicles.

1.758 "**Vehicle Milestone**" means any Milestone containing as a component thereof all or any part of a Vehicle Component.

1.759 "**Vehicle Procurement Officer**" means Rainer Ibowski.

1.760 "**Vehicle Supply Manager**" means an individual with a minimum of 15 years of relevant experience in vehicle selection and procurement with 10 years of experience specifically related to design, manufacturing and delivery of vehicles. The individual shall have a P.Eng. designation and shall have experience in DBFM projects where vehicles were supplied by the bidder.

1.761 "**Vehicle Working Drawings**" has the meaning given in Section 29.3 of the Project Agreement.

1.762 "**Vehicles**" means prior to Revenue Service Availability the Stage 1 Vehicles and after Delivery of each Stage 2 Additional Vehicle, the Stage 1 Vehicles and such Stage 2 Additional Vehicles together; and "**Vehicle**" has a corresponding meaning.

1.763 "**Warning Notice**" has the meaning given in Section 31.3 of the Project Agreement.

1.764 "**West Trial Running Period**" has the meaning given in Schedule 20 – Payment Mechanism.

1.765 "**Work**" or "**Works**" means all workmanship, materials and anything and everything required to be done to achieve Final Completion and includes the Design, Construction, testing, commissioning and completion of the System and all components of the System (including any Temporary Works) to be performed by Project Co in accordance with this Project Agreement as may be varied, amended or supplemented from time to time in accordance with this Project Agreement.

1.766 "**Work Default**" has the meaning given in Section 33.1 of the Project Agreement.

1.767 "**Works Change in Law**" means any Change in Law that:

(a) is not a Relevant Change in Law;

(b) occurs after Commercial Close;

(c) requires Project Co to perform any work of alteration, addition, demolition, extension or variation in the quality or function of (i) the System which is similar in nature to Design and Construction Works or the Maintenance Construction or (ii) the Highway which is similar in nature to the Highway Works; but is not Design and Construction Works, Maintenance Construction, Highway Works or capital replacement work which Project Co would otherwise be required to perform in order to comply with its obligations under the Project Agreement; and

(d) was not reasonably foreseeable at Commercial Close by an experienced contractor carrying out activities and/or performing design and/or other operations similar to those to be carried out and/or performed by any Project Co Party in relation to the Project.

1.768 "**Works Committee**" has the meaning given in Section 11.1(a) of the Project Agreement.

1.769 "**Works Report**" has the meaning given in Section 22.5(a) of the Project Agreement.

1.770 "**Works Schedule**" means the schedule to be prepared and submitted by Project Co in accordance with Section 22.2 of the Project Agreement.

1.771 "**Works Submittal**" has the meaning given in Section 1.1 of Schedule 10 – Review Procedure.

1.772 "**WSIB**" means the Ontario Workplace Safety and Insurance Board that is responsible for administering the *Workplace Safety and Insurance Act, 1997* (Ontario).

2. INTERPRETATION

The Project Agreement shall be interpreted according to the following provisions, unless the context requires a different meaning:

2.1 The tables of contents, headings, marginal notes and references to them in the Project Agreement are for convenience of reference only, shall not constitute a part of the Project

Agreement, and shall not be taken into consideration in the interpretation of, or affect the meaning of, the Project Agreement.

2.2 Except where the context requires otherwise (irrespective of whether some, but not all, references in a Schedule specifically refer to that Schedule or to other portions of the Project Agreement) references to specific Sections, Clauses, Paragraphs, Subparagraphs, Schedules, and other divisions of the Project Agreement are references to such Sections, Clauses, Paragraphs, or Subparagraphs of, Schedules to, or divisions of the Project Agreement and the terms "Section" and "Clause" are used interchangeably and are synonymous.

2.3 Except where the context requires otherwise, references to specific Sections, Clauses, Paragraphs, Subparagraphs, Schedules, and other divisions of the Project Agreement followed by a number are references to the whole of the Section, Clause, Paragraph, Subparagraphs, Schedule or other division of the Project Agreement as applicable, bearing that number, including all subsidiary provisions containing that same number as a prefix.

2.4 Except where the context requires otherwise, references in the Output Specifications to specific Parts, Sections, Clauses, Paragraphs, Subparagraphs, Schedules, and other divisions of the Output Specifications shall be construed such that each such reference on a page of the Output Specifications will be read to be preceded by and to include the prefix Section number or other reference at the top of the applicable page, and all cross-references to any Section in Schedule 15 – Output Specifications shall be interpreted to include the applicable prefix Section number or other reference.

2.5 The Schedules to the Project Agreement are an integral part of the Project Agreement and a reference to the Project Agreement includes a reference to the Schedules, provided that the Stage 2 Variation Schedules shall be read and interpreted in accordance with their terms.

2.6 All references in the Project Agreement to a Schedule shall be to a Schedule of the Project Agreement.

2.7 All capitalized terms used in a Schedule shall have the meanings given to such terms in Schedule 1 – Definitions and Interpretation, unless stated otherwise in a particular Schedule in which case such definition shall have the meaning given to it in that Schedule solely for the purposes of that Schedule.

2.8 The language of the Output Specifications and other documents comprising the Project Agreement is in many cases written in the imperative for brevity. Clauses containing instructions, directions or obligations are directed to Project Co and shall be construed and interpreted as if the words "Project Co shall" immediately preceded the instructions, directions or obligations.

2.9 Words importing persons or parties are to be broadly interpreted and include an individual, corporation, limited liability company, joint stock company, firm, partnership, joint venture, trust, unincorporated organization, Governmental Authority,

unincorporated body of persons or association and any other entity having legal capacity, and the heirs, beneficiaries, executors, administrators or other legal representatives of a person in such capacity.

2.10 Unless the context otherwise requires, wherever used herein the plural includes the singular, the singular includes the plural, and each of the masculine, feminine and neuter genders include all other genders.

2.11 Unless otherwise provided in the Project Agreement, all accounting and financial terms used in the Project Agreement shall be interpreted and applied in accordance with Canadian GAAP.

2.12 References to any standard, principle, agreement or document include (subject to all relevant approvals and any other provisions of the Project Agreement concerning amendments) a reference to that standard, principle, agreement or document as amended, supplemented, restated, substituted, replaced, novated or assigned.

2.13 References to any Applicable Law, including any statutes or other Applicable Law specifically referred to herein, whether or not amendments or successors to such Applicable Law are referred to herein, are to be construed as references to that Applicable Law as from time to time amended or to any Applicable Law covering the same or similar subject matter from time to time replacing, extending, consolidating or amending the same.

2.14 References to a statute shall include all regulations, by-laws, ordinances and orders made under or pursuant to the statute.

2.15 References to persons shall include their successors and assigns. References to a public organization shall include their successors and assigns, and if a public organization ceases to exist or ceases to perform its functions without a successor or assign, references to such public organization shall be deemed to include a reference to any public organization or any organization or entity which has taken over either or both the functions and responsibilities of such public organization.

2.16 A reference in the Project Agreement or in any Project Document to any right, power, obligation or responsibility of any Governmental Authority shall be deemed to be a reference to the Governmental Authority that, pursuant to Applicable Laws has such right, power, obligation or responsibility at the relevant time.

2.17 References to a deliberate act or omission or deliberate or negligent act or omission of any City Person shall be construed having regard to the interactive nature of the activities of the City Persons and Project Co and further having regard to:

(a) acts contemplated by the Expanded Output Specifications;

(b) acts or omissions in the ordinary course of the Governmental Activities and expressly or reasonably inferred from the Expanded Output Specifications to be

taken into account by Project Co in the performance of the Maintenance Services; or

(c) acts otherwise provided for in the Project Agreement.

2.18 The words in the Project Agreement shall bear their natural meaning.

2.19 Each of Project Co's and the City's respective obligations shall be construed as separate obligations owed to the other.

2.20 References containing terms such as:

(a) "hereof", "herein", "hereto", "hereinafter", and other terms of like import are not limited in applicability to the specific provision within which such references are set forth but instead refer to the Project Agreement taken as a whole; and

(b) "includes" and "including", whether or not used with the words "without limitation" or "but not limited to", shall not be deemed limited by the specific enumeration of items but shall, in all cases, be deemed to be without limitation and construed and interpreted to mean "includes without limitation" and "including without limitation".

2.21 In construing the Project Agreement, the rule known as the ejusdem generis rule shall not apply nor shall any similar rule or approach apply to the construction of the Project Agreement and, accordingly, general words introduced or followed by the word "other" or "including" or "such as" or "in particular" shall not be given a restrictive meaning because they are followed or preceded (as the case may be) by particular examples intended to fall within the meaning of the general words.

2.22 Where the Project Agreement states that an obligation shall be performed "no later than" or "within" or "by" a stipulated date or event which is a prescribed number of days after a stipulated date or event the latest time for performance shall be 5:00 p.m. on the last day for performance of the obligation concerned, or, if that day is not a Business Day, 5:00 p.m. on the next Business Day.

2.23 Where the Project Agreement states that an obligation shall be performed "no later than" or "by" a prescribed number of days before a stipulated date or event or "by" a date which is a prescribed number of days before a stipulated date or event, the latest time for performance shall be 5:00 p.m. on the last day for performance of the obligation concerned, or if that day is not a Business Day, 5:00 p.m. on the next Business Day.

2.24 Where the Project Agreement states that an obligation shall be performed "on" a stipulated date, the latest time for performance shall be 5:00 p.m. on that day, or, if that day is not a Business Day, 5:00 p.m. on the next Business Day.

2.25 Any reference to time of day or date means the local time or date in Toronto, Ontario.

2.26 Unless otherwise indicated, time periods will be strictly construed.

2.27 Whenever the terms "will" or "shall" are used in the Project Agreement in relation to Project Co or the City they shall be construed and interpreted as synonymous and to read "Project Co shall" or the City shall" as the case may be.

2.28 Any reference to currency is to Canadian currency and any amount advanced, paid or calculated is to be advanced, paid or calculated in Canadian currency.

2.29 Unless otherwise identified in the Project Agreement, all units of measurement in any documents submitted by Project Co to the City shall be in accordance with the SI system of units.

2.30 Terms not defined herein and used in the Project Agreement which have a technical meaning commonly understood by the transit system construction and maintenance industry or the public road and highway construction industry, as applicable, in Ontario will be construed as having that meaning unless the context otherwise requires.

2.31 Save where expressly stated otherwise, references to amounts or sums expressed to be "indexed" or "index linked" are references to amounts or sums which require adjustment to reflect the effects of inflation. Such adjustment shall be calculated in accordance with the following formula:

$$\text{Adjusted amount or sum} = \text{Amount or sum} \times \frac{CPI_n}{CPI_O}$$

2.32 The terms "properly inferable", "readily apparent" and "readily discoverable" as used in this Project Agreement,

(a) in respect of the Project Scope (excluding the Highway Work), shall be interpreted by taking into consideration Project Co's and any Project Co Party's experience and the investigations, inspections and examinations of the Background Information (in respect of the Stage 1 System) or the Stage 2 Background Information (in respect of the Stage 2 System and the Maintenance Services only) and in respect of the Lands carried out by Project Co or by any Project Co Party during the Request for Proposals process or other due diligence, including pursuant to the Stage 2 MOU, Stage 2 Variations and in preparation for the Stage 2 Maintenance Services Variation (for the purposes of the Maintenance Services only); and by taking into consideration reasonable, normal course and industry standard investigations, inspections or other due diligence; in each case in accordance with Good Industry Practice (Works); and

(b) in respect of the Highway Work, shall be interpreted by taking into consideration Project Co's and any Project Co Party's experience and the investigations, inspections and examinations of the Background Information carried out by Project Co or by any Project Co Party during the Request for Proposals process in accordance with Good Industry Practice (Works) and Good Industry Practice (Highway).

2.33 If any review, approval, inspection, examination, audit, determination or acceptance is provided, performed or made by or on behalf of the City under, pursuant to or in respect of this Agreement, then with the exception of any express written consent or approval by the City in case of a specific act or conduct by Project Co that, in the absence of such consent or approval, would constitute a breach by Project Co of any of its obligations under this Agreement:

(a) such review, approval, inspection, examination, audit, determination or acceptance will be for general compliance only; and

(b) no such review, approval, inspection, examination, audit or determination or acceptance now or in the future, and whether or not negligent on the part of the City (including the City Indemnified Parties):

(i) shall relieve or exempt Project Co from any of its obligations under this Agreement or at law or in equity;

(ii) shall constitute a waiver or release by the City of any duty or liability owed by Project Co to the City under this Agreement or of any indemnity given by Project Co to the City under this Agreement;

(iii) shall constitute an approval by the City of any plans or specifications; or

(iv) shall create or impose any requirement, liability, covenant, agreement or obligation on the City.

APPENDIX 1
CITY PERMITS, LICENCES AND APPROVALS

SCHEDULE 1
DEFINITIONS AND INTERPRETATION

APPENDIX 1
PERMITS, LICENCES AND APPROVALS (PLAA) TABLE

CITY OF OTTAWA AND PROJECT CO RESPONSIBILITY TABLE

PART 1 - WORKS

NOTE 1: **The Permits, Licences and Approvals may include, but are not limited to, those included in the tables below.**

NOTE 2: **[Intentionally deleted]**

NOTE 3: **The following Responsibility Tables are for the purpose of the performance of the Works, Highway Work and Civic Works.**

NOTE 4: **If, for any permit, licence or approval, there is a legislative requirement for the applicant to be the City, then Project Co shall act as the City's agent and will be responsible for the all aspects of the application preparation and submittal process. If required the City will sign off on the application.**

Permits, Licences and Approvals	Issuing Agency	Status	Responsibility of: City of Ottawa or Project Co
Site Plan Control – Development Outside of the Public Transit System Right-of-Way	City of Ottawa	The City's Site Plan Control By-law exempts transitway buildings and structures from site plan control approval. However, site plan control approval may be required for development located outside of the public transit system right-of-way. Project Co shall be responsible for submitting any site plan control applications and obtaining site plan control approval to permit development that is not exempt from site plan control approval. Further, Project Co shall be responsible for complying with any conditions that may	Project Co

Permits, Licences and Approvals	Issuing Agency	Status	Responsibility of: City of Ottawa or Project Co
		result from the approval.	
Building and Demolition Permits – Stations and MSF	City of Ottawa		Project Co
Noise By-law Exemption	City of Ottawa		Project Co
Approval under the Sewer Use By-law to discharge waste water	City of Ottawa		Project Co
Road Cut Permit (utility circulation)	City of Ottawa	Utility circulation was initiated by the City in the preliminary engineering phase.	Project Co
Temporary Road Closure Permit	City of Ottawa		Project Co
Temporary Construction Easements	City of Ottawa		City of Ottawa
Street or Lane Closing/Opening	City of Ottawa		Project Co
Zoning By-Law Amendment	City of Ottawa		Project Co
Sign Permit	City of Ottawa		Project Co
Permit under Ontario Heritage Act	City of Ottawa	Permits required under the Ontario Heritage Act will not be obtained by the City of Ottawa prior to Financial Close.	City of Ottawa
Emergency Services Approval – Fire and Life Safety	City of Ottawa		Project Co
City of Ottawa Urban Design Review Panel (UDRP) Review Note: not an approval. Review by the UDRP is a requirement of the City's development review process.	N/A	UDRP comments have been received on station design submissions in 2011 through pre-consultation meetings and/or design review meetings. These comments have been incorporated into the station reference drawings. The UDRP comments are also available online at Ottawa.ca, under the Panel recommendations for June 1 & 2, 2011.	City of Ottawa is responsible to submit, as required, updated designs to the UDRP for their review. Project Co. is responsible to support the City in regards to the

Permits, Licences and Approvals	Issuing Agency	Status	Responsibility of: City of Ottawa or Project Co
			submission requirements.
Electrical Plan Review	Electrical Safety Authority		Project Co
Construction Registration Permit	Electrical Safety Authority		Project Co
Notice of Project	Ministry of Labour		Project Co
Registration of Constructors and Employers Engaged in Construction	Ministry of Labour		Project Co
Permit to Take Water	Ontario Ministry of the Environment		Project Co
Certificate of Approval – SWM facilities	Ontario Ministry of the Environment		Project Co
Certificate of Approval – Water and Sanitary Sewer	Ontario Ministry of the Environment (City of Ottawa has delegated authority for issuance)		Project Co.
Certificate of Approval – Air and Noise	Ontario Ministry of the Environment		Project Co
Approval from MOE under *Ontario Environmental Assessment Act* O. Reg. 231/08	Ontario Ministry of the Environment	City of Ottawa received approval for the "Downtown Ottawa Transit Tunnel: Tunney's Pasture to Blair via a Downtown LRT Tunnel, Environmental Project Report" (DOTT EPR) from the Minister of the Environment on August 11, 2010.	City of Ottawa
Amendments to the approval from MOE under *Ontario Environmental*	Ontario Ministry of the Environment	An addendum to the DOTT EPR has been completed by the City in accordance with O. Reg. 231/08 and posted to the	Project Co.

Permits, Licences and Approvals	Issuing Agency	Status	Responsibility of: City of Ottawa or Project Co
Assessment Act O. Reg. 231/08		Data Room.	
Archaeology – Letter confirming report complies with Ministry requirements and filed with Ontario Public Register of Archaeological Reports	Ontario Ministry of Tourism, Culture and Sports (MTCS)	Letters of Concurrence received from the MTCS have been posted to the Data Room.	City of Ottawa (any archaeological reports completed prior to Financial Close) Project Co (any archaeological reports completed after Financial Close)
Approval for provincial funding	Ontario Ministry of Transportation	Funding agreement was signed on September 1, 2011.	City of Ottawa
Approval from MTO for a building and land use permit in accordance with the requirements of the Public Transportation and Highway Improvement Act	Ontario Ministry of Transportation		Project Co
Ontario Regulation 174/06 – Development, Interference with Wetlands and Alterations to Shorelines and Watercourses	Rideau Valley Conservation Authority		Project Co
Approval under Section 35 of the *Fisheries Act*	Fisheries and Oceans Canada		Project Co
Land Access Permit	National Capital Commission		Project Co
Federal Land Use, Design, and	National Capital	The City of Ottawa has initiated the approval process.	City of Ottawa

Permits, Licences and Approvals	Issuing Agency	Status	Responsibility of: City of Ottawa or Project Co
Transaction Approval	Commission	Federal Land Use, Design, and Transaction Approval will not be obtained by the City of Ottawa prior to Financial Close.	Project Co is responsible for supporting the City in the submission process to the extent outlined in Schedule 10 which will include submissions to the NCC at the Final Design Development and Final Construction Document Submittal phases.
Federal Heritage Buildings Review Office (FHBRO) federal heritage building approval	Parks Canada		Project Co
Rideau Canal In-Water and Shoreline Work Permit	Parks Canada		Project Co
Land Acquisition and/or Lease	Public Works and Government Services Canada		City of Ottawa
Approval for federal funding	Transport Canada	Federal funding commitment has been obtained.	City of Ottawa
CEAA Screening determination	Transport Canada (Lead Responsible Authority)	A CEAA determination was made by the federal Responsible Authorities on July 13, 2012 that the project is not likely to cause significant adverse environmental effects.	City of Ottawa

Permits, Licences and Approvals	Issuing Agency	Status	Responsibility of: City of Ottawa or Project Co
Amendment to the CEAA Screening determination (approval)	Transport Canada (Lead Responsible Authority)		Project Co
Agreement to undertake works under VIA Rail at Belfast.	Agreement between City of Ottawa and Canadian National Railway (CN)		City of Ottawa - responsible for obtaining the agreement for the OLRT tunnel crossing under CN rail (leased by VIA) at Belfast as described in the reference design and approved as part of the CEAA Process

PART 2 – HIGHWAY WORK

Permits, Licences and Approvals	Issuing Agency	Status	Responsibility of: City of Ottawa or Project Co
Lane Closure Permit	MTO		Project Co
Noise By-law Exemption	City of Ottawa		Project Co
Land Access Permit from NCC Urban Lands for use of the Aviation Parkway	NCC		Project Co
Traffic Management Plan for the use of the Aviation Parkway	NCC		Project Co
Final Permit to Take Water	MOE	Draft received from MOE by MTO	Project Co
Environmental Assessments	MOE	Design Construction Report complete.	City of Ottawa on behalf of the MTO
Clearance that No Harmful Alteration, Disruption or Destruction to habitat will be created	Department of Fisheries and Oceans	Received	City of Ottawa on behalf of the MTO
Navigable Waters Protection Act Approval	Transport Canada	Received	City of Ottawa on behalf of the MTO
Land Access Permit from the National Capital Commission	National Capital Commission	Received	City of Ottawa on behalf of the MTO
Federal Land Use and Design Approval	National Capital Commission	Received	City of Ottawa on behalf of the MTO
Stage I and II Archaeology Reports Approval	Ministry of Tourism Culture and Sport	Received	City of Ottawa on behalf of the MTO
Licence of Occupation	National Capital Commission	Received	City of Ottawa on behalf of the MTO
Letter of Permission pursuant to	Rideau Valley	Received	City of Ottawa on

Permits, Licences and Approvals	Issuing Agency	Status	Responsibility of: City of Ottawa or Project Co
Ontario Regulation 174/06	Conservation Authority		behalf of the MTO
Design Criteria	MTO	Received	City of Ottawa on behalf of the MTO
Permit To Take Water Application	MOE	Submitted	City of Ottawa on behalf of the MTO
Designation of Construction Zone	MTO	Received	City of Ottawa on behalf of the MTO
Encroachment Permit	MTO	To be obtained prior to Financial/Commercial Close	City of Ottawa on behalf of Project Co

PART 3 – CIVIC WORKS

Albert Street Work			
Permits, Licences and Approvals	**Issuing Agency**	**Status**	**Responsibility of: City of Ottawa or Project Co**
Approval under the Sewer Use By-law to discharge waste water	City of Ottawa		City of Ottawa
Certificate of Approval – Water and Sanitary Sewer	Ontario Ministry of the Environment (City of Ottawa has delegated authority for issuance)		City of Ottawa
Federal Land Use, Design, and Transaction Approval	National Capital Commission		City of Ottawa
All Remaining Permits, Licenses and Approvals	Various Agencies		Project Co

Queen Street Work			
Permits, Licences and Approvals	**Issuing Agency**	**Status**	**Responsibility of: City of Ottawa or Project Co**
Approval under the Sewer Use By-law to discharge waste water	City of Ottawa		City of Ottawa
Certificate of Approval – Water and Sanitary Sewer	Ontario Ministry of the Environment (City of Ottawa has delegated authority for issuance)		City of Ottawa
All Remaining Permits, Licenses and Approvals	Various Agencies		Project Co

Rock Stabilization Work			
Permits, Licences and Approvals	**Issuing Agency**	**Status**	**Responsibility of: City of Ottawa or Project Co**
All Remaining Permits, Licenses and Approvals	Various Agencies		Project Co

Coventry Bridge Work			
Permits, Licences and Approvals	**Issuing Agency**	**Status**	**Responsibility of: City of Ottawa or Project Co**
Federal Land Use, Design, and Transaction Approval	National Capital Commission		City of Ottawa
All Remaining Permits, Licenses and Approvals	Various Agencies		Project Co

Combined Sewage Storage Tunnel (CSST) Work			
Permits, Licences and Approvals	**Issuing Agency**	**Status**	**Responsibility of: City of Ottawa or Project Co**
Approval under the Sewer Use By-law to discharge waste water	City of Ottawa		City of Ottawa
Certificate of Approval – Water and Sanitary Sewer	Ontario Ministry of the Environment (City of Ottawa has delegated authority for issuance)		City of Ottawa
Federal Land Use, Design, and Transaction Approval	National Capital Commission		City of Ottawa
All Remaining Permits, Licenses and Approvals	Various Agencies		Project Co

APPENDIX 2
REAL PROPERTY SCHEDULE

1. Introduction

This Real Property Schedule describes every Real Property Interest to be included in the licenses to be granted to Project Co. in accordance with Section 14 of the Project Agreement. The boundaries and limits of the said Real Property Interests, including commencement dates and durations of Temporary Construction Easements, are more particularly described in the tables below (the "**Property Tables**") together with the Property Request Plans referred to in the Property Tables. The City shall provide Project Co with access to all Property Request Plans referred to in this Real Property Schedule.

Additional limitations on Real Property Interests included in this Real Property Schedule are denoted by a reference number included in the "Notes" column of the Property Tables which reference number corresponds to the number listed in Section 3 "Special Limitations" to this Real Property Schedule. The limitations described in Section 3 "Special Limitations" to this Real Property Schedule are in addition to any Encumbrances or Title Encumbrances which apply to the Real Property Interests described herein.

Lands
Possession Date: Commercial Close

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
001	West Running Way	14152p001-REV7- 001b.dgn	04097-0113	Parcel 1	Fee Simple	12-May-15	N/A	
001	West Running Way	14152p001-REV7- 001b.dgn	04097-0112	Parcel 2	Fee Simple	12-May-15	N/A	
001	West Running Way	14152p001-REV7- 001b.dgn	04097-0111	Parcel 3	Fee Simple	12-May-15	N/A	
001	West Running Way	14152p001-REV7- 001b.dgn	04097-0049	Parcel 4	Fee Simple	12-May-15	N/A	
16	Downtown Tunnel	14152p001-REV7- 016a.dgn	04114-0010	Parcel 1	Fee Simple	12-Nov-13	N/A	
16	Downtown Tunnel	14152p001-REV7- 016a.dgn	04114-0009	Parcel 1	Fee Simple	12-Nov-13	N/A	
122	Downtown Tunnel	14152p001-REV7- 122a.dgn	04116-0016	Parcel 1	Fee Simple (Stratified)	16-Apr-15	N/A	
124	Downtown Tunnel	14152p001-REV7- 124c.dgn	04112-0049	Parcel 1	Fee Simple (Stratified)	12-Nov-13	N/A	12
124	Downtown Tunnel	14152p001-REV7- 124c.dgn	04112-0036	Parcel 1	Fee Simple (Stratified)	12-Nov-13	N/A	12
125	West Running Way	14152p001-REV7-125a.dgn	04032-0202	Parcel 1	Fee Simple	27-May-15	N/A	20
125	West Running Way	14152p001-REV7-125a.dgn	04032-0185	Parcel 2	Fee Simple	27-May-15	N/A	20
126	Downtown Tunnel	14152p001-REV7-126.dgn	04114-0274	Parcel 1	Fee Simple(Stratified)	12-Nov-13	N/A	12
127	West Running Way	14152p001-REV7- 127c.dgn	04096-0216	Parcel 1	Fee Simple	27-May-15	N/A	20
127	West Running Way	14152p001-REV7- 127c.dgn	04097-0065	Parcel 2	Fee Simple	27-May-15	N/A	20
128	Downtown Tunnel	14152p001-REV7- 128b.dgn	04114-0275	Parcel 1	Fee Simple(Stratified)	12-Nov-13	N/A	12
129	Downtown Tunnel	14152p001-REV7- 129d.dgn	04115-0041	Parcel 1	Fee Simple (Stratified)	12-Nov-13	N/A	12
129	Downtown Tunnel	14152p001-REV7- 129d.dgn	04115-0067	Parcel 1	Fee Simple (Stratified)	12-Nov-13	N/A	12
130	Bayview Station	14152p001-REV7-130.dgn	04097-0171	Parcel 1	Permanent (Utilities Easement)	25-May-16	N/A	
130	Bayview Station	14152p001-REV7-130.dgn	04097-0171	Parcel 2	Temporary Construction Easement	25-May-16	24	
130	Bayview Station	14152p001-REV7-130.dgn	04097-0171	Parcel 3	Temporary Construction Easement	25-May-16	24	
130	Bayview Station	14152p001-REV7-130.dgn	04097-0171	Parcel 4	Fee Simple	25-May-16	N/A	

Lands
Possession Date: Commercial Close

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
130	Bayview Station	14152p001-REV7-130.dgn	04097-0171	Parcel 5	Temporary Construction Easement	25-May-16	24	
132	West Running Way	14152p001-REV7-132c.dgn	04097-0140	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04097-0195	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04097-0165	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04097-0161	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04097-0142	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04097-0144	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04097-0137	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04097-0138	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04097-0160	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04097-0199	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04097-0075	Parcel 1	Temporary Construction Easement	12-May-15	36	1, 6, 20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0001	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0111	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0025	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0005	Parcel 1	Temporary Construction Easement	12-May-15	36	1, 6, 20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0185	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0108	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0095	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0168	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0094	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0152	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0092	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0166	Parcel 1	Fee Simple	12-May-15	N/A	20

Lands
Possession Date: Commercial Close

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
132	West Running Way	14152p001-REV7-132c.dgn	04112-0090	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0112	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0088	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0017	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0104	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0107	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0172	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0169	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0125	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0181	Parcel 1	Fee Simple	12-May-15	N/A	20
132	West Running Way	14152p001-REV7-132c.dgn	04112-0084	Parcel 1	Fee Simple	12-May-15	N/A	20
133	Downtown Tunnel	14152p001-REV7- 133a.dgn	04116-0101	Parcel 1	Fee Simple	16-Apr-15	N/A	2
134	Downtown Tunnel	14152p001-REV7- 134f.dgn	04215-0236	Parcel 1	Fee Simple	21-Oct-13	N/A	12
134	Downtown Tunnel	14152p001-REV7- 134f.dgn	04215-0150	Parcel 1	Fee Simple	21-Oct-13	N/A	12
134	Downtown Tunnel	14152p001-REV7- 134f.dgn	04215-0158	Parcel 1	Fee Simple	21-Oct-13	N/A	12
135	Downtown Tunnel	14152p001-REV7- 135g.dgn	04112-0005	Parcel 1	Fee Simple	15-Feb-13	N/A	20
135	Downtown Tunnel	14152p001-REV7- 135g.dgn	04112-0027	Parcel 2	Temporary Construction Easement (Staging)	15-Feb-13	62	3, 20
135	Downtown Tunnel	14152p001-REV7- 135g.dgn	04112-0029	Parcel 3	Temporary Construction Easement	15-Feb-13	62	20
135	Downtown Tunnel	14152p001-REV7- 135g.dgn	04112-0028	Parcel 4	Temporary Construction Easement	15-Feb-13	62	20
135	Downtown Tunnel	14152p001-REV7- 135g.dgn	04112-0037	Parcel 5	Temporary Construction Easement	15-Feb-13	62	20
136	Downtown Tunnel	14152p001-REV7- 136e.dgn	04210-0118	Parcel 1	Fee Simple	Commercial Close	N/A	12
136	Downtown Tunnel	14152p001-REV7- 136e.dgn	04210-0140	Parcel 2	Fee Simple	Commercial Close	N/A	12
136	Downtown Tunnel	14152p001-REV7- 136e.dgn	04210-0125	Parcel 2	Fee Simple	Commercial Close	N/A	12

Lands
Possession Date: Commercial Close

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
136	Downtown Tunnel	14152p001-REV7- 136e.dgn	04210-0141	Parcel 2	Fee Simple	Commercial Close	N/A	12
136	Downtown Tunnel	14152p001-REV7- 136e.dgn	04210-0124	Parcel 2	Fee Simple	Commercial Close	N/A	12
136	Downtown Tunnel	14152p001-REV7- 136e.dgn	04210-0139	Parcel 2	Fee Simple	Commercial Close	N/A	12
137	Hurdman Station	14152p001-REV7-137b.dgn	04203-0707	Parcel 1	Fee Simple	29-Aug-14	N/A	
137	Hurdman Station	14152p001-REV7-137b.dgn	04203-0702	Parcel 2	Fee Simple	29-Aug-14	N/A	
137	Hurdman Station	14152p001-REV7-137b.dgn	04203-0706	Parcel 2	Fee Simple	29-Aug-14	N/A	
138	East Running Way	14152p001-REV7- 138b.dgn	04203-0245	Parcel 1	Fee Simple	10-Aug-15	N/A	15
138	East Running Way	14152p001-REV7- 138b.dgn	04256-0584	Parcel 2	Fee Simple	10-Aug-15	N/A	15
139	East Running Way	14152p001-REV7-139.dgn	04256-0287	Parcel 1	Temporary Construction Easement	2-Jul-15	34	
139	East Running Way	14152p001-REV7-139.dgn	04256-0287	Parcel 2	Temporary Construction Easement	2-Jul-15	34	
140	East Running Way	14152p001-REV7-140a.dgn	04256-0277	Parcel 1	Fee Simple	2-Dec-13	N/A	
140	East Running Way	14152p001-REV7-140a.dgn	04256-0278	Parcel 1	Fee Simple	2-Dec-13	N/A	
140	East Running Way	14152p001-REV7-140a.dgn	04256-0287	Parcel 1	Fee Simple	2-Dec-13	N/A	
142	East Running Way	14152p001-REV7-142a.dgn	04256-0272	Parcel 1	Fee Simple	2-Dec-13	N/A	20
142	East Running Way	14152p001-REV7-142a.dgn	04256-0272	Parcel 2	Fee Simple	2-Dec-13	N/A	5, 20
142	East Running Way	14152p001-REV7-142a.dgn	04256-0272	Parcel 3	Fee Simple	2-Dec-13	N/A	20
143	East Running Way Laurier	14152p001-REV7- 143a.dgn	04210-0142	Parcel 1	Fee Simple	29-May-13	N/A	
143	East Running Way Nicholas	14152p001-REV7- 143a.dgn	04125-0182	Parcel 1	Fee Simple	3-May-16	N/A	
143	East Running Way Nicholas	14152p001-REV7- 143a.dgn	04125-0200	Parcel 1	Fee Simple	29-May13	N/A	
143	East Running Way Nicholas	14152p001-REV7- 143a.dgn	04125-0198	Parcel 1	Fee Simple	3-May-16	N/A	
143	East Running Way Waller	14152p001-REV7- 143a.dgn	04125-0052	Parcel 1	Fee Simple	29-May13	N/A	
143	East Running Way	14152p001-REV7- 143a.dgn	04125-0084	Parcel 1	Fee Simple	3-May-16	N/A	

Lands Possession Date: Commercial Close								
No	**Project Sector**	**Property Request Plan No.**	**PIN**	**Parcel**	**Type of Interest**	**Commencement Date**	**Duration (Months)**	**Notes**
	Mann							
143	East Running Way Mann	14152p001-REV7- 143a.dgn	04125-0068	Parcel 1	Fee Simple	3-May-16	N/A	
145	East Running Way St. Laurent	14152p001-REV7-145b.dgn	04254-0082	Parcel 1	Temporary Subterranean Easement	28-Sep-15	32	
145	East Running Way St. Laurent	14152p001-REV7-145b.dgn	04254-0082	Parcel 2	Temporary Detour Easement	28-Sep-15	32	
146	East Running Way	14152p001-REV7- 146d.dgn	04264-0115	Parcel 1	Temporary Detour Easement	2-May-15	37	
146	East Running Way	14152p001-REV7- 146d.dgn	04264-0112	Parcel 2	Temporary Detour Easement	2-May-15	37	
146	East Running Way	14152p001-REV7- 146d.dgn	04264-0117	Parcel 2	Temporary Detour Easement	2-May-15	37	
146	East Running Way	14152p001-REV7-146d.dgn	04264-0118	Parcel 2	Temporary Detour Easement	2-May-15	37	
146	East Running Way	14152p001-REV7- 146d.dgn	04264-0136	Parcel 3	Fee Simple	2-May-15	N/A	
147	East Running Way	14152p001-REV7- 147b.dgn	04264-0025	Parcel 1	Fee Simple	10-Jul-15	N/A	
147	East Running Way	14152p001-REV7- 147b.dgn	04264-0435	Parcel 2	Fee Simple	10-Jul-15	N/A	
147	East Running Way	14152p001-REV7- 147b.dgn	04264-0161	Parcel 3	Fee Simple	10-Jul-15	N/A	
147	East Running Way	14152p001-REV7- 147b.dgn	04264-0177	Parcel 4	Fee Simple	10-Jul-15	N/A	
147	East Running Way	14152p001-REV7- 147b.dgn	04264-0177	Parcel 5	Temporary Construction Easement (Staging)	10-Jul-15	36	3
147	East Running Way	14152p001-REV7- 147b.dgn	04264-0161	Parcel 6	Permanent Easement	10-Jul-15	N/A	
147	East Running Way	14152p001-REV7- 147b.dgn	04264-0161	Parcel 7	Permanent Easement	10-Jul-15	N/A	
148	East Running Way	14152p001-REV7- 148a.dgn	04264-0180	Parcel 1	Fee Simple	10-Jul-15	N/A	
148	East Running Way	14152p001-REV7- 148a.dgn	04264-0047	Parcel 2	Fee Simple	10-Jul-15	N/A	
149	East Running Way	14152p001-REV7- 149e.dgn	04264-0080	Parcel 1	Fee Simple	10-Jul-15	N/A	
149	East Running Way	14152p001-REV7-149e.dgn	04264-0048	Parcel 1	Fee Simple	10-Jul-15	N/A	
149	East Running Way	14152p001-REV7-149e.dgn	04264-0198	Parcel 1	Fee Simple	10-Jul-15	N/A	

Lands
Possession Date: Commercial Close

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
149	East Running Way	14152p001-REV7- 149e.dgn	04363-0114	Parcel 1	Fee Simple	10-Jul-15	N/A	
149	East Running Way	14152p001-REV7- 149e.dgn	04363-0114	Parcel 2	Temporary Construction Easement	10-Jul-15	N/A	
149	East Running Way	14152p001-REV7- 149e.dgn	04264-0119	Parcel 1	Fee Simple	10-Jul-15	N/A	
149	East Running Way	14152p001-REV7- 149e.dgn	04264-0198	Parcel 3	Temporary Construction Easement	10-Jul-15	N/A	
149	East Running Way	14152p001-REV7- 149e.dgn	04264-0119	Parcel 5	Temporary Construction Easement (Staging)	10-Jul-15	N/A	3
149	East Running Way	14152p001-REV7- 149e.dgn	04363-0114	Parcel 5	Temporary Construction Easement (Staging)	10-Jul-15	N/A	3
150	East Running Way	14152p001-REV7- 150c.dgn	04204-0273	Parcel 1	Fee Simple	3-May-16	N/A	
150	East Running Way	14152p001-REV7- 150c.dgn	04204-0273	Parcel 2	Permanent (Utilities Easement)	3-May-16	N/A	
150	East Running Way	14152p001-REV7- 150c.dgn	04204-0247	Parcel 3	Temporary Construction Easement (Staging)	3-May-16	25	3
150	East Running Way	14152p001-REV7- 150c.dgn	04204-0249	Parcel 3	Temporary Construction Easement (Staging)	3-May-16	25	3
150	East Running Way	14152p001-REV7- 150c.dgn	04204-0233	Parcel 5	Fee Simple	3-May-16	N/A	
150	East Running Way	14152p001-REV7- 150c.dgn	04204-0233	Parcel 6	Temporary Construction Easement (Staging)	3-May-16	25	3
150	East Running Way	14152p001-REV7-150c.dgn	04204-0233	Parcel 7	Temporary Construction Easement	3-May-16	25	
150	East Running Way	14152p001-REV7- 150c.dgn	04204-0227	Parcel 8	Temporary Construction Easement	3-May-16	25	
150	East Running Way	14152p001-REV7- 150c.dgn	04204-0227	Parcel 9	Fee Simple	3-May-16	N/A	
150	East Running Way	14152p001-REV7- 150c.dgn	04203-0731	Parcel 10	Fee Simple	3-May-16	N/A	
151	West Running Way	14152p001-REV7- 151b.dgn	04097-0070	Parcel 1	Temporary Construction Easement (Staging)	29-Feb-16	27	3
151	West Running Way	14152p001-REV7- 151b.dgn	04097-0069	Parcel 1	Temporary Construction Easement (Staging)	29-Feb-16	27	3

Lands Possession Date: Commercial Close								
No	**Project Sector**	**Property Request Plan No.**	**PIN**	**Parcel**	**Type of Interest**	**Commencement Date**	**Duration (Months)**	**Notes**
155	West Running Way	14152p001-REV7-155b.dgn	04098-0008	Parcel 1	Permanent (Utilities Easement)	1-May-15	N/A	
155	West Running Way	14152p001-REV7-155b.dgn	04098-0011	Parcel 2	Permanent (Utilities Easement)	1-May-15	N/A	
156	West Running Way	14152p001-REV7-156a.dgn	04097-0160	Parcel 1	Temporary Construction Easement	12-May-15	36	
156	West Running Way	14152p001-REV7-156a.dgn	04097-0138	Parcel 2	Temporary Construction Easement	12-May-15	36	
164	West Running Way	14152p001-REV7-164.dgn	04205-0229	Parcel 1	Temporary Construction Easement	3-May-16	36	
208	West Running Way	14152p001-REV7-208c.dgn	04112-0005	Parcel 1	Fee Simple	29-May-13	N/A	20
208	West Running Way	14152p001-REV7-208c.dgn	04112-0019	Parcel 1	Permanent (Utilities Easement)	29-May-13	N/A	20
208	West Running Way	14152p001-REV7-208c.dgn	04112-0105	Parcel 1	Fee Simple	29-May-13	N/A	20
208	West Running Way	14152p001-REV7-208c.dgn	04112-0106	Parcel 1	Fee Simple	29-May-13	N/A	20
208	West Running Way	14152p001-REV7-208c.dgn	04112-0110	Parcel 1	Fee Simple	29-May-13	N/A	20
208	West Running Way	14152p001-REV7-208c.dgn	04112-0164	Parcel 1	Fee Simple	29-May-13	N/A	20
208	West Running Way	14152p001-REV7-208c.dgn	04112-0162	Parcel 1	Fee Simple	29-May-13	N/A	20
208	West Running Way	14152p001-REV7-208c.dgn	04112-0028	Parcel 1	Fee Simple	29-May-13	N/A	20
208	West Running Way	14152p001-REV7-208c.dgn	04112-0037	Parcel 1	Fee Simple	29-May-13	N/A	20
224	West Running Way	14152p001-REV7-224a.dgn	04097-0159	Parcel 1	Temporary Construction Easement (Detour)	12-May-15	36	
226	West Running Way	14152p001-REV7-226.dgn	04280-0034	Parcel 1	Temporary Construction Easement	15-Feb-13	62	2

After-Acquired Lands
Phase 1: After-Acquired Lands
Possession Date: April 1, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Real Property Interest	Commencement Date	Duration	Notes
100	Maintenance & Storage Yards	14152p001-REV7-100a.dgn	04256-0698	Parcel 1	Fee Simple	5-Apr-13	NA	20
100	Maintenance & Storage Yards	14152p001-REV7-100a.dgn	04256-0214	Parcel 1	Fee Simple	5-Apr-13	NA	20
100	Maintenance & Storage Yards	14152p001-REV7-100a.dgn	04256-0213	Parcel 1	Fee Simple	5-Apr-13	NA	20
100	Maintenance & Storage Yards	14152p001-REV7-100a.dgn	04256-0212	Parcel 1	Fee Simple	5-Apr-13	NA	20
100	Maintenance & Storage Yards	14152p001-REV7-100a.dgn	04256-0211	Parcel 1	Fee Simple	5-Apr-13	NA	20
100	Maintenance & Storage Yards	14152p001-REV7-100a.dgn	04256-0632	Parcel 1	Fee Simple	5-Apr-13	NA	20
100	Maintenance & Storage Yards	14152p001-REV7-100a.dgn	04256-0631	Parcel 1	Fee Simple	5-Apr-13	NA	20
100	Maintenance & Storage Yards	14152p001-REV7-100a.dgn	04256-0209	Parcel 1	Fee Simple	5-Apr-13	NA	20

After-Acquired Lands
Phase 2: After-Acquired Lands
Possession Date: April 15, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
39	East Running Way	14152p001-REV7-039c.dgn	04125-0001	Parcel 1	Fee Simple (Stratified)	29-May-13	N/A	17, 20
39	East Running Way	14152p001-REV7-039c.dgn	04125-0001	Parcel 2	Temporary Construction Easement	15-Apr-13	62	17, 20
39	East Running Way	14152p001-REV7-039c.dgn	04125-0001	Parcel 3	Temporary Construction Easement (Staging)	15-Apr-13	62	3, 17, 20
59	East Running Way	14152p001-REV7- 059e.dgn	04210-0159	Parcel 1	Temporary Detour Easement	23-Apr-13	62	
61	East Running Way	14152p001-REV7-061a.dgn	04125-0024	Parcel 1	Fee Simple	23-Apr-13	N/A	17
61	East Running Way	14152p001-REV7-061a.dgn	04125-0010	Parcel 2	Fee Simple	23-Apr-13	N/A	17
61	East Running Way	14152p001-REV7-061a.dgn	04125-0199	Parcel 3	Fee Simple	23-Apr-13	N/A	17
61	East Running Way	14152p001-REV7-061a.dgn	04125-0024	Parcel 4	Temporary Construction Easement	23-Apr-13	62	17
61	East Running Way	14152p001-REV7-061a.dgn	04125-0010	Parcel 5	Temporary Construction Easement	23-Apr-13	62	17
61	East Running Way	14152p001-REV7-061a.dgn	04125-0199	Parcel 6	Temporary Construction Easement	23-Apr-13	62	17
62	East Running Way	14152p001-REV7-062b.dgn	04125-0011	Parcel 1	Fee Simple	3-May-16	N/A	17, 20
62	East Running Way	14152p001-REV7-062b.dgn	04125-0011	Parcel 2	Temporary Construction Easement	12-Apr-16	27	17, 20
62	East Running Way	14152p001-REV7-062b.dgn	04125-0015	Parcel 3	Temporary Construction Easement	12-Apr-16	27	17, 20
62	East Running Way	14152p001-REV7-062b.dgn	04125-0008	Parcel 4	Temporary Construction Easement	12-Apr-16	27	17, 20
63	East Running Way	14152p001-REV7-063.dgn	04125-0013	Parcel 1	Fee Simple	3-May-16	N/A	17, 20
63	East Running Way	14152p001-REV7-063.dgn	04125-0012	Parcel 2	Fee Simple	3-May-16	N/A	17, 20
63	East Running Way	14152p001-REV7-063.dgn	04125-0012	Parcel 3	Fee Simple	3-May-16	N/A	17, 20
63	East Running Way	14152p001-REV7-063.dgn	04125-0012	Parcel 4	Permanent (Utilities Easement)	3-May-16	N/A	17, 20

After-Acquired Lands
Phase 2: After-Acquired Lands
Possession Date: April 15, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
63	East Running Way	14152p001-REV7-063.dgn	04125-0013	Parcel 5	Temporary Construction Easement	12-Apr-16	27	17, 20
63	East Running Way	14152p001-REV7-063.dgn	04125-0012	Parcel 6	Temporary Construction Easement	12-Apr-16	27	17, 20
63	East Running Way	14152p001-REV7-063.dgn	04125-0012	Parcel 7	Temporary Construction Easement	12-Apr-16	27	17, 20
152	East Running Way	14152p001-REV7-152.dgn	04096-0210	Parcel 1	Permanent Easement	29-Mar-16	N/A	
163	East Running Way	14152p001-REV7-163.dgn	04125-0154	Parcel 1	Temporary Construction Easement	24-Oct-13	36	17
166	East Running Way	14152p001-REV7-166.dgn	04203-0732	Parcel 1	Temporary Construction Easement	12-Apr-16	26	
170	Downtown Tunnel	14152p001-REV7-170d.dgn	04112-0209	Parcel 1	Fee Simple (Stratified)	15-Apr-13	N/A	
170	Downtown Tunnel	14152p001-REV7-170d.dgn	04112-0211	Parcel 1	Fee Simple (Stratified)	15-Apr-13	N/A	
170	Downtown Tunnel	14152p001-REV7-170d.dgn	04112-0213	Parcel 1	Fee Simple (Stratified)	15-Apr-13	N/A	
171	Downtown Tunnel	14152p001-REV7-171d.dgn	04112-0215	Parcel 1	Fee Simple (Stratified)	12-Nov-13	N/A	
172	Downtown Tunnel	14152p001-REV7-172d.dgn	04112-0217	Parcel 1	Fee Simple (Stratified)	12-Nov-13	N/A	

After-Acquired Lands
Phase 3: After-Acquired Lands
Possession Date: June 30, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0186	Parcel 1	Fee Simple	12-May-15	N/A	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0186	Parcel 2	Fee Simple	12-May-15	N/A	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0186	Parcel 3	Fee Simple	12-May-15	N/A	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0186	Parcel 4	Temporary Construction Easement	12-May-15	36	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0184	Parcel 5	Temporary Construction Easement	12-May-15	36	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0186	Parcel 6	Temporary Construction Easement	12-May-15	36	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0186	Parcel 7	Temporary Construction Easement (Detour)	12-May-15	36	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0186	Parcel 8	Temporary Construction Easement (Detour)	12-May-15	36	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0194	Parcel 9	Temporary Construction Easement (Detour)	12-May-15	36	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0188	Parcel 10	Temporary Construction Easement	12-May-15	36	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0188	Parcel 11	Fee Simple	12-May-15	N/A	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0184	Parcel 12	Fee Simple	12-May-15	N/A	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0188	Parcel 13	Temporary Construction Easement	12-May-15	36	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0186	Parcel 14	Temporary Construction Easement	12-May-15	36	6, 20, 21
2	West Running Way	14152p001-REV7- 002e.dgn	04097-0188	Parcel 15	Permanent (Utility Easement)	12-May-15	36	6, 20, 21
4	West Running Way	14152p001-REV7- 004c.dgn	04112-0011	Parcel 1	Fee Simple	30-Jun-13	N/A	6, 21
33	Downtown Tunnel	14152p001-REV7-033d.dgn	04116-0025	Parcel 1	Fee Simple (Stratified)	16-Apr-15	N/A	2, 21

After-Acquired Lands
Phase 3: After-Acquired Lands
Possession Date: June 30, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
34	Downtown Tunnel	14152p001-REV7- 034e.dgn	04116-0100	Parcel 1	99 Year Easement	16-Apr -15	N/A	6, 13, 21
41	East Running Way	14152p001-REV7-041b.dgn	04204-0232	Parcel 1	Fee Simple	3-May-16	N/A	9, 21
41	East Running Way	14152p001-REV7-041b.dgn	04204-0232	Parcel 2	Temporary Construction Easement (Detour)	12-Apr-16	25	9, 21
41	East Running Way	14152p001-REV7-041b.dgn	04204-0232	Parcel 3	Temporary Construction Easement	12-Apr-16	25	9, 21
42	East Running Way	14152p001-REV7-042.dgn	04203-0632	Parcel 1	Fee Simple	3-May-16	N/A	7
48	East Running Way	14152p001-REV7-048a.dgn	04264-0119	Parcel 1	Fee Simple	10-Jul-15	N/A	9,21
48	East Running Way	14152p001-REV7-048a.dgn	04264-0119	Parcel 2	Fee Simple	10-Jul-15	N/A	9, 21
49	East Running Way	14152p001-REV7-049.dgn	04264-0178	Parcel 1	Fee Simple	10-Jul-15	N/A	
74	Downtown Tunnel	14152p001-REV7 074f.dgn	04116-0094	Parcel 1	Fee Simple(Stratified)	16-Apr-15	N/A	2, 21
74	Downtown Tunnel	14152p001-REV7- 074f.dgn	04116-0098	Parcel 2	Fee Simple(Stratified)	16-Apr-15	N/A	2,21
74	Downtown Tunnel	14152p001-REV7- 074f.dgn	04116-0024	Parcel 3	Fee Simple(Stratified)	16-Apr-15	N/A	2, 21
74	Downtown Tunnel	14152p001-REV7 074f.dgn	04116-0094	Parcel 4	Fee Simple(Stratified)	16-Apr-15	N/A	2,21
75	Downtown Tunnel	14152p001-REV7- 075f.dgn	04116-0021	Parcel 1	(Stratified) 99 Year Easement	16-Apr-15	N/A	6,13, 21
75	Station/ Downtown Tunnel	14152p001-REV7- 075f.dgn	04280-0035	Parcel 2	(Stratified) 99 Year Easement	16-Apr-15	N/A	6,13, 21
76	Stations	14152p001-REV7- 076a.dgn	04097-0062	Parcel 1	Fee Simple	29-Feb-16	N/A	6, 21
76	Stations	14152p001-REV7- 076a.dgn	04097-0129	Parcel 2	Fee Simple	29-Feb-16	N/A	6, 21
76	West Running Way	14152p001-REV7- 076a.dgn	04097-0061	Parcel 3	Fee Simple	29-Feb-16	N/A	6, 21
76	West Running Way	14152p001-REV7- 076a.dgn	04097-0059	Parcel 4	Fee Simple	29-Feb-16	N/A	6, 21
76	West Running Way	14152p001-REV7- 076a.dgn	04097-0059	Parcel 5	Temporary Construction Easement	29-Feb-16	27	6, 21

After-Acquired Lands
Phase 3: After-Acquired Lands
Possession Date: June 30, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
76	West Running Way	14152p001-REV7- 076a.dgn	04097-0059	Parcel 6	Temporary Construction Easement	29-Feb-16	27	6, 21
76	West Running Way	14152p001-REV7- 076a.dgn	04097-0062	Parcel 7	Temporary Construction Easement	29-Feb-16	27	6, 21
78	Stations	14152p001-REV7-078b.dgn	04032-0236	Parcel 1	Fee Simple	26-May-16	N/A	2, 21
78	Stations	14152p001-REV7-078b.dgn	04032-0236	Parcel 2	Temporary Construction Easement	26-May-16	24	2,21
78	Stations	14152p001-REV7-078b.dgn	04032-0235	Parcel 3	Temporary Construction Easement	26-May-16	24	2,21
78	Stations	14152p001-REV7-078b.dgn	04032-0235	Parcel 4	Fee Simple	26-May-16	N/A	2,21
78	Stations	14152p001-REV7- 078bdgn	04032-0235	Parcel 5	Fee Simple	26-May-16	N/A	2,21
78	Stations	14152p001-REV7-078b.dgn	04032-0235	Parcel 6	Temporary Construction Easement	26-May-16	24	2,21
78	Stations	14152p001-REV7-078b.dgn	04032-0236	Parcel 7	Temporary Construction Easement	26-May-16	24	2,21
78	Stations	14152p001-REV7-078b.dgn	04032-0236	Parcel 8	Fee Simple	26-May-16	NA	2,21
79	East Running Way	14152p001-REV7-079.dgn	04204-0232	Parcel 1	Fee Simple	3-May-16	N/A	9, 21
79	East Running Way	14152p001-REV7-079.dgn	04204-0232	Parcel 2	Permanent (Utilities Easement)	3-May-16	N/A	8,9, 21
80	Hurdman Station	14152p001-REV7- 080c.dgn	04203-0633	Parcel 1	Fee Simple	29-Aug-14	N/A	6, 13, 15, 21
80	Hurdman Station	14152p001-REV7- 080c.dgn	04203-0633	Parcel 2	99 Year Easement	29-Aug-14	N/A	4, 6, 13, 15, 21
80	Hurdman Station	14152p001-REV7- 080c.dgn	04203-0633	Parcel 3	Permanent (Slope Easement)	29-Aug-14	N/A	4, 6, 15, 21
80	Hurdman Station	14152p001-REV7- 080c.dgn	04203-0633	Parcel 4	Permanent (Slope Easement)	29-Aug-14	N/A	4, 6, 15, 21
80	Hurdman Station	14152p001-REV7- 080c.dgn	04203-0633	Parcel 5	Temporary Construction Easement	29-Aug-14	45	6, 15, 21

After-Acquired Lands
Phase 3: After-Acquired Lands
Possession Date: June 30, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
80	Hurdman Station	14152p001-REV7- 080c.dgn	04203-0633	Parcel 6	Temporary Construction Easement	29-Aug-14	45	6, 13, 15, 21
80	Hurdman Station	14152p001-REV7- 080cdgn	04203-0633	Parcel 7	Temporary Construction Easement	29-Aug-14	45	6, 13, 15, 21
80	East Running Way	14152p001-REV7- 080c.dgn	04203-0633	Parcel 8	Temporary Construction Easement (Staging)	29-Aug-14	45	3, 6, 15, 21
80	East Running Way	14152p001-REV7- 080c.dgn	04203-0633	Parcel 9	99 Year Easement	29-Aug-14		6, 15, 21
82	East Running Way	14152p001-REV7-082b.dgn	04203-0246	Parcel 1	Fee Simple	10-Aug-15	N/A	25
82	East Running Way	14152p001-REV7-082b.dgn	04203-0246	Parcel 2	Temporary Construction Easement	10-Aug-15	33	25
83	East Running Way	14152p001-REV7-083b.dgn	04255-0001	Parcel 1	Fee Simple	2-Jul-15	N/A	9, 21
84	East Running Way	14152p001-REV7-084d.dgn	04256-0267	Parcel 1	Fee Simple	2-Jul-15	N/A	6, 21
84	East Running Way	14152p001-REV7-084d.dgn	04256-0267	Parcel 2	Fee Simple	2-Jul-15	N/A	6, 21
84	East Running Way	14152p001-REV7084d.dgn	04256-0267	Parcel 3	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 6, 21
84	East Running Way	14152p001-REV7-084d.dgn	04256-0267	Parcel 4	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 6, 21
84	East Running Way	14152p001-REV7084d.dgn	04256-0267	Parcel 5	Temporary Construction Easement	2-Jul-15	33	6, 21
84	East Running Way	14152p001-REV7-084d.dgn	04256-0267	Parcel 6	Fee Simple	1-Sep-13	N/A	6, 21
84	East Running Way	14152p001-REV7-084d.dgn	04256-0267	Parcel 7	Permanent (Utility Easement)	2-Jul-15	NA	3, 6, 21
84	East Running Way	14152p001-REV7-084d.dgn	04256-0267	Parcel 8	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0268	Parcel 1	Fee Simple	2-Jul-15	N/A	6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0268	Parcel 2	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 6, 21

After-Acquired Lands
Phase 3: After-Acquired Lands
Possession Date: June 30, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
86	Stations	14152p001-REV7- 086e.dgn	04256-0268	Parcel 3	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0268	Parcel 4	Temporary Construction Easement	2-Jul-15	33	6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0268	Parcel 5	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0270	Parcel 6	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0270	Parcel 7	Fee Simple	2-Jul-15	N/A	6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0269	Parcel 8	Fee Simple	2-Jul-15	N/A	6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0269	Parcel 9	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0269	Parcel 10	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0269	Parcel 11	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0269	Parcel 12	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0269	Parcel 13	Temporary Construction Easement	2-Jul-15	33	6, 21
86	Stations	14152p001-REV7- 086e.dgn	04256-0269	Parcel 14	Permanent (Utility Easement)	2-Jul-15	N/A	6, 21
87	East Running Way	14152p001-REV7-087b.dgn	04256-0281	Parcel 1	Fee Simple	2-Jul-15	N/A	6, 20, 21
88	East Running Way	14152p001-REV7-088b .dgn	04256-0280	Parcel 1	Fee Simple	2-Jul-15	N/A	6, 21
89	St.Laurent Station	14152p001-REV7-089d.dgn	04254-0083	Parcel 1	Fee Simple	22-Dec-15	N/A	9, 21
89	St.Laurent Station	14152p001-REV7-089d.dgn	04254-0083	Parcel 2	Fee Simple	22-Dec-15	N/A	9, 21
89	St.Laurent Station	14152p001-REV7-089d.dgn	04254-0083	Parcel 3	Temporary Construction Easement (Staging)	22-Dec-15	29	3, 9, 21

After-Acquired Lands
Phase 3: After-Acquired Lands
Possession Date: June 30, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
89	St.Laurent Station	14152p001-REV7-089d.dgn	04254-0083	Parcel 4	Temporary Construction Easement (Staging)	22-Dec-15	29	3, 9, 21
89	St.Laurent Station	14152p001-REV7-089d.dgn	04254-0083	Parcel 6	Fee Simple	22-Dec-15	29	9, 21
90	East Running Way	14152p001-REV7- 090c.dgn	04264-0119	Parcel 1	Fee Simple	10-Jul-15	N/A	9, 21
90	East Running Way	14152p001-REV7- 090c.dgn	04264-0119	Parcel 2	Temporary Construction Easement (Staging)	10-Jul-15	33	3, 9, 21
90	East Running Way	14152p001-REV7- 090c.dgn	04264-0119	Parcel 3	Temporary Construction Easement (Staging)	10-Jul-15	33	3, 9, 21
90	East Running Way	14152p001-REV7- 090c.dgn	04264-0119	Parcel 4	Temporary Construction Easement	10-Jul-15	33	9, 21
90	East Running Way	14152p001-REV7- 090c.dgn	04264-0119	Parcel 5	Permanent Easement	10-Jul-15	N/A	9, 21
90	East Running Way	14152p001-REV7- 090c.dgn	04264-0119	Parcel 6	Temporary Construction Easement	10-Jul-15	33	9, 21
94	Downtown Tunnel	14152p001-REV7-094k.dgn	04112-0038	Parcel 1	99 Year Easement (Stratified)	N/A	N/A	6, 13, 21
97	West Running Way	14152p001-REV7-097.dgn	04097-0130	Parcel 1	Temporary Construction Easement (Staging)	29-Feb-16	26	3, 6, 21
110	East Running Way	14152p001-REV7-110d.dgn	04255-0001	Parcel 1	Temporary Construction Easement	1-Sep-2013	33	9, 21
110	East Running Way	14152p001-REV7-110d.dgn	04255-0001	Parcel 2	Permanent (Utility Easement)	2-Jul-15	N/A	9, 21
110	East Running Way	14152p001-REV7-110d.dgn	04255-0001	Parcel 3	Temporary Construction Easement	2-Jul-15	33	9, 21
110	East Running Way	14152p001-REV7-110d.dgn	04255-0001	Parcel 4	Temporary Construction Easement	2-Jul-15	33	9, 21
112	Stations / West Running Way	14152p001-REV7- 112c.dgn	04097-0156	Parcel 1	Fee Simple	12-May-15	N/A	6, 21
112	Stations / West Running Way	14152p001-REV7- 112c.dgn	04097-0156	Parcel 2	Temporary Construction Easement	12-May-15	34	6, 21

After-Acquired Lands
Phase 3: After-Acquired Lands
Possession Date: June 30, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
112	Stations / West Running Way	14152p001-REV7- 112c.dgn	04097-0200	Parcel 3	Temporary Construction Easement	12-May-15	34	6, 21
112	Stations / West Running Way	14152p001-REV7- 112c.dgn	04097-0200	Parcel 4	Temporary Construction Easement	12-May-15	34	6, 21
112	Stations / West Running Way	14152p001-REV7- 112c.dgn	04097-0198	Parcel 5	Fee Simple	12-May-15	N/A	6, 21
112	Stations / West Running Way	14152p001-REV7- 112c.dgn	04097-0200	Parcel 6	Fee Simple	12-May-15	N/A	6, 21
112	Stations / West Running Way	14152p001-REV7- 112c.dgn	04097-0200	Parcel 7	Fee Simple	12-May-15	N/A	6, 21
112	Stations / West Running Way	14152p001-REV7- 112c.dgn	04097-0156	Parcel 8	Permanent (Utility Easement)	12-May-15	N/A	6, 21
112	Stations / West Running Way	14152p001-REV7- 112c.dgn	04097-0200	Parcel 9	Permanent (Utility Easement)	12-May-15	N/A	6, 21
113	West Running Way	14152p001-REV7-113.dgn	04097-0194	Parcel 1	Temporary Construction Easement	27-May-15	36	6, 21
113	West Running Way	14152p001-REV7-113.dgn	04097-0194	Parcel 2	Fee Simple	9-Jul-15	N/A	6, 21
113	West Running Way	14152p001-REV7-113.dgn	04097-0155	Parcel 3	Temporary Construction Easement	27-May-15	36	6, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0186	Parcel 1	Fee Simple	30-Jun-13	N/A	6, 20, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0186	Parcel 2	Fee Simple	30-Jun-13	N/A	6, 20, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0018	Parcel 3	Fee Simple	30-Jun-13	N/A	6, 20, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0184	Parcel 4	Fee Simple	30-Jun-13	N/A	6, 20, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0184	Parcel 5	Fee Simple	30-Jun-13	N/A	6, 20, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0184	Parcel 6	Fee Simple	30-Jun-13	N/A	6, 20, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0184	Parcel 7	Fee Simple	30-Jun-13	N/A	6, 20, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0184	Parcel 8	Temporary Construction Easement (Staging)	30-Jun-13	59	3, 6, 20, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0184	Parcel 9	Temporary Construction Easement (Staging)	30-Jun-13	59	3, 6, 20, 21

After-Acquired Lands
Phase 3: After-Acquired Lands
Possession Date: June 30, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
114	West Running Way	14152p001-REV7-114d.dgn	04112-0184	Parcel 10	Permanent (Utilities Easement)	30-Jun-13	N/A	6, 20, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0018	Parcel 11	Permanent (Utilities Easement)	30-Jun-13	N/A	6, 20, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0018	Parcel 12	Temporary Construction Easement	30-Jun-13	59	6, 20, 21
114	West Running Way	14152p001-REV7-114d.dgn	04112-0186	Parcel 13	Temporary Construction Easement	30-Jun-13	59	6, 20, 21
118	East Running Way	14152p001-REV7- 118c.dgn	04255-0001	Parcel 1	Fee Simple	10-Jul-15	N/A	9, 21
118	East Running Way	14152p001-REV7- 118c.dgn	04255-0001	Parcel 2	Temporary Construction Easement (Staging)	10-Jul-15	33	3, 9, 21
153	West Running Way	14152p001-REV7-153.dgn	04096-0211	Parcel 1	Temporary Construction Easement	27-May-15	34	6, 21
154	West Running Way	14152p001-REV7-154.dgn	04098-0007	Parcel 1	Fee Simple	27-May-15	N/A	6, 21
169	East Running Way	14152p001-REV7-169.dgn	04264-0197	Parcel 1	Temporary Construction Easement	10-Jul-15	33	
184	East Running Way	14152P001-REV7-184b.dgn	04363-0029	Parcel 1	Temporary Construction Easement	10-Jul-15	33	9, 21
184	East Running Way	14152P001-REV7-184b.dgn	04363-0029	Parcel 2	Temporary Construction Easement (Staging)	10-Jul-15	33	3, 9, 21
211	West Running Way	14152P001-REV7-211.dgn	04097-0196	Parcel 1	Temporary Construction Easement	12-May-15	36	6, 21
211	West Running Way	14152P001-REV7-211.dgn	04112-0182	Parcel 2	Temporary Construction Easement	12-May-15	36	6, 21
225	East Running Way	14152p001-REV7- 225a.dgn	04264-0119	Parcel 1	Fee Simple	10-Aug-15	N/A	9, 21
225	East Running Way	14152p001-REV7- 225a.dgn	04264-0119	Parcel 2	Temporary Construction Easement	10-Jul-15	33	9, 21

After-Acquired Lands
Phase 4: After-Acquired Lands
Possession Date: October 24, 2013.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
5	Downtown Tunnel	14152p001-REV7-005f.dgn	04112-0189	Parcel 1	Fee Simple (Stratified)	12-Nov-2013	N/A	
21	Downtown Tunnel	14152p001-REV7-021.dgn	04114-0364	Parcel 1	Temporary Construction Easement (Staging)	1-Nov-13	60	3
30	Downtown Tunnel	14152p001-REV7-030e.dgn	04115-0035	Parcel 1	Fee Simple (Stratified)	1-Nov-13	N/A	10
30	Downtown Tunnel	14152p001-REV7-030e.dgn	04115-0036	Parcel 2	Fee Simple(Stratified)	1-Nov-13	N/A	10
31	Downtown Tunnel	14152p001-REV7-031e.dgn	04115-0278	Parcel 1	99 Year Easement (Stratified)	1-Nov-13	N/A	6, 10, 13, 21
35	Downtown Tunnel	14152p001-REV7-035c.dgn	04210-0115	Parcel 1	Fee Simple(Stratified)	1-Nov-13	N/A	10
36	Downtown Tunnel	14152p001-REV7-036c.dgn	04210-0114	Parcel 1	Fee Simple(Stratified)	1-Nov-13	N/A	10
101	Downtown Tunnel	14152p001-REV7-101e.dgn	04210-0113	Parcel 1	Fee Simple(Stratified)	1-Nov-13	N/A	10
102	Downtown Tunnel	14152p001-REV7-102e.dgn	04210-0112	Parcel 1	Fee Simple(Stratified)	1-Nov-13	N/A	10
107	Downtown Tunnel	14152p001-REV7-107d.dgn	04210-0110	Parcel 1	Fee Simple (Stratified)	1-Nov-13	N/A	10
108	Downtown Tunnel	14152p001-REV7-108e.dgn	04210-1111	Parcel 1	Fee Simple (Stratified)	1-Nov-13	N/A	10
209	Downtown Tunnel	14152P001-REV7-209b.dgn	04115-0277	Parcel 1	99 Year Easement (stratified)	1-Nov-13	N/A	
246	Downtown West Station	14152p001-REV7-246c.dgn	04114-0022	Parcel 1	Temporary Construction Easement	1-Nov-13	48	

After-Acquired Lands
Phase 5: After-Acquired Lands
Possession Date: May 1, 2015.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
44	East Running Way	14152p001-REV7- 044c.dgn	04256-0693	Parcel 1	Fee Simple	2-Jul-15	N/A	21, 24
44	East Running Way	14152p001-REV7- 044c.dgn	04256-0693	Parcel 2	Temporary Construction Easement	2-Jul-15	34	21, 24
46	East Running Way	14152p001-REV7- 046d.dgn	04256-0693	Parcel 1	Fee Simple	2-Jul-15	N/A	21, 24
46	East Running Way	14152p001-REV7- 046d.dgn	04256-0693	Parcel 2	Fee Simple	2-Jul-15	N/A	21, 24
46	East Running Way	14152p001-REV7- 046d.dgn	04256-0693	Parcel 3	Temporary Construction Easement	2-Jul-15	24	21, 24
46	East Running Way	14152p001-REV7- 046d.dgn	04256-0693	Parcel 4	Temporary Construction Easement (Staging)	2-Jul-15	24	3,21, 24
46	East Running Way	14152p001-REV7- 046d.dgn	04256-0693	Parcel 5	Temporary Construction Easement (Staging)	2-Jul-15	24	3,21, 24
81	West Running Way	14152p001-REV7-081a.dgn	04112-0161	Parcel 1	Temporary Construction Easement	12-May-15	36	
81	West Running Way	14152p001-REV7-081a.dgn	04112-0167	Parcel 1	Temporary Construction Easement	12-May-15	36	
85	East Running Way	14152p001-REV7- 085f.dgn	04256-0693	Parcel 1	Fee Simple (Stratified)	N/A	N/A	21, 24
85	East Running Way	14152p001-REV7- 085f.dgn	04256-0693	Parcel 2	Fee Simple (Stratified)	N/A	N/A	21, 24
85	East Running Way	14152p001-REV7- 085f.dgn	04256-0693	Parcel 3	Temporary Construction Easement (Staging)	2-Jul-15	33	3, 21,24
85	East Running Way	14152p001-REV7- 085f.dgn	04256-0693	Parcel 4	Temporary Construction Easement (Staging)	2-Jul-15	33	3,21, 24
85	East Running Way	14152p001-REV7- 085f.dgn	04256-0693	Parcel 5	Temporary Construction Easement (Staging)	2-Jul-15	33	3,21, 24
85	East Running Way	14152p001-REV7- 085f.dgn	04256-0693	Parcel 6	Temporary Construction Easement	2-Jul-15	33	21, 24
150	East Running Way	14152p001-REV7- 150c.dgn	04204-0233	Parcel 4	Temporary Construction Easement (Staging)	12-Apr-16	26	3

After-Acquired Lands
Phase 5: After-Acquired Lands
Possession Date: May 1, 2015.

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
168	East Running Way	14152p001-REV7-168b.dgn	04264-0685	Parcel 1	Temporary Construction Easement	2-Jul-15	33	
168	East Running Way	14152p001-REV7-168b.dgn	04264-0685	Parcel 2	Temporary Construction Easement	2-Jul-15	33	
168	East Running Way	14152p001-REV7-168b.dgn	04264-0195	Parcel 3	Temporary Construction Easement	2-Jul-15	33	
227	West Running Way	14152p001-REV7-227.dgn	04098-0005	Parcel 1	Temporary Construction Easement	27-May-15	34	

Phase 6: After-Acquired Lands – Additional Real Property Interests
Possession Date: April 15, 2014

2. Additional Real Property Interests

The following provisions apply to any Real Property Interest to be included in this Phase 6: After-Acquired Lands – Additional Real Property Interests (an "**Additional Real Property Interest**"):

1. Notwithstanding anything to the contrary in the Project Agreement, the City's failure to acquire any Additional Real Property Interest on or prior to the target possession date identified for Phase 6 After-Acquired Lands shall not constitute a Delay Event, a Compensation Event, a Relief Event or a City Event of Default under the Project Agreement;

2. Additional Real Property Interests subject to Note 19 of Section 3 "Special Limitations" to this Real Property Schedule are located within Crown Land. The City's obligations with respect to the acquisition of any such Additional Real Property Interest shall be limited to using commercially reasonable efforts to negotiate such acquisition and the City shall be entitled to abandon such negotiation at any time and in its Discretion, in which case the Real Property Interest will not form part of the licenses to be granted to Project Co. in accordance with Section 14 of the Project Agreement.;

3. Project Co shall be responsible for all costs and expenses associated with the City's acquisition of any Additional Real Property Interest including legal costs, administrative costs, the market value of the Additional Real Property Interest, disturbance damages, injurious affection and any and all compensation payable under the *Expropriations Act*, R.S.O. 1990, c. E. 26, if applicable, and the City shall be entitled, in accordance with Section 34.14 of the Project Agreement, to set off any such costs and expenses against any amounts otherwise due to Project Co pursuant to the terms of this Project Agreement; and,

4. For the sake of clarity, the provisions set out immediately above under the heading "Additional Real Property Interests" shall only apply to Phase 6: After Acquired Lands – Additional Real Property Interests and shall not apply to any other Lands currently set out in this Real Property Schedule nor to future Lands that may be added to this Real Property Schedule unless specifically stated herein.

5.

After-Acquired Lands
Phase 6: After-Acquired Lands
Possession Date: April 15, 2014

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
001	West Running Way	14152p001-REV7-001b.dgn	04097-0112	Parcel 5	Temporary Construction Easement	15-Apr-14	42	
001	West Running Way	14152p001-REV7-001b.dgn	04097-0113	Parcel 5	Temporary Construction Easement	15-Apr-14	42	
002	West Running Way	14152p001-REV7-002d.dgn	04097-0186	Parcel 16	Temporary Construction Easement	30-Jun-14	42	6, 19, 20, 21
004	West Running Way	14152p001-REV7-004c.dgn	04112-0011	Parcel 2	Temporary Construction Easement	30-Jun-14	42	6,19, 21
005	Downtown Tunnel	14152p001-REV7- 005f.dgn	04112-0189	Parcel 2	Fee Simple (Stratified)	12-Nov-13	N/A	26
44	East Running Way	14152p001-REV7-044c.dgn	04256-0693	Parcel 3	Temporary Construction Easement	2-Jul-15	34	21, 24
59	East Running Way	14152p001-REV7-059e.dgn	04210-0159	Parcel 2	Temporary Construction Easement (Detour)	23-Apr13	60	26
59	East Running Way	14152p001-REV7-059e.dgn	04210-0159	Parcel 3	Temporary Construction Easement (Detour)	23-Apr-13	60	26
76	West Running Way	14152p001-REV7-076a.dgn	04097-0059	Parcel 8	Temporary Construction Easement	30-Jun-14	24	6, 19, 21
82	East Running Way	14152p001-REV7-082b.dgn	04203-0246	Parcel 3	Temporary Construction Easement	30-Jun-14	36	25
89	St.Laurent Station	14152p001-REV7-089c.dgn	04254-0083	Parcel 5	Temporary Construction Easement	30-Jun-14	24	9, 19, 21
90	East Running Way	14152p001-REV7-090b.dgn	04264-0119	Parcel 7	Temporary Construction Easement	30-Jun-14	24	9,19, 21
127	West Running Way	14152p001-REV7-127c.dgn	04096-0146	Parcel 3	Temporary Construction Easement	15-Apr-14	48	20
135	Downtown Tunnel	14152p001-REV7- 135g.dgn	04112-0037	Parcel 6	Fee Simple (Stratified)	29-May-13	59	18,26
138	East Running Way	14152p001-REV7-138b.dgn	04203-0245	Parcel 3	Temporary Construction Easement	15-Apr-14	48	15

After-Acquired Lands
Phase 6: After-Acquired Lands
Possession Date: April 15, 2014

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Commencement Date	Duration (Months)	Notes
146	East Running Way	14152p001-REV7-146c.dgn	04264-0136	Parcel 4	Temporary Construction Easement	15-Apr-14	42	
148	East Running Way	14152p001-REV7-148a.dgn	04264-0182	Parcel 3	Temporary Construction Easement	10-Aug-15	33	
148	East Running Way	14152p001-REV7-148a.dgn	04264-0180	Parcel 4	Temporary Construction Easement	10-Aug-15	33	
149	East Running Way	14152p001-REV7-149g.dgn	04264-0119	Parcel 4	Fee Simple	N/A	N/A	
225	East Running Way	14152p001-REV7-225a.dgn	04264-0119	Parcel 3	Temporary Construction Easement	10-Jul-15	33	9, 19, 21
225	East Running Way	14152p001-REV7-225a.dgn	04264-0119	Parcel 4	Temporary Construction Easement	10-Jul-15	33	9, 19, 21
243	East Running Way	14152p001-REV7-243.dgn	04264-0441	Parcel 1	Temporary Construction Easement	15-Apr-14	42	
244	East Running Way	14152p001-REV7-244a.dgn	04264-0683	Parcel 1	Temporary Construction Easement	15-Apr-14	42	
244	East Running Way	14152p001-REV7-244a.dgn	04264-0440	Parcel 2	Temporary Construction Easement	15-Apr-14	42	
094	Downtown Tunnel	14152p001-REV7- 094k.dgn	04112-0038	Parcel 2	Fee Simple	12-Nov-13		13, 19, 21,26

After-Acquired Lands
Phase 7: After-Acquired Lands

No	Project Sector	Property Request Plan No.	PIN	Parcel	Type of Interest	Possession Date	Duration (Months)	Notes
37	Downtown Tunnel	14152p001-REV7-037c.dgn	15468-0001	Parcel 1	Temporary Construction Easement (Stratified)	1-Mar-14	26	23
64	Downtown Tunnel (Integrated Station Rideau)	14152p001-REV7-064b.dgn	04116-0092		To be determined	1-Mar-14	N/A	22, 23
64	Downtown Tunnel (Integrated Station Rideau)	14152p001-REV7-064b.dgn	04116-0005		To be determined	1-Mar-14	N/A	22, 23
159	Downtown Tunnel	14152p001-REV7-159a.dgn	15417-0000	Parcel 1	Temporary Construction Easement	1-Feb-14	48	23
160	Downtown Tunnel (Integrated Station Downtown East)	14152p001-REV7-160b.dgn	04115-0050	Parcel 1	Temporary Construction Easement	1-Feb-14	48	23
160	Downtown Tunnel (Integrated Station Downtown East)	14152p001-REV7-160b.dgn	04115-0050	Parcel 2	Temporary Construction Easement (Stratified)	1-Feb-14	48	23
245	Downtown Tunnel (Integrated Station Rideau)	14152p001-REV7-245a.dgn	04215-0175		To be determined	1-Jun-14	N/A	22, 23
251	East Running Way	14152p001-REV7-251.dgn	04256-0693	Parcel 1	Fee Simple	1-Sept-13	N/A	23, 24

3. Special Limitations

The following notes correspond to the numbers shown in the "Notes" column of the Property Tables:

1. Ownership of these parcels may be transferred to the National Capital Commission following Final Completion and as a result, no permanent component of the System may be constructed on these parcels.

2. May be subject to additional terms and conditions imposed by Public Works and Government Services Canada.

3. Only those Temporary Construction Easements designated as "Temporary Construction Easement (Staging)" may be used for construction staging purposes. All Temporary Construction Easements (Staging) will be subject to standard terms and conditions.

4. Those permanent Real Property Interests designated as "Permanent (Slope Easement)" will be subject to standard terms and conditions including, inter alia, provisions governing the replacement of slopes by retaining walls to facilitate future development of adjacent property.

5. Subject to a crossing agreement with Canadian National Railway Company, Canadian Pacific Limited and VIA Rail Canada Inc.

6. Subject to National Capital Commission standard terms and conditions for licenses of occupation during construction.

7. Subject to terms and conditions of a licence of occupation granted by the Ontario Ministry of Natural Resources.

8. Subject to terms and conditions of a storm drain easement in favour of the Ontario Ministry of Transportation.

9. Subject to terms and conditions imposed by the Ontario Ministry of Transportation.

10. INTENTIONALLY DELETED.

11. INTENTIONALLY DELETED.

12. Temporary Construction Easements to be supplied above stratified permanent Real Property Interest during construction.

13. National Interest Land Mass permanent interest to be in the form of a long-term lease or easement subject to National Capital Commission standard terms and conditions.

14. INTENTIONALLY DELETED.

15. Uninterrupted access (twenty four (24) hours a day, seven (7) days a week) to the City's pumping station located on property described in PIN 04203-0245 and identified on Property Request Plan No. 14152p001-Rev7-138a.dgn must be maintained.

16. Real Property Interest to be used in connection with construction of the Coventry pedestrian bridge described in Schedule 15-2, Part 1, Article 32 of the Project Agreement.

17. Real Property Interest extends only to within one hundred and fifty millimetres (150mm) from any building structure or façade except for those areas required to complete the works described in Schedule 15-2, Part 5, Article 1, Section 1.9 of the Project Agreement. Building overlay included in the Property Request Plan suggests approximate extent of building envelope only. The City makes no representation as to the accuracy or completeness of building overlays included in Property Request Plans.

18. Upper Limit of Temporary Construction Easement (Stratified) to commence at a depth which is at least 2 metres (2m) below the lower limit of any existing structure or building.

19. Real Property Interest is located within Crown Land.

20. Real Property Interest may also be required to support the construction, installation, use or maintenance of hydro-electric infrastructure and, as a result, use of the Real Property Interest may require coordination with the utility provider. Refer to the Hydro Easement Plans included in the Background Information for details of the hydro-electric utility provider's property requirements.

21. The type of interest indicated under the column for 'Type of Interest' is subject to change and may be different than what is currently set out therein. Notwithstanding that the type of interest may change, if the interest indicated is a type of permanent interest as set out in Section 4 (Definitions) below, Project Co. may construct permanent infrastructure on such lands notwithstanding the type of permanent interest that will ultimately be conveyed.

22. The type of real property interest referred to in the column 'Type of Interest' as well as the area, scope and extent of Real Property required has not yet been determined.

23. Phase 7: After-Acquired Lands is a category of land based on all different PRP delivery dates in which the possession date is the commencement date.

24. Subject to terms and conditions imposed by VIA Rail Canada Inc.

25. Subject to terms and conditions imposed by Canadian National Railway Company

26. The Commencement Date occurs before the Possession Date, therefore the Commencement Date shall be deemed to be the Possession Date in respect of this Additional Real Property Interest. Notwithstanding the foregoing, all of the other provisions in respect of Phase 6: After-Acquired Lands – Additional Real Property Interests shall apply.

4. Definitions

In this Real Property Schedule, the following definitions apply in respect of the terms used in the 'Type of Interest' column:

Permanent Interests:

"**Fee Simple**" means all rights of ownership of the Real Property.

"**Permanent Easement**" means the rights to use the Real Property for a specific purpose such as slope, utility, drainage, access, etc. Typically, no duration but it can be specified that the underlying interest in the property remains with the original owner and at such time that the specified use is no longer to be used the acquired rights are relinquished to the original owner. Permanent Easement includes:

a) "**Permanent (Utilities Easement)**" and "**Permanent (Utility Easement)**" which is a Permanent Easement for a utility or utilities; and

b) "**Permanent (Slope Easement)**" which is a Permanent Easement for the purpose of slope as referred to in note 4 above.

"**99 Year Easement**" means the rights of ownership of the Real Property for 99 years.

"**Stratified**" means the property rights are to specified vertical limits as shown on the applicable PRP and can be combined with other property interests such as Fee Simple or Permanent Easement by way of an example.

Temporary Interests

"**Temporary Easement**" means the rights to use the Real Property for a specific purpose for a specific duration after which the acquired rights are relinquished to the original owner. Specific purposes can be construction, detour, staging and laydown, etc. Temporary Easement includes:

a) "**Temporary Construction Easement**" which is a Temporary Easement for construction purposes;

b) "**Temporary Construction Easement (Staging)**" which is a Temporary Easement used for staging in connection with construction in accordance with note 3 above;

c) "**Temporary Detour Easement**" or "**Temporary Construction Easement (Detour)**" which is a Temporary Easement used for vehicular detour purposes; and

d) "**Temporary Subterranean Easement**" which is a Temporary Easement which is Stratified below ground level.

"**Stratified**" means the property rights are to specified vertical limits as shown on the applicable PRP and can be combined with other property interests such as a Temporary Construction Easement by way of an example.

5. Stage 2 Lands

The Stage 2 West Lands shall comprise those parcels of land indicated with "SI" (being "System Infrastructure Lands" in the DB Co Works Agreement) in the tables headed "CONFEDERATION LINE WEST" in section 6 of Appendix 2 of this Schedule 1, save to the extent that the City confirms to Project Co prior to the Stage 2 West Revenue Service Availability Date that any such parcels of land are not required to be part of the Stage 2 West Lands for the purposes of this Agreement (provided that the City may not remove any such parcels where to do so would adversely affect the delivery by Project Co of the Project Scope).

The Stage 2 East Lands shall comprise those parcels of land indicated with "SI" (being "System Infrastructure Lands" in the DB Co Works Agreement) in the tables headed "CONFEDERATION LINE EAST" in section 6 of Appendix 2 of this Schedule 1, save to the extent that the City confirms to Project Co prior to the Stage 2 West Revenue Service Availability Date that any such parcels of land are not required to be part of the Stage 2 East Lands for the purposes of this Agreement (provided that the City may not remove any such parcels where to do so would adversely affect the delivery by Project Co of the Project Scope).

The tables referred to in the previous two paragraphs are referred to as the "Stage 2 Lands Tables".

Without prejudice to Project Co's rights under Section 27.4(a), Project Co's Licence for the Stage 2 Lands shall be subject to the restrictions, qualifications and requirements contained in the Stage 2 Lands Tables, to the extent such restrictions, qualifications and requirements continue to apply to those Lands following the Stage 2 West Substantial Completion Date (in respect of the Stage 2 West Lands) or the Stage 2 East Substantial Completion Date (in respect of the Stage 2 East Lands).

In addition, Project Co acknowledges:

(1) some parcels comprising part of the Stage 2 Lands are noted as "Stratified Parcels" in the Stage 2 Lands Tables where the vertical limits of the parcel will be limited to the extent of the System Infrastructure located within such parcel. Without limiting the generality of provisions of the Project Agreement confirming the non-exclusive nature of the licence granted to Project Co by the City with respect to the Stage 2 Lands and any restrictions or protections for Project Co in the Project Agreement in relation to such use, the use of Stratified Parcels will be subject to the reservation of rights in favour of the City and/or third parties with an interest in infrastructure located above or below such parcels, including but not limited to rights of access for purposes of maintaining, repairing and replacing such infrastructure; and

(2) in the course of carrying out the Maintenance Services, Project Co shall be deemed to have taken into account any rights, stratification or use of the Site outside of the Stratified Parcels that is reasonably foreseeable as at the date of the Project Agreement based on the information available to Project Co in the Output Specifications.

6. System Infrastructure Lands

Set out below is an extract from Schedule 20 to the DB Co Works Agreement. Without prejudice to Project Co's rights under Section 27.4(a) and the Stage 2 Interface and Design Management Variation which shall apply to any changes, the Stage 2 Lands Tables shall be adjusted to reflect any subsequent changes to the tables of Lands applicable under Schedule 20 of the DB Co Works Agreement, to the extent the Permitted Use for such Lands are (or will be) marked as "SI" (being "System Infrastructure Lands" in the DB Co Works Agreement), including by way of any Additional Property Interests (as referred to in Section 8.2 of Schedule 20 of the DB Co Works Agreement).

The Parties acknowledge that Project Co may, under the terms of the Stage 2 Interface and Design Management Variation, request that certain Additional Property Interests (or other property interests) should be added to the scope of the licence to be made available to Project Co under Section 14.1 to reflect the development of the design of the DB Co Works in the context of Project Co's reasonable expectation for suitable access for efficient maintenance of the Stage 2 System by Project Co in accordance with this Project Agreement. Any such interests that are agreed or determined to be provided, and which are not already covered within the Stage 2 Lands Tables as "System Infrastructure Lands", shall be added to the tables herein and noted as "Access Lands", and noting any applicable terms to which such rights of access may be subject.

Key to "Permitted Use" column:
SI: System Infrastructure Lands. Note that to the extent any such parcels were highlighted in Schedule 20 of the DB Co Works Agreement as also being permitted for New Municipal Infrastructure (NMI) or New MTO Infrastructure (NMTOI), it is envisaged that the NMI and NMTOI components will be removed from the relevant plots at the point the relevant areas are handed over to the relevant authorities as envisaged by the DB Co Works Agreement, and accordingly the boundaries of the remaining System Infrastructure Lands within such plots will be clarified during the design development of the DB Co Works.
ACC: Access Lands (if required to be added).

For the purposes of this Section 6, the following terms have the following meanings. Any capitalised terms not defined in this Section 6 shall have the meaning given to them in the Project Agreement.

(a) **"Additional Property Interest"** includes any additional parcel of land not forming part of the Lands, the expansion or alteration of any boundary of any parcel of land forming part of the Lands, the extension of any term of use of any parcel of

forming part of the Lands and the inclusion of additional Permitted Uses for any parcel of land forming part of the Lands listed below unless and until such parcel, extension, extended term or additional Permitted Use becomes part of the Lands and is included in the grant of the non-exclusive licence described in Section 16.1 of the Project Agreement in accordance with Section 16.7 of the Project Agreement;

(b) "**Algonquin College Terms**" designates property, the use of which is subject to the terms and conditions of the agreement between the City and Algonquin College a copy of which is located in a file folder titled "Agreements" and located in the Data Room;

(c) "**City Road Allowance Lands**" means lands forming part of a municipal road having the status of a highway pursuant to Section 26 of the *Municipal Act, 2001* R.S.O. c.25. Within the tables below, property comprising City Road Allowance Lands are designated "**ROW**" in the column marked "Restrictions and Requirements";

(d) "**Construction Period**" means that period of time commencing on Financial Close under the DB Co Works Agreement and ending on the earlier of (i) the Termination Date of the DB Co Works Agreement, or (ii) the latest Final Completion Date under the DB Co Works Agreement.

(e) "**Existing LRT Infrastructure Lands Constraints**" designates property which includes, abuts or is in close proximity to Existing System Infrastructure Lands as defined in the DB Co Works Agreement where coordination with RTG and/or the RTG Parties may be required in accordance with the Interface Agreement and the terms of this Project Agreement;

(f) "**Highway Corridor Lands**" means lands forming part of the controlled access highways known as Highway 417 and Highway 416 and owned by the MTO which are designated "**HCL**" in the column marked "Restrictions and Requirements" in the tables below;

(g) **"HONI Terms**" designates property forming part of an electricity transmission or distribution corridor. The use of such lands may be subject to approvals pursuant to the provincial secondary land use program jointly administered by Infrastructure Ontario and Hydro One Networks Inc. and is also subject to the terms and conditions of a Standard Agreement comprising a grant of an easement or licence, by Her Majesty the Queen in right of Ontario as represented by the Ontario Infrastructure Lands Corporation to the City, to construct, use and maintain infrastructure within lands forming part of an electricity transmission or distribution corridor or to make temporary use of such lands for the purpose stipulated in the grant of easement or licence;

(h) "**MTO Terms**" designates property, the use of which is subject to the terms and conditions of a Standard Agreement comprising an encroachment permit granted by the MTO to the City with respect Highway Corridor Lands;

(i) "**Murlee Holdings Terms"** designates property, the use of which is subject to the terms and conditions of the agreement between the City and Murlee Holdings Limited, a copy of which is located in a file folder titled "Agreements" and located in the Data Room;

(j) "**NCC Terms & Conditions**" designates property, the use of which is subject to the terms and conditions of agreements between the City and the National Capital Commission ("**NCC**") copies of which are located in a file folder titled "Agreements" and located in the Data Room as well as the conditions of the Approvals in Principle issued by the National Capital Commission and any Federal Land Use Design and Transaction Approvals granted by the National Capital Commission with respect to the Project or any part thereof;

(k) "**Parkland Improvement Works**" designates property to be improved with New Municipal Infrastructure as set out in the Works Schedule to the DB Co Works Agreement, being constructed by DB Co for the benefit of the National Capital Commission in accordance with Schedule 15 of the DB Co Works Agreement and the NCC Terms and Conditions;

(l) **"Permitted Use"** or "**Permitted Uses**" means the use(s) which may be put to each parcel forming part of the Lands as designated in the column marked "Permitted Use" in the tables below, being one or more of the following:

(i) "**New MTO Infrastructure Lands**" means property forming part of the Lands and designated "**NMTOI**" in the column marked "Permitted Use" in the Lands Table in Schedule 20 of the DB Co Works Agreement representing the location where New MTO Infrastructure is to be constructed or installed in accordance with Schedule 15 of the DB Co Works Agreement.

(ii) "**New Municipal Infrastructure Lands**" means property forming part of the Lands and designated "**NMI**" in the column marked "Permitted Use" in the Lands Table in Schedule 20 of the DB Co Works Agreement representing the location where New Municipal Infrastructure is to be constructed or installed in accordance with Schedule 15 of the DB Co Works Agreement;

(iii) "**System Infrastructure Lands**" means property forming part of the Lands and designated "**SI**" in the column marked "Permitted Use" in the tables below and/or the Lands Table in Schedule 20 of the DB Co Works Agreement representing the location where System Infrastructure is located or is to be constructed or installed in accordance with Schedule 15 of the DB Co Works Agreement;

(iv) "**Temporary Access Lands**" means property forming part of the Lands and designated "**TA**" in the column marked "Permitted Use" in the Lands Table in Schedule 20 of the DB Co Works Agreement which may be used temporarily for

the sole purpose of providing non-exclusive pedestrian and/or vehicular access to other property forming part of the Lands;

(v) "**Temporary Mobilization Lands**" means property forming part of the Lands and designated "**TM**" in the column marked "Permitted Use" in the Lands Table in Schedule 20 of the DB Co Works Agreement which may be used as part of a mobilization site or staging area, being a designated area where personnel, equipment, supplies, site offices and other facilities required to undertake the Construction Activities are established and maintained in accordance with the provisions of Schedule 15 of the DB Co Works Agreement relating to mobilization sites; and

(vi) "**Temporary Construction Lands**" means property forming part of the Lands and designated "**TC**" in the column marked "Permitted Use" in the Lands Table in Schedule 20 of the DB Co Works Agreement which may be used temporarily in connection with the construction of System Infrastructure, New Municipal Infrastructure, and/or New MTO Infrastructure but which may not be used as part of a mobilization site or staging area other than for short term storage of mobile equipment and material required for construction in close proximity to the relevant parcel of Temporary Construction Lands.

(m) "**PWGSC Terms**" designates property, the use of which is subject to the terms and conditions of the agreement between the City and Her Majesty the Queen as represented by Public Works and Government Services Canada a copy of which is located in a file folder titled "Agreements" and located in the Data Room.

(n) "**Remedial Action Plan**" is a document that defines the purpose and specific objectives of a remediation, documents the evaluation of remedial options, and specifies how the remediation will be carried out and how the success of the remediation actions will be validated.

(o) "**Report Card Parcel**" means any parcel designated as a "Report Card Parcel" in the tables below and which are subject to the protocol set out in Section 6 of Schedule 20 to the DB Co Works Agreement.

(p) "**Standard Agreements**" means agreement(s) on substantively the same terms and conditions as existing easements, licenses or similar agreements that have been entered into by the City and that is provided as Background Information prior to Financial Close or are currently contemplated in the "Restrictions and Requirements" column of the tables below, and copies of which are included in the folder titled "Agreements" in the Data Room.

(q) "**Stratified Parcel**" means property having both horizontal and vertical boundaries.

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
18689-PRP_024d	1	SI	Parcel is a Stratified Parcel where pedestrian bridge crosses bus layby. Area below pedestrian bridge to remain open for bus circulation in accordance with Schedule 34 – Mobility Matters.
18689-PRP_026b	1	SI	
18689-PRP_027b	1	SI	
18689-PRP_028b	1	SI	
18689-PRP_028b	2	SI	
18689-PRP_030b	1	SI	
N/A Refer to description of leased premises contained in 2670 Queensview Lease	N/A	In accordance with 2670 Queensview Lease	2670 Queensview Lease
18689-PRP_031e	1	SI	
18689-PRP_031e	2	SI	SI limited to emergency access and egress.
18689-PRP_032b	2	SI	Report Card Parcel
18689-PRP_035f	2	SI	Parts of Parcel 2, being the portions comprised of Parts of PIN 03969-0155, PIN 03970-0102, PIN 03970-0106, PIN 03970-0112, PIN 03970-0113, PIN 03970-0123, constitute City Road Allowance Lands and are subject to additional Restrictions and Requirements including with respect to commencement date and duration

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			Parcel is a Stratified Parcel for SI. Refer to Schedule 15-2 for minimum depth.
18689-PRP_035f	5	SI	Part of Parcel 5, being Part of PIN 03970-0123, constitutes City Road Allowance Lands (ROW) and is subject to additional Restrictions and Requirements including with respect to commencement date and duration
18689-PRP_039e	3	SI	Part of Parcel 3, being parts of PINs 04751-0147 and 04751-0152 , constitute City Road Allowance Lands and are subject to additional Restrictions and Requirements including with respect to commencement date and duration Parcel is a Stratified Parcel for SI. Refer to Schedule 15-2 for minimum depth.
18689-PRP_041f	1	SI	Parts of Parcel 1, being the portions comprised of Parts of PIN 04018-0162 and PIN 04019-0136, constitute City Road Allowance Lands and are subject to additional Restrictions and Requirements including with respect to commencement date and duration
18689-PRP_042d	1	SI	Temporary site office permitted
18689-PRP_043b	1	SI	
18689-PRP_044c	1	SI	Existing LRT Infrastructure Lands Constraints. Report Card Parcel
18689-PRP_044c	2	SI	Report Card Parcel

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			Existing LRT Infrastructure Lands Constraints.
18689-PRP_044c	3	SI	Existing LRT Infrastructure Lands Constraints. Report Card Parcel
18689-PRP_045f	1	SI	Report Card Parcel Part of Parcel 1 is a Stratified Parcel commencing at the tunnel portal and ending where the station will be constructed. Part of Parcel 1 is located within the access road for the bus station terminal. Algonquin College Terms
18689-PRP_045f	9	SI	Report Card Parcel Algonquin College Terms
18689-PRP_045f	10	SI	Report Card Parcel Algonquin College Terms
18689-PRP_103	1	SI	Report Card Parcel
18689-PRP_025c	1	SI	ROW Parcel is a Stratified Parcel for SI commencing at the underside of the Richmond Road grade separation.
18689-PRP_032b	1	SI	ROW

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			Parcel to become a Stratified Parcel commencing at the upper limit of the tunnel box following reinstatement of travelled portion of City Right of Way Lands.
18689-PRP_033e	1	SI	ROW
18689-PRP_033e	3	SI	ROW
18689-PRP_033e	4	SI	ROW
18689-PRP_034e	1	SI	ROW, Report Card Parcel Parcel to become a Stratified Parcel commencing at the upper limit of the tunnel box following reinstatement of travelled portion of City Right of Way Lands.
18689-PRP_034e	3	SI	ROW , Report Card Parcel
18689-PRP_034e	4	SI	ROW, Report Card Parcel
18689-PRP_039e	1	SI	ROW, Report Card Parcel
18689-PRP_039e	2	SI	ROW, Report Card Parcel
18689-PRP_045f	7	SI	ROW Stratified Parcel – Commencing at the underside and within the horizontal limits of the Baseline Bridge in accordance with Schedule 15-Output Specifications
18689-PRP_106a	3	SI	ROW

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
18689-PRP_138c	1	SI	ROW
18689-PRP_138c	2	SI	ROW
18689-PRP_138c	7	SI	ROW
18689-PRP_148	1	SI	ROW
18689-PRP_009e	1	SI	HCL MTO Terms
18689-PRP_009e	2	SI	HCL MTO Terms
18689-PRP_009e	3	SI	HCL MTO Terms
18689-PRP_009e	4	SI	HCL MTO Terms
18689-PRP_010c	1	SI	HCL MTO Terms
18689-PRP_011e	1	SI	HCL MTO Terms Temporary site office permitted subject to MTO encroachment permit.
18689-PRP_012f	1	SI	HCL MTO Terms Parcel includes a portion of HWY 417 E – N/S ramp for Pinecrest Road
18689-PRP_013c	1	SI	HCL MTO Terms
18689-PRP_133a	1	SI	HCL MTO Terms

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			Temporary site office permitted subject to MTO encroachment permit.
18689-PRP_134c	1	SI	HCL Parcel includes ROW at Moodie Drive grade separation. MTO Terms Parcel includes HWY 417 S-W ramp.
18689-PRP_134c	2	SI	HCL MTO Terms Parcel includes ROW at Moodie Drive grade separation Parcel includes HWY 417 S-W ramp.
18689-PRP_134c	3	SI	HCL MTO Terms Parcel includes ROW at MoodieDrive grade separation Parcel includes HWY 417 S-W ramp.
18689-PRP_134c	11	SI	HCL MTO Terms
18689-PRP_134c	12	SI	HCL MTO Terms SI limited to water drainage / pumping equipment

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
18689-PRP_136b	1	SI	HCL MTO Terms
18689-PRP_001d	1	SI	Report Card Parcel, NCC Terms & Conditions Temporary site office permitted
18689-PRP_001d	2	SI	Report Card Parcel, NCC Terms & Conditions Temporary site office permitted
18689-PRP_001d	3	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_001d	4	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_002g	1	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_002g	2	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_002g	3	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_002g	4	SI	Report Card Parcel, NCC Terms & Conditions SI limited to multiuse pathway for access to guideway. NMI limited to Parkland Improvement Works.
18689-PRP_003k	1	SI	Report Card Parcel, NCC Terms & Conditions

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
18689-PRP_003k	2	SI	Report Card Parcel, NCC Terms & Conditions NMI limited to Woodriffe Pedestrian Bridge.
18689-PRP_003k	3	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_003k	4	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_003k	5	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_003k	6	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_003k	7	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_003k	8	SI	Report Card Parcel, NCC Terms & Conditions SI limited to access to guideway via multiuse pathway. NMI limited to Parkland Improvement Works
18689-PRP_003k	9	SI	Report Card Parcel, NCC Terms & Conditions SI limited to access to guideway via multiuse pathway. NMI limited to Parkland Improvement Works
18689-PRP_003k	10	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_003k	11	SI	Report Card Parcel, NCC Terms & Conditions NMI limited to Parkland Improvement Works (multiuse pathway crossing under guideway)
18689-PRP_003k	35	SI	Report Card Parcel, NCC Terms & Conditions

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			NMI limited to Parkland Improvement Works (above tunnel) Parcel is a Stratified Parcel for SI. Refer to Schedule 15-2 for minimum depth.
18689-PRP_003k	37	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_004g	1	SI	Report Card Parcel, NCC Terms & Conditions Temporary site office permitted
18689-PRP_004g	2	SI	Report Card Parcel, NCC Terms & Conditions
18689-PRP_004g	3	SI	Report Card Parcel, NCC Terms & Conditions NMI limited to Parkland Improvement Works Parcel is a Stratified Parcel for SI. Refer to Schedule 15-2 for minimum depth.
18689-PRP_004g	4	SI	Report Card Parcel, NCC Terms & Conditions Temporary site office permitted
18689-PRP_004g	5	SI	Report Card Parcel, NCC Terms & Conditions NMI limited to City storm / sanitary and/or water utility Temporary site office permitted
18689-PRP_004g	9	SI	Report Card Parcel, NCC Terms & Conditions NMI limited to City storm / sanitary and/or water utility
18689-PRP_004g	12	SI	Report Card Parcel, NCC Terms & Conditions

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			NMI limited to City storm / sanitary and/or water utility and Parkland Improvement Works
18689-PRP_004g	24	SI	Report Card Parcel, NCC Terms & Conditions Temporary site office permitted
18689-PRP_005h	1	SI	Report Card Parcel, NCC Terms & Conditions NCC may request access to parcel prior to end of term of licence for the purpose of undertaking additional parkland improvement works subject to reasonable requirements and limitations imposed by the City with input from DB Co. Parcel is a Stratified Parcel for SI. Refer to Schedule 15-2 for minimum depth.
18689-PRP_005h	2	SI	Report Card Parcel, NCC Terms & Conditions Parkland Improvement Works NCC may request access to parcel prior to end of term of licence for the purpose of undertaking additional parkland improvement works subject to reasonable requirements and limitations imposed by the City with input from DB Co. Parcel is a Stratified Parcel for SI. Refer to Schedule 15-2 for minimum depth. NMI limited to City storm / sanitary and/or water utility and Parkland

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			Improvement Works
18689-PRP_005h	3	SI	Report Card Parcel, NCC Terms & Conditions NCC may request access to parcel prior to end of term of licence for the purpose of undertaking additional parkland improvement works subject to reasonable requirements and limitations imposed by the City with input from DB Co. Parcel is a Stratified Parcel for SI. Refer to Schedule 15-2 for minimum depth.
18689-PRP_005h	4	SI	Report Card Parcel, NCC Terms & Conditions Parkland Improvement Works NCC may request access to parcel prior to end of term of licence for the purpose of undertaking additional parkland improvement works subject to reasonable requirements and limitations imposed by the City with input from DB Co. Parcel is a Stratified Parcel for SI. Refer to Schedule 15-2 for minimum depth.
18689-PRP_006f	1	SI	Report Card Parcel, NCC Terms & Conditions NMI limited to Parkland Improvement Works

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			NCC may request access to parcel prior to end of term of licence for the purpose of undertaking additional parkland improvement works subject to reasonable requirements and limitations imposed by the City with input from DB Co. Parcel is a Stratified Parcel for SI. Refer to Schedule 15-2 for minimum depth.
18689-PRP_007e	1	SI	Report Card Parcel, NCC Terms & Conditions NMI limited to Parkland Improvement Works NCC may request access to parcel prior to end of term of licence for the purpose of undertaking additional parkland improvement works subject to reasonable requirements and limitations imposed by the City with input from DB Co. Parcel is a Stratified Parcel for SI. Refer to Schedule 15-2 for minimum depth.
18689-PRP_007e	2	SI	Report Card Parcel, NCC Terms & Conditions NMI limited to Parkland Improvement Works NCC may request access to parcel prior to end of term of licence for the purpose of undertaking additional parkland improvement works subject to reasonable requirements and limitations imposed by the City with input from DB Co.

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
18689-PRP_007e	3	SI	Report Card Parcel, NCC Terms & Conditions NMI limited to Parkland Improvement Works NCC may request access to parcel prior to end of term of licence for the purpose of undertaking additional parkland improvement works subject to reasonable requirements and limitations imposed by the City with input from DB Co.
18689-PRP_007e	4	SI	Report Card Parcel, NCC Terms & Conditions NMI limited to Parkland Improvement Works NCC may request access to parcel prior to end of term of licence for the purpose of undertaking additional parkland improvement works subject to reasonable requirements and limitations imposed by the City with input from DB Co.
18689-PRP_137c	1	SI	Report Card Parcel, NCC Terms & Conditions Temporary site office permitted.
18689-PRP_137c	2	SI	Report Card Parcel, NCC Terms & Conditions

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			Temporary site office permitted.
18689-PRP_014c	1	SI	
18689-PRP_015c	1	SI	
18689-PRP_016c	1	SI	
18689-PRP_016c	5	SI	
18689-PRP_017d	1	SI	Report Card Parcel Subject to Murlee Holdings Terms
18689-PRP_017d	3	SI	Subject to Murlee Holdings Terms, Report Card Parcel
18689-PRP_017d	6	SI	Report Card Parcel Subject to Murlee Holdings Terms
18689-PRP_017d	8	SI	Report Card Parcel Subject to Murlee Holdings Terms
18689-PRP_017d	20	SI	Report Card Parcel Subject to Murlee Holdings Terms
18689-PRP_018b	2	SI	Report Card Parcel Some remediation of this parcel may be undertaken by the City in advance of the Commencement Date indicated for this Parcel in connection with the decommissioning of the gasoline service station and the remediation of soil and groundwater on Parcel 1 18689-PRP_018b
18689-PRP_055d	1	SI	Report Card Parcel

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			Parcel to be a Stratified Parcel at Revenue Service for SI. Refer to Schedule 15-2 for minimum depth SOD Parcel Remedial Action Plan required pursuant to Section 4.5(b) of Schedule 17 – Environment Obligations. Remedial Action Plan shall include estimated cost to remediate.
18689-PRP_055d	5	SI	Report Card Parcel SOD Parcel Parcel to be a Stratified Parcel at Revenue Service for SI. Refer to Schedule 15-2 for minimum depth Remedial Action Plan required pursuant to Section 4.5(b) of Schedule 17 – Environment Obligations. Remedial Action Plan shall include estimated cost to remediate. NMI limited to watermain
18689-PRP_056d	1	SI	
18689-PRP_057c	2	SI	Report Card Parcel Subject to terms of temporary construction licence with property owner in the form of a Standard Agreement.

Confederation Line List			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			Pre-construction survey required.
18689-PRP_057c	4	SI	Report Card Parcel Subject to terms of temporary construction licence with property owner in the form of a Standard Agreement. Pre-construction survey required.
18689-PRP_057c	5	SI	Report Card Parcel Subject to terms of temporary construction licence with property owner in the form of a Standard Agreement. Pre-construction survey required.
18689-PRP_064d	2	SI	Report Card Parcel Pre-construction survey required.
18689-PRP_076a	1	SI	
18689-PRP_067c	3	SI	PWGSC Terms
18689-PRP_067c	5	SI	PWGSC Terms

Confederation Line East			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
18695-PRP_001b	1	SI	ROW Existing LRT Infrastructure Lands Constraints.
18695-PRP_001b	2	SI	ROW Existing LRT Infrastructure Lands Constraints
18695-PRP_001b	3	SI	ROW Existing LRT Infrastructure Lands Constraints.
18695-PRP_001b	4	SI	ROW Existing LRT Infrastructure Lands Constraints.
18695-PRP_001b	5	SI	ROW
18695-PRP_001b	6	SI	ROW
18695-PRP_002e	1	SI	ROW
18695-PRP_002e	2	SI	ROW
18695-PRP_002e	12	SI	ROW SI limited to TPSS
		SI	
18695-PRP_004d	1	SI	ROW
18695-PRP_004d	2	SI	ROW
18695-PRP_004d	3	SI	ROW
18695-PRP_004d	4	SI	ROW

Confederation Line East			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
18695-PRP_005e	1	SI	ROW Parcel contains segments of subsurface pavement sensors linked to a road weather information station
18695-PRP_037e	3	SI	ROW
18695-PRP_038c	1	SI	ROW
18695-PRP_040b	1	SI	ROW
18695-PRP_040b	2	SI	ROW
18695-PRP_040b	3	SI	ROW
18695-PRP_040b	16	SI	ROW
18695-PRP_041d	1	SI	ROW
18695-PRP_041d	2	SI	ROW
18695-PRP_041d	3	SI	ROW
18695-PRP_041d	17	SI	ROW SI limited to TPSS
18695-PRP_041d	18	SI	ROW SI limited to TPSS
18695-PRP_041d	19	SI	ROW SI limited to TPSS Use of parcel partly constrained by existing electricity transmission infrastructure. Utility coordination required.

Confederation Line East			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
18695-PRP_048a	3	SI	ROW
18695-PRP_005e	2	SI	
18695-PRP_005e	3	SI	
18695-PRP_038c	2	SI	Subject to Schedule 15 – Output Specifications with respect to operation, maintenance and reconstruction of bus loop and station and the maintenance and protection of the existing pedestrian bridge during Construction Period.
18695-PRP_038c	3	SI	
18695-PRP_038c	8	SI	Subject to Schedule 15 – Output Specifications with respect to operation, maintenance and reconstruction of bus loop and station and the maintenance, operation and protection of the existing pedestrian bridge during Construction Period.
18695-PRP_038c	14	SI	Subject to Schedule 15 – Output Specifications with respect to operation, maintenance and reconstruction of bus loop and station and the maintenance and protection of the existing pedestrian bridge during Construction Period.
18695-PRP_034b	2	SI	HONI Terms SI limited to the construction of foundation for a pedestrian bridge and subject to provincial secondary land use approvals process as described in Schedule 35.
18695-PRP_034b	3	SI	HONI Terms

Confederation Line East			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			SI limited to the construction of foundation for a pedestrian bridge and subject to provincial secondary land use approvals process as described in Schedule 35.
18695-PRP_034b	4	SI	HONI Terms SI limited to the construction of foundation for a pedestrian bridge and subject to provincial secondary land use approvals process as described in Schedule 35.
18695-PRP_037e	4	SI	TC limited to construction of access drive to TPSS located on Parcel 5 Parcel may contain segments of subsurface pavement sensors linked to a road weather information station and/or portion(s) of a road weather information station
18695-PRP_037e	5	SI	TC limited to construction of TPSS SI limited to TPSS Parcel may contain segments of subsurface pavement sensors linked to a road weather information station and/or portion(s) of a road weather information station
18695-PRP_019c	1	SI	Place d'Orleans Terms

Confederation Line East			
Property Request Plan	**Parcel**	**Permitted Use**	**Restrictions & Requirements**
			Report Card Parcel

APPENDIX 3
[INTENTIONALLY DELETED]

APPENDIX 4
ARCHAEOLOGICAL REPORTS

Name of Report	Final Date (On Report)
Stage 1 Archaeological Assessment of the Ottawa Light Rail Transit, City of Ottawa	October 2011
Stage 1 Archaeological Assessment of the Maintenance and Storage Facility Site and the MSF Cut and Cover Access Tunnel, OLRT Project Lots 11 and 12, Junction Gore, City of Ottawa	October 2011
Stage 1 Archaeological Assessment of the Ottawa Light Rail, Queen Street Alignment, City of Ottawa, Ontario	December 2011
Stage 1 Archaeological Assessment of the Ottawa Light Rail, Rideau Street Re-Alignment, City of Ottawa, Ontario	December 2011
Stage 2 Archaeological Assessment Maintenance and Storage Facility Site, Ottawa Light Rail Transit Project, Part Lot 11, Junction Gore, City of Ottawa	December 2011
Technical Memorandum – Archaeological Concerns Related to the Commissioner Street/Cliff Street Options, Ottawa Light Rail Transit Project	December 22, 2011
Stage 2/3 Archaeological Assessment West Portal, Ottawa Light Rail Transit Project, Ottawa Ontario	April 2012
Revised Report, Stage 3 Archaeological Assessment of the Former Union Station, Ottawa Light Rail Transit Project, Ottawa, Ontario	June 2012
Preliminary Excavation Report, Stage 4 Archaeological Assessment, Western Methodist Church BiFw-166, Ottawa Light Rail Transit Project, Wellington Street at Commissioner Street, Concession A Lot 40, Former Township of Nepean, Ottawa, Ontario	September 2012
Preliminary Excavation Report, Stage 4 Archaeological Assessment, 555-561 Albert Street Outbuildings BiFw-169, Ottawa Light Rail Transit Project, Parking Lot at Albert and Brickhill Street, Concession A Lot 40, Former Township of Nepean, Ottawa, Ontario	September 2012
Preliminary Excavation Report, Stage 4 Archaeological Assessment, 541-549 Albert Street Outbuildings BiFw-168, Ottawa Light Rail Transit Project, Parking Lot at Albert and Brickhill Streets, Concession A Lot 40, Former Township of Nepean, Ottawa, Ontario	September 2012
Preliminary Excavation Report, Stage 4 Archaeological Assessment, West End Hotel BiFw-167, Ottawa Light Rail Transit Project, Parking Lot at Albert and Brickhill Streets, Concession A Lot 40, Former Township of Nepean, Ottawa, Ontario	September 2012

APPENDIX 5
ENVIRONMENTAL REPORTS

Name of Report	Final Date (On Report)
Technical Memorandum – Interim Environmental Considerations for the Downtown Tunnel, OLRT Alignment, Ottawa, Ontario	October 21, 2011
Phase I Environmental Site Assessment, Maintenance and Storage Facility at 645, 681, 707, 731, 747 and 805 Belfast Road, Ottawa, Ontario	November 2011
Phase II Environmental Site Assessment, Maintenance and Storage Facility, Ottawa Light Rail Transit Project	November 2011
Technical Memorandum – Soil Gas Investigations for Proposed Bayview and Hurdman Stations	November 7, 2011
Technical Memorandum – Excavated Materials Management Considerations, OLRT (Version 1)	November 25, 2011
Phase I Environmental Site Assessment, Ottawa Light Rail Transit Corridor, Ottawa, Ontario	December 2011
Factual Scoped Phase II Environmental Site Assessment, Ottawa Light Rail Transit (OLRT) Project, Ottawa, Ontario	December 2011
Supplemental Phase II Environmental Site Assessment, Maintenance and Storage Facility, Ottawa Light Rail Transit Project, 645 to 805 north Side of Belfast Road, Ottawa, Ontario	December 2011
Technical Memorandum – Testing of Acid Generation Potential of Rock Samples, Ottawa Light Rail Transit	December 21, 2011
Phase I Environmental Site Assessment, 156-160 Lyon Street, Ottawa, Ontario	January 2012
Phase II Environmental Site Assessment, 156-160 Lyon Street, Ottawa Light Rail Transit Project	January 2012
Technical Memorandum – Underground Storage Tank Investigation – Ottawa Light Rail Transit (OLRT)	January 4, 2012
Technical Memorandum – Factual Environmental Results Alternate Rideau Station Alignment, OLRT Alignment, Ottawa, Ontario	January 10, 2012
Technical Memorandum – Factual Supplemental Soil Results, Commissioner Street Overpass, OLRT Project, Ottawa, Ontario	January 19, 2012
Pre-Demolition Designated Substances Survey, Ottawa Light Rail Transit (OLRT), 681Belfast Road, Ottawa, Ontario	August 2012
Updated Pre-Demolition Designated Substances Survey, Ottawa Light Rail Transit (OLRT),707-725 Belfast Road, Ottawa, Ontario	August 2012
Updated Pre-Demolition Designated Substances Survey, Ottawa Light Rail Transit (OLRT),731 Belfast Road, Ottawa, Ontario	August 2012

Name of Report	Final Date (On Report)
Updated Pre-Demolition Designated Substances Survey, Ottawa Light Rail Transit (OLRT),747 Belfast Road, Ottawa, Ontario	August 2012
Updated Pre-Demolition Designated Substances Survey, Ottawa Light Rail Transit (OLRT),767 Belfast Road, Ottawa, Ontario	August 2012
Updated Pre-Demolition Designated Substances Survey, Ottawa Light Rail Transit (OLRT), 805 Belfast Road, Ottawa, Ontario	August 2012

APPENDIX 6
CANADIAN CONTENT CERTIFICATE

APPENDIX 7
HIGHWAY SITE BACKGROUND REPORTS

Name of Report	Draft Date (On Report)	Final Date (On Report)
Foundation Investigation Report Central Transitway Overpass Rehabilitation and Widening Highway 417 Expansion from Nicholas Street to Vanier Parkway G.W.P. 4091-07-00, Site No. 3-389		January 23, 2012
Foundation Investigation and Design Report Central Transitway Overpass Rehabilitation and Widening Highway 417 Expansion from Nicholas Street to Vanier Parkway G.W.P. 4091-07-00, Site No. 3-389		January 23, 2012
Foundation Investigation and Design Report Hurdman Bridge Replacement		April 10, 2012
Foundation Investigation Report Hurdman Bridge Replacement		April 10, 2012
Foundation Investigation and Design Report Lees Avenue Underpass Rehabilitation		April 19, 2012
Foundation Investigation Report Lees Avenue Underpass Rehabilitation		April 19, 2012
Foundation Investigation and Design Report Belfast Road Underpass Rehabilitation		January 19, 2012
Foundation Investigation Report Belfast Road Underpass Rehabilitation		January 19, 2012
Foundation Investigation and Design Report Riverside Drive Underpass Rehabilitation		January 19, 2012
Foundation Investigation Report Riverside Drive Underpass Rehabilitation		January 19, 2012
Foundation Investigation and Design Report St. Laurent BLVD. Overpass Rehabilitation and Widening		January 19, 2012
Foundation Investigation Report St. Laurent Blvd. Overpass Rehabilitation and Widening		January 19, 2012
DRAFT Foundation Investigation and Design Report Hurdman Bridge Replacement	December, 2011	
Central Transitway - Addendum 1 Foundation Investigation Design Report Central Transitway Overpass Rehabilitation and Widening Highway 417 Expansion From Nicholas Street to Vanier Parkway GWP 4091-07-00 site 3-389		May 16, 2012

Name of Report	Draft Date (On Report)	Final Date (On Report)
Foundation Investigation Report High Mast Light Poles Highway 417 Widening Nicholas Street to OR 174 GWP 4320-06-00		July 6, 2012
Draft Foundation Investigation Report Retaining Walls and Noise Barrier Walls Highway 417 Widening Nicholas Street to OR 174 GWP 4091-07-00 and 4320-06-00	May 15, 2012	
Foundation Investigation Report Overhead and Variable Message Signs Highway 417 Widening Nicholas Street to OR 174 GWP 4091-07-00 and 4320-06-00		July 6, 2012
Final Foundation Investigation and Design Report High Mast Light Poles Highway 417 Widening Nicholas Street to OR 174 GWP 4320-06-00		July 6, 2012
Draft Foundation Investigation and Design Report Retaining Walls and Noise Barrier Walls Highway 417 Widening Nicholas Street to OR 174 GWP 4091-07-00 and 4320-06-00		July 6, 2012
Final Foundation Investigation and Design Report Overhead and Variable Message Signs Highway 417 Widening Nicholas Street to OR 174 GWP 4091-07-00 and 4320-06-00		July 6, 2012
DRAFT Pavement Design Report GWP 4320-06-00 Hwy 417 Widening Vanier Parkway to OC 174	December, 2011	
Pavement Design Report GWP 4091-07-00 Highway 417 Widening Nicholas Street to Vanier Parkway		May, 2012
Pavement Design Report GWP 4320-06-00 Highway 417 Widening Vanier Parkway to OR 174		May, 2012
DRAFT Pavement Design Report GWP 4091-07-00 Highway 417 Widening Nicholas Street to Vanier Parkway	December, 2011	
DRAFT Pavement Investigation GWP 4320-06-00 (Draft Version) OR 174 Widening Between Highway 417 and Blair Road, Ottawa, On.	March 15, 2012	
Pavement Investigation GWP 4320-06-00 (Final Version) OR 174 Widening Between Highway 417 and Blair Road, Ottawa, On.		July 6, 2012
Highway 417 Expansion: Hurdman's Bridge Rehabilitation GWP 4091-07-00 and GWP 4320-06-00 Project Description		December 28, 2011

Name of Report	Draft Date (On Report)	Final Date (On Report)
Cultural Heritage Evaluation Report Belfast Road Underpass, MTO Site No. 3-071 Highway 417 (Ottawa Queensway) Lot 10, Junction gore Geographic Township of Gloucester City of Ottawa, Ontario GWP 4320-06-00/ GWP 4091-07-00		September, 2011
Cultural Heritage Evaluation Report Lees Avenue Underpass, MTO Site No. 3-225, Concession D, Rideau Front Geographic Township of Nepean City of Ottawa, Ontario GWP 4320-06-00 / GWP 4091-07-00		July, 2011
Cultural Heritage Evaluation Report Nicholas Street Underpass, MTO Site No. 3-224 Highway 417 (Ottawa Queensway) Lots F & G, Concession D, Rideau Front Geographic Township of Nepean City of Ottawa, Ontario GWP 4320-06-00 / GWP 4091-07-00		July, 2011
Cultural Heritage Evaluation Report Rideau River (Hurdman's) Bridges, MTO Site No. 3-073/1/2 Highway 417 (Ottawa Queensway) Lot G, Concession D, Rideau Front Geographic Township of Nepean & Lot 11, Junction Gore Geographic Township of Gloucester City of Ottawa, Ontario GWP 4320-06-00 / GWP 4091-07-00		September, 2011
Cultural Heritage Evaluation Report Vanier Parkway Underpass, MTO Site No. 3-069 Highway 417 (Ottawa Queensway) Lot 11, Junction Gore Geographic Township of Gloucester City of Ottawa, Ontario GWP 4320-06-00		July, 2011
DRAFT Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation from Nicholas Street to Ottawa Road 174 Fish and Fish Habitat Impact Assessment Report	December, 2011	
PRE-DRAFT -DRAFT Terrestrial Ecosystem Impact Assessment Report Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation From Nicholas Street to Ottawa Road 174 (GWP 4091-07-00 & 4320-06-00)	February, 2012	
DRAFT Report Contaminant Investigation Highway 417 at Lees Avenue Overpass Ottawa Ontario	December, 2011	
Arborist Report Nation Capital Commission Property at Highway 417 Hurdman Bridge GWP 4091-07-00 & 4320-06-00		February, 2012
Summary of Existing Environmental Conditions Report Detail Design Update Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation From Nicholas Street to Ottawa Road 174 (GWP 4091-07-00 & 4320-06-00)		September, 2011

Name of Report	Draft Date (On Report)	Final Date (On Report)
Memo MTO Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation WP 4091-07-00 Nicholas Street to Vanier Parkway Detail Design - Noise Review - WP 4091-07-00 Nicholas Street to Vanier Parkway		February 10, 2012
Hydrogeological Assessment in Support of A Category 3 Permit to Take Water Application		June 1, 2012
Final Report Contaminant Investigation Highway 417 at Lees Avenue Overpass Ottawa Ontario		March 1, 2012
Design and Construction Report Piers		March 1, 2012
Design and Construction Report Nicholas to Vanier		April 1, 2012
Ministry of Transportation Highway 417 - Ottawa Carleton Road 26 to Eighth Line Road Traffic Operations Study Report Final Report		March 19, 2012
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 DRAFT Traffic Analysis & Queuing Assessment		January, 2012
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 DRAFT Traffic & Incident Management Plan		February, 2012
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 Traffic & Incident Management Plan		May, 2012
Highway 417 Widening From Nicholas to OR 174 Detail Design Study GWP 4091-07-00 and 4320-06-00 Drainage and Stormwater Management Report FINAL DRAFT Report	December, 2011	
Highway 417 Expansion Operational Improvements and Infrastructure Rehabilitation Total Project Management Detail Design Services Risk Assessment Report		November 14, 2011
Highway 417 Expansion Nicholas Avenue 401 to Ottawa Road 174 GWP 4091-07-00 and GWP 4320-06-00 Constructability Review Report		November, 2011
DRAFT Highway 417 Expansion Nicholas Avenue 401 to Ottawa Road 174 GWP 4091-07-00 and GWP 4320-06-00 Constructability Review Report	November, 2011	
Highway 417 Storm Sewers from Island Park Drive to Nicholas Street GWP 4091-07-00 and GWP 4320-06-00 Condition Assessment Final Report		March, 2012

Name of Report	Draft Date (On Report)	Final Date (On Report)
Drainage Exhibits - Proposed Storm Sewers Map 1, Map 2, Map 3 - Exhibit 18,19,20		April 17, 2012
Appendix A - Notification Material - Notice of Study Commencement Highway 417 Expansion, Operational Improvements and Infrastructure from Nicholas Street to Ottawa Road 174 (GWP 4091-07-00 & 4320-06-00), Detail Design		April 26, 2012
MTO Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation From Nicholas Street to Ottawa Road 174, Detail Design GWP 4091-07-00 & GWP 4320-06-00 City of Ottawa - Class environmental Assessment for Provincial Transportation Facilities (2000) Group "B" Project - Ministry of Transportation Eastern Region - Design and Construction Report		April, 2012
MTO Highway 417 Widening from Nicholas to OR 174 Detail Design Study GWP 4091-07-00 and GWP 4320-06-00 -Drainage and Stormwater Management Report Final Report		April, 2012
Risk Management Health and Safety Plan 200 Lees Ave - Uottawa		February, 2012
Tender for Grading, Drainage, Granular Base, Hot Mix Paving, Structures, Electrical, ATMS and Landscaping. At Highway 417, Highway 417 expansion from 150 m west of Parkdale Avenue Easterly to 900m east of Walkley Road I.C. 110 13.6 k Eastern Region under Contract No. 2012-4007		April 30, 2012 (date provided)
Bell Relocation at Belfast Transmittals (Temporary Bell Canada Pole Placement on Hwy 417 (Belfast Bridge)		April 16, 2012
Bell Temp. Pole Relocation at Highway 417 - Belfast Plans		April 16, 2012
Enbridge Queensway Relocation - City of Ottawa Prjt No. 6.7913966, Work Request No. 8263533		November 30, 2011
Phase I Bell Canada BC No. Ottawa - Vanier - Belfast Rd. Plan No. 401 - Project No. 2980559		January 28, 2012
Phase I Bell Canada BC No. Ottawa - Vanier - Belfast Rd & Tremblay Rd. Plan No. 402 - Project No. 2980559		March 22, 2012
Phase I Bell Canada BC No Ottawa - Vanier - Belfast Rd. Plan No. 701 Project No. 2980559		March 22, 2012
Promark 1-31 -Auxiliary Locate Sheet		September, 2011
Promark 32-61 - Auxiliary Locate Sheet		September, 2011

Name of Report	Draft Date (On Report)	Final Date (On Report)
Locates (with Disclaimer) Thurber Report		June, 2011 to February 2012
Hydro Preliminary Relocation Plans - Belfast Road No. 92006453TOH/TUG-MC Rev 0-3		
Detailed Condition Survey Report Structure No. 014010, Central Transitway Bridge (EBL)		December 1, 2011
Detailed Condition Survey Report Structure No. 014010, Central Transitway Bridge (WBL)		December 1, 2011
Detailed Condition Survey Report Site No. 03-079/ 1 Rideau River (Hurdman) Overpass (EBL)		December 1, 2011
Detailed Condition Survey Report Site No. 03-079/2 Rideau River (Hurdman_ Overpass (WBL),		December 1, 2011
Detailed Condition Survey Report Site NO. 03-389 / 2 East Transitway Structure (WBL)		December 1, 2011
Memo Belfast Road Underpass (site 03-071) Limited Condition Survey		June 15, 2011
Memo Lees Avenue Underpass (Site 3-225.0) Limited Condition Survey		June 15, 2011
Memo Vanier Parkway Underpass (Site 03-069) Limited Condition Survey		June 15, 2011
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 DRAFT Belfast Road Underpass Site No. 03-071 Structural Design Report	June, 2011	
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 Central Transitway Overpass (Structure No. 014010) Structural Design Report		December, 2011
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 East Transitway Structure (EBL and WBL) (Structure No. 056700) Structural Design Report		December, 2011
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 DRAFT Lees Avenue Underpass Site No. 03-225 Structure Design Report	July, 2011	
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 DRAFT Rideau River (Hurdman) Bridge Site No. 03-073/1-2 Structural Design Report	August, 2011	

Name of Report	Draft Date (On Report)	Final Date (On Report)
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 DRAFT St. Laurent Boulevard Overpass EBL and WBL (Site No. 3-72.1 & .2) Structural Design Report	July, 2011	
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 DRAFT Vanier Parkway Underpass Site No. 03-069 Structural Design Report	June, 2011	
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 final Belfast Road Underpass Site No. 03-071 Structural Design Report		February, 2012
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 final Lees Avenue Underpass Site No. 03-225 Structure Design Report		February, 2012
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 final Rideau River (Hurdman) Bridge Site No. 03-073/1-2 Structural Design Report		February, 2012
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 final St. Laurent Boulevard Overpass EBL and WBL (Site No. 3-72.1 & .2) Structural Design Report		February, 2012
Highway 417 Expansion, Operational Improvements and Infrastructure Rehabilitation GWP 4091-07-00 and 4320-06-00 final Vanier Parkway Underpass Site No. 03-069 Structural Design Report		February, 2012

APPENDIX 8
ORIGINAL DEFINED TERMS

3. DEFINITIONS

In the Project Agreement, unless the context otherwise requires:

3.1 "**Adjacent Structures**" means every structure, building, utility road, transportation interface on, under, affixed or adjacent to the Alignment.

3.2 "**Advanced Environmental Reports**" means any and all environmental reports prepared to support the preliminary engineering design including but not limited to the phase I and phase II environmental site assessments, the designated substances surveys and other reports, assessments and or memos prepared in respect of the Lands, as set forth in Appendix 6 - Environmental Reports to this Schedule 1 - Definitions and Interpretation.

3.3 "**After-Acquired Lands**" means Real Property Interests, including Real Property Interests in Crown Lands, to be acquired by the City after Financial Close and on or before the possession dates described in the Real Property Schedule.

3.4 "**Archaeological Reports**" means the document(s) described in Appendix 5 – Archaeological Reports to this Schedule 1 – Definitions and Interpretation.

3.5 "**As-Built Highway Drawings**" means a set of Contract Documents marked-up by Project Co or a Project Co Party during construction, to record changes in the Highway Work from the design documents and to illustrate actual locations of hidden utilities or concealed elements, and shall include plans approved by the Consultant showing the as-constructed location of the Highway Work. The term may also be interpreted to mean a set of Contract Documents containing Project Co's annotations. The As-Built Highway Drawings shall be prepared by Project Co in bound hardcopies and a digital "PDF" format.

3.6 "**Bus Rapid Transit or BRT**" means the existing network of transit traffic lanes including the existing Transitway system (i: East Bus Rapid Transitway from Blair Road to Hurdman Station; ii: Central Bus Rapid Transitway from Hurdman Station to Empress Avenue; iii: West Bus Rapid Transitway Albert Street/Empress Avenue to Tunney's Pasture Station; and iv: Southeast Transitway (Hurdman Station)), as well as the dedicated transit lanes on Albert Street/Slater Street from Nicholas Street to Empress Avenue. The BRT shall also include any other routes that are being used for the purpose of the BRT during a detour implemented for the purpose of constructing the Work.

3.7 "**Checking Team**" means Hatch Mott Macdonald, MMM Group Limited, Fast + Epp, and SNC-Lavalin Inc.

3.8 "**City Design Team**" means any of the City, its agents, contractors and subcontractors of any tier and its or their directors, officers and employees, and other persons engaged in respect of design reviews, design evaluation, or design consultation processes with respect to the System or the City Activities, but excluding Project Co and any Project Co Party.

3.9 "**Civic Works**" means the construction, installation, testing and completion, in accordance with the applicable Civic Works Specifications, of each of:

(a) the Queen Street road, sewer and watermain construction work in respect of Queen Street from Bronson Avenue to Elgin Street as further described in Article 28 – Schedule 15-2, Part 1 of the Output Specifications as may be amended pursuant to Section 20.13(b) (the "**Queen Street Work**");

(b) the Albert Street road, sewer and watermain construction work in respect of Albert Street (Brickhill Street to Bayview Road), Scott Street (Bayview Road to Smirle Avenue), Booth Street (Primrose Avenue to north of Albert Street), Empress Avenue (Albert Street to dead-end), Perkins Street (Albert Street to dead-end) and Lorne Avenue (Albert Street to Primrose Avenue) as further described in Article 27 – Schedule 15-2, Part 1 of the Output Specifications as may be amended pursuant to Section 20.13(b) (the "**Albert Street Work**");

(c) the West Transitway rock face stabilization and retaining walls renewal work as further described in Article 31 – Schedule 15-2, Part 1 of the Output Specifications as may be amended pursuant to Section 20.13(b) (the "**Rock Stabilization Work**");

(d) a multi-use (pedestrian and cyclist) pathway structure from the Ottawa Baseball Stadium parking lot near Coventry Road to the south side of Highway 417 adjacent to Tremblay Road, including works, superstructure, embankments, ramps and multi use pathway connections, and as further described in Article 32 – Schedule 15-2, Part 1 of the Output Specifications as may be amended pursuant to Section 20.13(b) (the "**Coventry Bridge Work**");

(e) the design and / or installation, relocation (temporary or permanent), labour and materials associated with the Utilities Work as further described in Article 6, Section 6.5(b) – Schedule 15-2, Part 1 of the Output Specifications as may be amended pursuant to Section 20.13(b) (the "**Utilities Work**"); and

(f) the civic works for the Combined Sewage Storage Tunnel Components in Lebreton Flats as further described in Article 30 – Schedule 15-2, Part 1 of the Output Specifications as may be amended pursuant to Section 20.13(b) (the "**CSST Work**"),

including in each case rectification of any minor deficiencies to such work, and any other activities relating thereto required pursuant to the provisions of this Project Agreement.

3.10 "**Commencement of Construction**" means the date on which Project Co commences, in a bona fide manner, Construction on the Alignment following receipt by Project Co of Notice to Commence Construction from the City, which Notice to Commence Construction shall be consistent with the Works Schedule; and "**Commenced Construction**" shall have a corresponding meaning.

3.11 "**Commercial Close**" means the date of the Project Agreement.

3.12 "**Construction**" means the construction, manufacture and creation of the System (as distinct from a Correction, a Repair, Maintenance or a Renovation) as required by this Agreement, including all labour, materials and the supply and installation of Equipment and Construction Activities; and "**Constructed**" and "**Construct**" shall have a corresponding meaning. For clarity, "**Construction**" includes both the Fixed Component and the Vehicle Component.

3.13 "**Construction Activities**" means construction, Reinstatement Work, rectification work, and any other aspect of the Works that:

(a) comprises the alteration, augmenting, upgrading, construction, completion, testing or commissioning of any part of the System Infrastructure;

(b) comprises the assessment of any System Infrastructure; or

(c) may affect the structural integrity of any System Infrastructure, and including any such aspect of the Works carried out as part of any Force Majeure event, Relief Event, Variation, or Innovation Proposal accepted by the City.

3.14 "**Construction Clearing and Grubbing**" means the stage of Design and Construction Work in which vegetation and debris is cleared from the Lands (clearing) and a root rake or similar device is employed to remove roots remaining in the soil (grubbing).

3.15 "**Construction Easements**" means all temporary or permanent easements or licences required to Construct the Fixed Component as shall be proposed by notice in writing by the Construction Contractor to the City and approved by the City.

3.16 "**Contribution Agreements**" means the Contribution Agreement dated September 1, 2011 between HMQ, represented by the Ministry of Transportation and the City in respect of the Project and the Contribution Agreement dated December 19, 2012 between the Government of Canada, represented by the Ministry of Transport, Infrastructure and Communities and the City in respect of the Project, each as may be amended, restated or replaced from time to time.

3.17 "**Correction**" means correction of any error or Defect in the System that is discovered and undertaken after the Revenue Service Availability Date.

3.18 "**Cost of the Highway Financing**" means all costs and expenses incurred in connection with the financing in respect of the Highway Work pursuant to the indicative financing term sheet included in the Response and Lending Agreements, including all interest, fees, expense reimbursements, pre-payment and breakage costs and all other costs and expenses, as set out in the Financial Model.

3.19 "**Cost of the Highway Work**" means the cost to Project Co of performing the Highway Work as set out in the Financial Model and shall include all amounts to be included in the Cost of the Highway Work set out in the Contract Documents, including, for greater certainty, the Project Co Design Contingency.

3.20 "**Defect**" means any defect, deficiency, error or fault in the Design, Construction or Work, or a failure to comply with the Project Scope and Output Specifications.

3.21 "**Design**" means the entire process for the design of the System as required by this Project Agreement.

3.22 "**Design and Certification Procedure**" means the procedure for design and certification of the System set forth in the Design and Construction Specifications and Section 20 of the Project Agreement.

3.23 "**Design and Construction Performance Requirements**" means the provisions respecting the Fixed Facilities, E&M and Vehicles set out in Schedule 15-2 – Output Specifications – Design and Construction Requirements.

3.24 "**Design and Construction Specifications**" means Schedule 15-2 – Output Specifications – Design and Construction Requirements.

3.25 "**Design and Construction Works**" means the design, construction, installation, testing, commissioning and completion of the System, including rectification of any Minor Deficiencies, and any other activities required to enable or facilitate the commencement of the Maintenance Services, and all work under the Permits, Licences and Approvals, together with the related construction-period operations and maintenance services described in Sections 1.1(b)(i) and (iii) of Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements.

3.26 "**Design Period**" means the period of time commencing upon the Design and Construction Works Commencement Date to and including the date on which the Design is completed.

3.27 "**Design Team**" means SNC-Lavalin Inc. and MMM Group Limited (which have entered into an unincorporated joint venture referred to as RTGE Joint Venture), engaged by the Construction Contractors to design the System and any substitute design team engaged by the Construction Contractor as may be permitted by the Project Agreement.

3.28 "**E&M**" means all electrical and mechanical equipment, machinery, computer hardware and systems included in the System together with all Project Intellectual Property as provided for in the Project Scope and Output Specifications.

3.29 "**EA Approvals**" means the approvals for the Project issued pursuant to EAA and CEAA, excluding those approvals or reviews relating to designs relating to the Project required to be submitted in accordance with EAA or CEAA, which designs shall be submitted by Project Co.

3.30 "**Existing Highway Infrastructure**" means Highway Infrastructure situated in, on, over or under any part of the Highway Site at Commercial Close that in accordance with the Highway Specifications is to form part of the completed Highway, but excluding Infrastructure and other property of Utility Companies.

3.31 "**Final Completion**" means the completion of the Design and Construction Works in accordance with the Project Agreement, including rectification of all Minor Deficiencies; for greater certainty, Final Completion shall not occur until Final Completion has occurred in respect of each Component.

3.32 "**Final Completion Date**" means the date on which Final Completion is achieved as evidenced by the Final Completion Certificate, as such date shall be stated therein.

3.33 "**Final Completion Notice**" has the meaning given in Section 26.8(b) of the Project Agreement.

3.34 "**Fixed Facilities**" means those improvements described as such in the Project Scope and Output Specifications (which for clarity, includes the Maintenance Centre and the Tunnel).

3.35 "**Highway Minor Deficiencies**" means any defects, deficiencies and items of outstanding Highway Work (including in relation to seasonal work), which would not materially impair City's use and enjoyment of the Highway Work and includes any damage to the Highway Work of Additional Contractors caused by Project Co.

3.36 "**Integration**" means the Design, Construction, testing and commissioning of all elements of the System, in part and as a whole, including the Fixed Facilities, the Vehicles, the MSF, and the E&M, such that all components of the System function together as one coherent system, notwithstanding the creation of the System as separate components, in accordance with the Output Specifications and otherwise as required in accordance with this Project Agreement, and "**Integrated**" shall have a corresponding meaning.

3.37 "**Liquidated Damages**" means the damages that will be suffered by the City if the Revenue Service Availability Date does not occur by the Required Revenue Service Availability Date or if Substantial Completion of the Highway Work does not occur by the Highway Scheduled Substantial Completion Date, which damages are as agreed upon by the Parties and described in Section 26.7 and Section 15.1 of Schedule 40 – Highway Work, respectively, and which damages are a genuine pre-estimate of the damages that will be suffered by the City in such event and are not a penalty.

3.38 "**Milestone Acceptance**" means with respect to any Milestone, the point at which the Milestone Acceptance Criteria for such Milestone have been attained in accordance with the Project Agreement subject only to Minor Deficiencies, a Milestone Acceptance Certificate has been issued evidencing Milestone Acceptance in respect of that Milestone, and all requirements for Milestone Acceptance for such Milestone described in Schedule 36 – Milestones, other than in respect of Minor Deficiencies, have been satisfied in respect of that Milestone.

3.39 "**Minor Deficiencies**" means any defects, deficiencies and items of outstanding work (including in relation to seasonal work) arising from or related to the work required to achieve Final Completion or Milestone Acceptance in the case of any Milestone, and which would not materially impair:

(a) the public's or the City's use and enjoyment of the System;

(b) the performance of the Governmental Activities;

(c) the performance of the Maintenance Services by Project Co; or

(d) safety or traffic flow on the System in any relevant respect,

but, for the avoidance of doubt, not including the MSF Deferred Completion Elements and the MSF Reconfiguration Elements.

3.40 "**NCC FLUA**" means the federal land use, design, and transaction approval of the NCC under section 12 of the *National Capital Act* required in respect of the change of use of, or erection, alteration, extension or demolition of a building or other work on, Crown Lands which are "public lands" within the "National Capital Region" (as such terms are defined in the NCC Act), as indicated in Appendix 2 – Lands – After – Acquired Lands – Crown Lands to this Schedule 1, which approval may include and be subject to conditions.

3.41 "**NCC Stations**" means the five (5) LRT stations within the Project, namely, Tunney's Pasture, Bayview, Lebreton, Hurdman and Train, which stations are subject to the NCC FLUA.

3.42 "**New System Infrastructure**" at any time means Infrastructure constructed in, on, over or under any part of the Lands as part of the Design and Construction Works, but excluding Third Party Facilities and Infrastructure and other property of Utility Companies.

3.43 "**Other Existing Infrastructure**" means all existing works and infrastructure on, over or under the Lands at Commercial Close.

3.44 "**Output Specifications**" means Schedule 15 – Output Specifications, and includes Schedule 15-1 – Technical Definitions and Reference Documents, Schedule 15-2 – Design, Construction Requirements, and Schedule 15-3 – Maintenance and Rehabilitation Requirements and Annex B – List of Highway Drawings and Highway Specifications to Schedule 40 – Highway Work and the Civic Work Specifications.

3.45 "**Permits**" means all permissions, consents, approvals, certificates, permits, licences, statutory agreements and authorizations required from any Relevant Authority, Regulated Utilities, Non Regulated Utilities and all necessary consents and agreements from any third parties or otherwise to Construct the System and the Highway Work, to effect the Revenue Service Availability and Substantial Completion of the Highway Work, and otherwise to carry out the Project in accordance with this Agreement, but excluding Excluded Permits.

3.46 "**Pre-Existing Environmental Site Conditions**" means the environmental conditions of the Lands as set out in the Environmental Reports.

3.47 "**Project Co Commissioning**" means the commissioning activities to be carried out by Project Co in order to achieve Revenue Service Availability as set forth in Schedule 14 – Commissioning.

3.48 "**Railway Approvals**" means all consent, approvals, permissions and agreements, and amendments thereto, required to be obtained pursuant to a Railway Order or Applicable Law, for the carrying out of Works, but does not include any Railway Orders.

3.49 "**Response**" or "**Reponses**" means the response to the RFP submitted by Project Co, including without limitation Response Drawings and Response Vehicle Drawings.

3.50 "**Response Drawings**" means plans and specifications for the System included within the Response.

3.51 "**Response Vehicle Drawings**" means the drawings with respect to the Vehicle Component submitted with the Response.

3.52 "**Revenue Service Availability**" means following the following conditions in respect of the System are achieved:

(a) the Substantial Completion in accordance with Schedule 15-2 – Output Specifications– Design and Construction Requirements, and Schedule 15-3 – Output Specifications –Maintenance and Rehabilitation Requirements;

(b) the commissioning and preliminary Operation of the System to ensure Integration and ability for the Operation of the System as contemplated in the Output Specifications;

(c) compliance with the test and commissioning requirements as provided for in Part 4 of Schedule 15-2 – Output Specifications– Design and Construction Requirements and Schedule 14 – Commissioning.

(d) compliance at that time with the Safety Requirements, as approved by the Safety Auditor;

(e) the receipt by the City of the Bill of Sale respecting the Vehicles and the Vehicle and Fixed Equipment Warranties referred to in Section 29.5 of the Project Agreement;

(f) staff training of staff provided by the City with respect to the Operation of the System has been completed and the requisite number of staff have been certified as required in accordance with "Training Plan" provided in Article 26 of Part 1 of Schedule 15-2 – Output Specifications– Design and Construction Requirements; and

(g) the Substantial Completion of the Civic Works;

as evidenced by the issuance by the Independent Certifier of a certificate acknowledging Revenue Service Availability (the "**Revenue Service Availability Certificate**").

3.53 "**Revenue Service Availability Date**" means the date on which the Revenue Service Availability is achieved.

3.54 "**Revenue Service Availability Payment Date**" means the date that is the later of:

(a) five Business Days following the Revenue Service Availability has been certified by the Independent Certifier; and

(b) five days following the receipt of the invoice in respect of the Revenue Service Availability.

3.55 "**Revenue Service Commencement**" means the commencement of Passenger service to the public on the System by the City on the Revenue Service Commencement Date.

3.56 "**Revenue Service Commencement Date**" means the 1st day following the Revenue Service Availability Date.

3.57 "**Safety Requirements**" means requirements of Applicable Law relating to health and Safety matters respecting the Design, Construction, Maintenance and Operation of the System and the Safety Case and Safety Management System.

3.58 "**Site**" means, at any time and from time to time, that portion of the Lands on which Project Co or any Project Co Party is engaged in any construction or demolition activities or is otherwise engaged in completing the Works or on which any of the Works have been commenced but not completed in their entirety or that is otherwise within the active construction footprint of the Works.

3.59 "**Stakeholders**" means individuals and organizations with an interest in the Project, including those listed in Section 4.1(c) of Schedule 17 – Environmental Obligations, but excluding any Governmental Authority or the City.

3.60 "**Substantial Completion**" means Substantial Completion of the Fixed Component and Substantial Completion of the Vehicle Component.

3.61 "**Substantial Completion Date**" means the date on which Substantial Completion is achieved as evidenced by the Substantial Completion Certificate, as such date shall be stated therein.

3.62 "**Substantial Completion of the Vehicle Component**" means:

(a) that all of the "Vehicles" required by this Project Agreement have been delivered at the location designated by the City in accordance with this Project Agreement and have been completed to the same extent as the Fixed Component, as referred to in the definition of Substantial Completion of the Fixed Component, but for clarity, there shall be no requirement for the publication of a certificate of substantial performance; and

(b) Project Co shall have caused compliance with "SAT 3" level of testing as described in the Integrated Test Plan outlined in Schedule 15 – Output Specifications.

(c) Project Co shall have demonstrated compliance with the test and commissioning requirements as provided for in Part 4 of Schedule 15 2 – Output Specifications– Design and Construction Requirements and Schedule 14 – Commissioning.

3.63 "**Substantial Completion of the Vehicle Component Date**" means the date on which Substantial Completion of the Vehicle Component is achieved as evidenced by the Substantial Completion Certificate, as such date shall be stated therein.

3.64 "**System**" means the light rail rapid transit system to be Designed, Constructed, supplied, tested, commissioned and Maintained by Project Co in accordance with this Project Agreement, being the Fixed Facilities, the Vehicles and the E&M, but, for greater certainty, including without limitation:

(a) all Infrastructure;

(b) all site services, utilities, roadways and parking areas required to support such Infrastructure;

(c) all supporting systems and improvements; and

(d) all other works, improvements, and demolitions to occur on the Lands or the Site,

in each case required to meet the Output Specifications and the requirements under the Permits, Licences and Approvals and whether or not in the course of construction, installation or completion.

3.65 "**System Design Functionality**" means the ability of the System to enable the City to carry out the Operation of the System in a manner that meets the City's Operation Requirements and Specifications as set out in the Output Specifications.

3.66 "**Vehicle Milestone**" means any Milestone containing as a component thereof all or any part of a Vehicle Component.

3.67 "**Work**" or "**Works**" means all workmanship, materials and anything and everything required to be done to achieve Final Completion and includes the Design, Construction, testing, commissioning and completion of the System and all components of the System (including any Temporary Works) to be performed by Project Co in accordance with this Project Agreement as may be varied, amended or supplemented from time to time in accordance with this Project Agreement.

SCHEDULE 2

COMPLETION DOCUMENTS

In this Schedule 2, "**certified**" shall mean that the relevant document is certified as a true and complete copy in full force and effect and unamended as of the date of the relevant certificate by an officer or director of the relevant corporation.

1. DOCUMENTS TO BE DELIVERED BY PROJECT CO

Unless an original document is specifically required, a certified copy of each of the following documents (in each case, executed by the parties to such agreement and in form and substance satisfactory to the City, acting reasonably) is to be delivered by Project Co to the City on or prior to the Financial Close Target Date:

1.1 an original of this Project Agreement;

1.2 an original of the Custody Agreement;

1.3 an original of the Lenders' Direct Agreement;

1.4 an original of the Contractor's Direct Agreement with the Construction Contractor;

1.5 an original of the Contractor's Direct Agreement with the Maintenance Contractor;

1.6 an original of the Independent Certifier Agreement;

1.7 an original of the Insurance Trust Agreement;

1.8 an original notice of appointment of the Project Co Representative;

1.9 an original of the acknowledgement and undertaking in the form attached as Appendix A to this Schedule 2;

1.10 the Lending Agreements;

1.11 the Construction Contract;

1.12 the Maintenance Contract;

1.13 a certificate of insurance and draft policies of insurance for the insurances required to be taken out by each of the Construction Contractors for the period prior to the Revenue Service Availability Date in accordance with this Project Agreement;

1.14 one (1) printed copy of the Financial Model (as revised pursuant to Section 2.3(c) of the Project Agreement, if applicable) and two (2) copies on CD-Rom;

1.15 a certificate of an officer of Project Co certifying:

(a) a true copy of the Financial Model audit report dated February 12, 2013 prepared by PKF LLP; and

(b) that the Financial Model algorithms have not changed from the audit report referred to in (a) above;

1.16 a certificate of an officer of each of ACS RTG Partner Inc., EllisDon RTG Partner Inc. and SNC RTG Partner Inc., substantially in the form attached as Appendix B to this Schedule 2;

1.17 a certificate of an officer of each member of each of the Contractors substantially in the form attached as Appendix B to this Schedule 2;

1.18 a certificate of an officer of each Guarantor substantially in the form attached as Appendix B to this Schedule 2;

1.19 an original of the opinion from counsel to Project Co, each of the Contractors, each of the Guarantors and such other Project Co Parties as the City may reasonably require substantially in the form attached as Appendix C to this Schedule 2 and otherwise acceptable to the City and its counsel; and

1.20 such other documents as the Parties may agree, each acting reasonably.

2. DOCUMENTS TO BE DELIVERED BY THE CITY

Unless an original document is specifically required, a certified copy of each of the following documents is to be delivered by the City to Project Co on or prior to the Financial Close Target Date:

2.1 an original of this Project Agreement;

2.2 an original of the Custody Agreement;

2.3 an original of the Lenders' Direct Agreement;

2.4 an original of the Contractor's Direct Agreement with the Construction Contractor;

2.5 an original of the Contractor's Direct Agreement with the Maintenance Contractor;

2.6 an original of the Independent Certifier Agreement;

2.7 an original of the Insurance Trust Agreement;

2.8 an original notice of appointment of the City Representative;

2.9 a certificate of an officer of the City respecting authorisation and execution of the Project Agreement in form satisfactory to the City;

2.10 an instruction to Project Co as to the amount payable to the unsuccessful Proponents (as defined in the Request for Proposals) by way of a Coordination Fee, including all necessary instructions in relation to payment of the same; and

2.11 such other documents as the Parties may agree, each acting reasonably.

APPENDIX A

FORM OF UNDERTAKING AND ACKNOWLEDGEMENT

TO: City of Ottawa ("**City**")

TO: Ontario Infrastructure and Lands Corporation ("**IO**")

RE: Project agreement (as amended, supplemented or modified from time to time, the "**Project Agreement**") dated the 12th day of February, 2013 between the City and Rideau Transit Group General Partnership ("**Project Co**")

---

1. The undersigned acknowledges that public ownership of the System will be preserved.

2. The undersigned undertakes to comply with all Applicable Law in any direction or order issued by the City to the extent that the direction or order affects the Project Scope.

3. Capitalized terms used but not defined herein have the respective meanings ascribed thereto in the Project Agreement.

DATED this 12th day of February, 2013.

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP, by its partners, ACS RTG PARTNER INC., SNC RTG PARTNER INC. and ELLISDON RTG PARTNER INC.

ACS RTG PARTNER INC.

Per: _____

Name:
Title:

I have authority to bind the corporation.

SNC RTG PARTNER INC.

Per: _____
Name:
Title:

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

ELLISDON RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

APPENDIX B

FORM OF PROJECT CO/PROJECT CO PARTY OFFICER'S CERTIFICATE

Certificate of an Officer of

[●]

(the "**Corporation**")

TO: **CITY OF OTTAWA** (the "**City**")

AND TO: **ONTARIO INFRASTRUCTURE AND LANDS CORPORATION**

AND TO: **BORDEN LADNER GERVAIS LLP**

AND TO: **LENDERS' AGENT**

AND TO: **[●]**

I, **[●]**, being the **[●]** of the Corporation and an authorized signatory of the Corporation and being duly authorized by the Corporation to deliver this certificate, hereby make the following certifications and confirmations for and on behalf of the Corporation and without incurring personal liability and that the same may be relied upon by you without further inquiry:

1. Constating Documents

   (a) The Corporation is a subsisting corporation duly incorporated under the laws of [●].

   (b) Attached hereto as **Schedule "A"** are true and complete copies of the articles, together with all amendments thereto, of the Corporation (the "**Articles**"). The Articles are in full force and effect on the date hereof and no other articles have been issued and no proceeding has been taken or is contemplated to the date hereof to authorize the Corporation to amend, surrender or cancel the Articles.

   (c) Attached hereto as **Schedule "B"** are true and complete copies of the by-laws of the Corporation (the "**By-laws**") enacted on or before the date hereof. The By-laws have been in full force and effect from and after the date thereof as set out therein and are in full force and effect, unamended as of the date hereof. No proceeding has been taken to the date hereof to authorize the Corporation to amend the By-laws and neither the directors nor the shareholders of the Corporation have passed, confirmed or consented to any resolutions amending or varying the By-laws.

(d) Attached hereto as **Schedule "C"** is a true and complete copy of a unanimous shareholders' agreement between the shareholders of the Corporation and the Corporation (the "**Unanimous Shareholders' Agreement**") executed on or before the date hereof. The Unanimous Shareholders' Agreement has been in full force and effect from and after the date thereof as set out therein and is in full force and effect, unamended as of the date hereof.

(e) The minute books and corporate records of the Corporation made available to **[●]** are the original minute books and corporate records of the Corporation and contain all minutes of meetings, resolutions and proceedings of the shareholders and directors of the Corporation to the date hereof and there have been no meetings, resolutions or proceedings authorized or passed by the shareholders or directors of the Corporation to the date hereof not reflected in such minute books and corporate records. Such minute books and corporate records are true, complete and correct in all material respects and there are no changes, additions or alterations necessary to be made thereto to make such minute books and corporate records true, complete and correct in all material respects.

(f) At the date hereof, no winding-up, liquidation, dissolution, insolvency, bankruptcy, amalgamation, arrangement, reorganization or continuation proceedings in respect of the Corporation have been commenced or are being contemplated by the Corporation, and the Corporation has no knowledge of any such proceedings having been commenced or contemplated in respect of the Corporation by any other party.

(g) At the date hereof, the Corporation is up-to-date in the filing of all returns and other documents required to be filed by it by governmental authorities, including under corporate, securities and tax legislation, and no notice of any proceedings to cancel its certificate of incorporation or otherwise to terminate its existence has been received by the Corporation.

(h) Pursuant to the Unanimous Shareholders' Agreement, the powers of the directors of the Corporation to manage the business and affairs of the Corporation, whether such powers arise from the [***Business Corporations Act*** **(Ontario) (the "Act")**], the Articles or the By-laws of the Corporation, or otherwise, are restricted to the fullest extent permitted by law, and, in accordance with the Act and the Unanimous Shareholders' Agreement, the shareholders of the Corporation have and enjoy and may exercise and perform all the rights, powers, and duties of the directors of the Corporation to manage the business and affairs of the Corporation.

(i) There are no provisions in the Articles, By-laws, Unanimous Shareholders' Agreement or in any other agreement binding on the Corporation which:

(i) restrict or limit the powers of the Corporation to enter into:

(1) a certain project agreement with the City made as of February 12, 2013 (as the same may be amended, supplemented, restated or otherwise modified from time to time, the "**Project Agreement**") pursuant to which the Corporation will design, build, finance and maintain a new light rail transit system;

(2) a lenders' direct agreement between the Corporation, the City and the Lenders' Agent;

(3) a direct agreement between the Corporation and the City; and

(4) **[NTD: List other documents delivered at Financial Close.]**,

(collectively, the "**Documents**"); or

(ii) restrict or limit the authority of the directors or shareholders of the Corporation by resolution to delegate the powers set out in subparagraph (i) to a director or an officer of the Corporation.

2. Resolutions

(a) Annexed hereto, forming part hereof and marked as **Schedule "D"** are true and complete copies of the resolutions of the [**directors/shareholders**] of the Corporation (the "Resolutions"), which have been duly and validly passed in accordance with applicable law, constituting authority and approval for the Corporation, *inter alia*, to enter into the Documents. The Resolutions are the only resolutions of the Corporation pertaining to the subject matter thereof and the same are in full force and effect, unamended as of the date hereof.

(b) The authorization, execution and delivery of each Document contemplated in the Resolutions, and the performance by the Corporation of its obligations thereunder, do not constitute or result in a violation or breach or default under:

(i) the Articles, By-laws or the Unanimous Shareholders' Agreement;

(ii) to the best of my knowledge and belief after due diligence, any order of any Canadian or **[**Ontario**]** governmental body by which it is bound;

(iii) to the best of my knowledge and belief after due diligence, the terms of any agreement or instrument under which any of its property or assets is bound; or

(iv) to the best of my knowledge and belief after due diligence, any writ, judgment, injunction, determination or award which is binding on the Corporation or any of its properties.

(c) To the best of my knowledge and belief after due diligence, there is no claim, action, suit, proceedings, arbitration, investigation or inquiry before any governmental agency, court or tribunal, foreign or domestic, or before any private arbitration tribunal, pending or threatened against the Corporation, or involving its properties or business. To the best of my knowledge and belief after due diligence, no administrative or court decree is outstanding in respect of the Corporation or its assets.

(d) To the best of my knowledge and belief after due diligence, no consent, approval or other order of any Canadian or [**Ontario**] governmental authority which has not been obtained is required to permit the Corporation to execute and deliver the Documents.

3. No Breach or Default

Neither the execution and delivery by the Corporation of the Documents nor the consummation of the transactions therein contemplated nor the fulfilment or compliance with the terms thereof will contravene or result in a breach of any of the terms, conditions or provisions of, or constitute a default under the Articles, By-laws, Unanimous Shareholders' Agreement or under any other agreement binding on the Corporation.

4. Specimen Signatures

The persons whose names are set forth below are, at the date hereof, officers and/or directors of the Corporation, duly elected or appointed to the office or offices set forth opposite their respective names and authorized to execute the Documents on behalf of the Corporation. The signatures set forth opposite their respective names are the true signatures of those persons:

NAME	POSITION	SIGNATURE
		_____
		_____
		_____
		_____
		_____
		_____

5. Capital

Listed below are all of the issued and outstanding shares in the capital of the Corporation and the registered owner(s) of such shares:

ISSUED SHARES	REGISTERED OWNER

Attached hereto as **Schedule "E"** are true copies of all certificates in respect of such issued and outstanding shares. The Corporation has issued no securities, including (without limitation) securities convertible or exchangeable into shares and/or securities in respect of debt, other than such issued and outstanding shares as are listed above.

DATED this _____ day of _____, 2012.

By: _____
Name:
Title:

APPENDIX C

FORM OF PROJECT CO/PROJECT CO PARTY OPINION

FEBRUARY 12, 2013 **[NTD: Form of opinion may be split between in house counsel and outside counsel opinions.]**

City of Ottawa
Finance Department
Supply Branch
100 Constellation Crescent
4th Floor, West Tower
Ottawa Ontario
K2G 6J8

Ontario Infrastructure and Lands Corporation
777 Bay Street, 9th Floor
Toronto, Ontario
M5G 2E5

Borden Ladner Gervais LLP
Scotia Plaza, 40 King Street West
Toronto, Ontario
M5H 3Y4

Dear Sirs/Mesdames:

Re: Ottawa Light Rail Transit System

We have acted as counsel to [●] **[NTD: insert the name of Project Co and/or any of the Contractors] [("Project Co")/(the "Contractor")]** in connection with the alternative financing and procurement transaction whereby Project Co has agreed to enter into a design, build, finance and maintain agreement for a new light rail transit system in the City of Ottawa. **[NTD: Additional parties to be added depending on consortium structure and/or the financing package. Add each partner of Project Co and each member of each of the Contractors.]**

This opinion is being delivered to the City of Ottawa (the "**City**"), Ontario Infrastructure and Lands Corporation ("**IO**") and their counsel pursuant to Section 1.21 of Schedule 2 to the project agreement made as of February 12, 2013 between the City and Project Co (as the same may be amended, supplemented, restated or otherwise modified from time to time, the "**Project Agreement**").

All capitalized terms used but not otherwise defined in this opinion shall have the respective meanings ascribed thereto in the Project Agreement.

In our capacity as counsel to Project Co **[and/or [●] Contractor]**, we have participated in the preparation and negotiation, and have examined an executed copy, of each of the following documents (unless otherwise indicated, all documents are dated as of **[●]**, 2013):

1. the Project Agreement; and

2. the following project documents (collectively, the "**Implementation Documents**"):

   (a) the Construction Contract;

   (b) the Maintenance Contract;

   (c) the Lenders' Direct Agreement;

   (d) the Contractor's Direct Agreement with the Construction Contractor;

   (e) the Contractor's Direct Agreement with the Maintenance Contractor;

   (f) the Lending Agreements;

   (g) **[the General Partnership Agreement]**; and

   (h) **[the Performance Guarantees]**.

The Project Agreement and the Implementation Documents are hereinafter collectively referred to as the "**Documents**", and each is individually referred to as a "**Document**". **[NTD: Additional documents to be added depending on consortium structure and/or the financing package.]**

We are qualified to practise law in the Province of Ontario. We have made no investigation of the laws of any jurisdiction other than Ontario, and the opinions expressed below are confined to the laws of Ontario and the federal laws of Canada applicable therein as at the date hereof.

[We do not act as corporate counsel to [Project Co and/or [●] Contractor], nor have we participated in the general maintenance of their corporate records and corporate proceedings. Therefore, in expressing certain of the opinions below, we have, where indicated, relied exclusively, and without any independent investigation or enquiry, on certificates of public officials and a certificate of an officer of each partner of Project Co and each member of the Construction Contractor dated as of the date hereof (the "Officer's Certificates") as to certain factual matters.] [NTD: use if appropriate]

<u>Searches and Reliance</u>

We have conducted, or have caused to be conducted, the searches identified in Schedule "A" (the "**Searches**") for filings or registrations made in those offices of public record listed in Schedule "A". The Searches were conducted against the current name and all former names of **[Project Co and/or the [●] Contractor]** (including, in each case, both the English and French versions, if any). The results of the Searches are set out in Schedule "A".

We have also made such investigations and examined originals or copies, certified or otherwise identified to our satisfaction, of such certificates of public officials and of such other certificates, documents and records as we have considered necessary or relevant for purposes of the opinions expressed below, including, without limitation, the Officer's Certificates.

We have relied exclusively, and without any independent investigation or enquiry, on the Officer's Certificates and the certificates of public officials with respect to certain factual matters.

In connection with the opinions set forth in paragraphs 1 and 2 below, we have relied exclusively on Certificates of Status issued by the **[Ministry of Government Services (Ontario)]** of even date, copies of which are attached as Schedule "B".

[In connection with the opinions set forth in paragraphs 4, 6, 8, 12, and 14 below, we have relied exclusively, and without any independent investigation or enquiry, upon the opinion of [●] dated [●], 2011 (the "CC Opinion"), a copy of which has been delivered to you. To the extent that the CC Opinion contains assumptions, qualifications, limitations or definitions, or is expressed as relying on any certificate(s) or other documents identified therein, the opinions herein expressed in reliance on the CC Opinion should be read as incorporating the identical assumptions, qualifications, limitations, definitions and reliances.] [NTD: use if appropriate]

Assumptions

For the purposes of the opinions expressed herein, we have assumed:

1. The genuineness of all signatures, the authenticity of all documents submitted to us as originals, the conformity to originals of all documents submitted to us as certified, true, conformed, photostatic or notarial copies or facsimiles thereof and the authenticity of the originals of such certified, true, conformed, photostatic or notarial copies or facsimiles.

2. Each of the parties (other than **[Project Co and/or [●] Contractor]**) to each of the Documents is and was, at all relevant times, a subsisting corporation, partnership, limited partnership, limited liability company or trust, as applicable, under the laws of its jurisdiction of formation.

3. Each of the parties (other than **[Project Co and/or [●] Contractor]**) has (and had) the corporate power, authority and capacity to own its property and assets and to carry on its business as such business is now (or as was then) being carried on by it, has (or had) all requisite corporate power, authority and capacity to execute and deliver each Document to which it is party and to perform its obligations thereunder, has taken all necessary corporate action, as applicable, to authorize the execution and delivery of each Document to which it is a party and the performance of its obligations thereunder, and has duly executed and delivered each Document to which it is a party and each Document to which it is a party is a legal, valid and binding obligation of such party enforceable against it in accordance with its terms.

4. The completeness, truth and accuracy of all facts set forth in the Officer's Certificates.

5. The completeness, truth and accuracy of all facts set forth in official public records and certificates and other documents supplied by public officials.

6. Value has been given by each of the parties (other than **[Project Co and/or [●] Contractor]**) to Project Co **[and/or [●] Contractor]**.

Opinions

Based upon and subject to the foregoing, and to the qualifications, exceptions and limitations hereinafter expressed, we are of the opinion that, as of the date hereof:

Incorporation and Existence

1. Project Co is a corporation incorporated under the laws of **[the Province of Ontario]** and has not been dissolved.

2. The **[●]** Contractor is a corporation incorporated under the laws of **[the Province of Ontario]** and has not been dissolved. **[NTD: insert the name of all Contractors that the counsel acts for]**

Corporate Power and Capacity

3. Project Co has the corporate power and capacity to own or lease its properties and assets, to carry on its business as it is currently being conducted and as it is contemplated to be conducted under the Project Agreement, and to enter into and perform its obligations under each of the Documents to which it is a party.

4. The **[●]** Contractor has the corporate power and capacity to own or lease its properties and assets, to carry on its business as it is currently being conducted and as it is contemplated to be conducted under the Documents, and to enter into and perform its obligations under each of the Documents to which it is a party. **[NTD: insert the name of all Contractors that the counsel acts for]**

Corporate Authorization

5. Project Co has taken all necessary corporate action to authorize the execution and delivery of, and the performance of its obligations under, each of the Documents to which it is a party.

6. The **[●]** Contractor has taken all necessary corporate action to authorize the execution and delivery of, and the performance of its obligations under, each of the Documents to which it is a party. **[NTD: insert the name of all Contractors that the counsel acts for]**

Execution and Delivery

7. Project Co has duly executed and delivered each of the Documents to which it is a party.

8. The **[●]** Contractor has duly executed and delivered each of the Documents to which it is a party. **[NTD: insert the name of all Contractors that the counsel acts for]**

Enforceability

9. Each of the Documents to which Project Co is a party constitutes a legal, valid and binding obligation of Project Co, enforceable against it in accordance with its terms.

10. Each of the Documents to which the **[●]** Contractor is a party constitutes a legal, valid and binding obligation of the **[●]** Contractor, enforceable against it in accordance with its terms. **[NTD: insert the name of all Contractors that the counsel acts for]**

No Breach or Default

11. The execution and delivery by Project Co of the Documents to which it is a party does not, and the performance by Project Co of its obligations under each such Document in accordance with its terms will not, breach or constitute a default under (i) any provisions of **[the General Partnership Agreement]**, or (ii) the provisions of any law, statute, rule or regulation to which Project Co is subject.

12. The execution and delivery by the **[●]** Contractor of the Documents to which it is a party does not, and the performance by the Construction Contractor of its obligations under each such Document in accordance with its terms will not, breach or constitute a default under (i) its articles, by-laws or unanimous shareholders' agreement, or (ii) the provisions of any law, statute, rule or regulation to which the **[●]** Contractor is subject. **[NTD: insert the name of all Contractors that the counsel acts for]**

Regulatory Approvals

13. No authorization, consent, permit or approval of, or other action by, or filing with or notice to, any governmental agency or authority, regulatory body, court, tribunal or other similar entity having jurisdiction is required in connection with the execution and delivery by Project Co of the Documents to which it is a party and the performance of its obligations thereunder.

14. No authorization, consent, permit or approval of, or other action by, or filing with or notice to, any governmental agency or authority, regulatory body, court, tribunal or other similar entity having jurisdiction is required in connection with the execution and delivery by the **[●]** Contractor of the Documents to which it is a party and the performance of its obligations thereunder. **[NTD: insert the name of all Contractors that the counsel acts for]**

<u>Qualifications</u>

Our opinions herein are subject to the following qualifications and reservations, namely:

1. The enforceability of any Document and the rights and remedies set out therein or any judgment arising out of or in connection therewith is subject to and may be limited by

any applicable bankruptcy, reorganization, winding-up, insolvency, moratorium or other laws of general application affecting creditors' rights from time to time in effect.

2. The enforceability of each of the Documents and the rights and remedies set out therein is subject to and may be limited by general principles of equity, and no opinion is given as to any specific remedy that may be granted, imposed or rendered, including equitable remedies such as those of specific performance and injunction, or the availability of equitable defences.

3. The enforceability of any Document will be subject to the limitations contained in the *Limitations Act*, 2002 (Ontario), and we express no opinion as to whether a court may find any provision of any Document to be unenforceable as an attempt to vary or exclude a limitation period under that Act.

4. Pursuant to the *Currency Act* (Canada), a judgment in money rendered by a court in the Province of Ontario must be awarded in Canadian currency and such judgment may be based on a rate of exchange in effect other than the day of payment of the judgment.

5. To the extent that a particular contractual provision is characterized by a court as a penalty and not as a genuine pre-estimate of damages, it will not be enforceable.

6. A court may not treat as conclusive those certificates and determinations which the Documents state are to be so treated.

7. A receiver or receiver and manager appointed pursuant to the provisions of any Document, for certain purposes, may not be treated by a court as being solely the agent of Project Co notwithstanding any agreement to the contrary.

8. The ability to recover or claim for certain costs or expenses may be subject to judicial discretion.

9. With respect to any provisions of the Documents pursuant to which the parties to such Documents are permitted or required to submit a dispute arising out of such Documents to arbitration, we express no opinion as to the enforceability of such arbitration provisions in all circumstances since under the *Arbitration Act*, 1991 (Ontario) a court of competent jurisdiction in Ontario may, in its discretion and upon certain grounds, refuse to stay judicial proceedings in which event an arbitration under such arbitration provisions may not be commenced or continued. In addition, the *Arbitration Act*, 1991 (Ontario) provides that a court may hear an appeal of an arbitration award on a question of law, or set aside an arbitration award or declare it invalid, in each case on certain prescribed grounds.

10. Any requirement in any of the Documents that interest be paid at a higher rate after than before default may not be enforceable.

11. The effectiveness of provisions which purport to relieve a person from a liability or duty otherwise owed may be limited by law, and provisions requiring indemnification or

reimbursement may not be enforced by a court, to the extent that they relate to the failure of such person to perform such duty or liability.

12. No opinion is expressed as to the enforceability of any provision contained in any Document which purports to sever from the Document any provision therein which is prohibited or unenforceable under applicable law without affecting the enforceability or validity of the remainder of the Document.

13. No opinion is expressed regarding any waiver of service of process, presentment, demand, protest or notice of dishonour which may be contained in any of the Documents.

14. Any award of costs is in the discretion of a court of competent jurisdiction.

15. The enforceability of rights of indemnity set out in the Documents may be limited under applicable law to the extent that they directly or indirectly relate to liabilities imposed by law on the City for which it would be contrary to public policy to require Project Co to indemnify the City or to the extent that they constitute the indirect enforcement of a foreign revenue or penal law.

16. We express no opinion as to the enforceability by any person who is not beneficiary to the Documents of any provisions therein that purports to bind or affect or confer a benefit on such person.

This opinion is being delivered solely in connection with the transaction addressed herein and may not be relied upon by any person other than the addressees, and their successors and permitted assigns, or for any purpose other than the transaction addressed herein.

Yours very truly,

[INSERT NAME OF LAW FIRM]

SCHEDULE 3

CUSTODY AGREEMENT

THIS AGREEMENT is made as of the 12th day of February, 2013

BETWEEN:

CITY OF OTTAWA

(the "**City**")

AND

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP, a general partnership formed under the laws of the Province of Ontario

("**Project Co**")

AND

BNY TRUST COMPANY OF CANADA, in its capacity as custodian for and on behalf of the City and Project Co

(in such capacity, the "**Custodian**")

AND

BNY TRUST COMPANY OF CANADA, in its capacity as collateral agent for and on behalf of the Lenders

(the "**Lenders' Agent**")

WHEREAS:

A. The City and Project Co (collectively, the "**PA Parties**" and each, a "**PA Party**") have entered into the Project Agreement.

B. Pursuant to the terms of the Project Agreement, the PA Parties wish to appoint the Custodian, and the Custodian wishes to accept such appointment, to perform certain services in connection with the Project Agreement.

C. The PA Parties and the Custodian wish to enter into this Custody Agreement in order to record the terms by which the Custodian shall perform such services.

NOW THEREFORE in consideration of the mutual covenants and agreements of the PA Parties and the Custodian herein contained and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the PA Parties and the Custodian covenant and agree as follows:

1. DEFINITIONS

In this Custody Agreement, including the recitals and appendices, unless the context indicates a contrary intention, terms which are defined in the Project Agreement (and not otherwise defined in this Custody Agreement) shall have meanings given to them in the Project Agreement and the following terms shall have the following meanings:

(a) "**City Signatory**" has the meaning given in Section 6(a)(i).

(b) "**Custodian**" means BNY Trust Company of Canada, acting as custodian for and on behalf of the City and Project Co.

(c) "**Lenders' Agent**" means BNY Trust Company of Canada, acting as collateral agent for and on behalf of the Lenders.

(d) "**Material**" means hard and electronic copies of the Financial Model.

(e) "**PA Parties**" means both the City and Project Co, and "**PA Party**" means either the City or Project Co, as the context requires.

(f) "**Party**" means the City, the Custodian, Project Co or the Lenders' Agent, and "**Parties**" means the City, the Custodian, Project Co and the Lenders' Agent.

(g) "**Project Agreement**" means the project agreement made on or about the 12th day of February, 2013 between the City and Project Co.

(h) "**Project Co**" means Rideau Transit Group General Partnership.

(i) "**Project Co Signatory**" has the meaning given in Section 6(a)(ii).

(j) "**Step-Out Date**" has the meaning given in Section 14(e).

2. INTERPRETATION

This Custody Agreement shall be interpreted according to the following provisions, unless the context requires a different meaning:

(a) The headings in this Custody Agreement are for convenience of reference only, shall not constitute a part of this Custody Agreement, and shall not be taken into consideration in the interpretation of, or affect the meaning of, this Custody Agreement.

(b) Unless the context otherwise requires, references to specific Sections, Paragraphs, Subparagraphs, and other divisions are references to such Sections, Paragraphs, Subparagraphs, or divisions of this Custody Agreement and the terms "Section" and "Section" are used interchangeably and are synonymous.

(c) Words importing persons or parties are to be broadly interpreted and include an individual, corporation, firm, partnership, joint venture, trust, unincorporated organization, Governmental Authority, unincorporated body of persons or association and any other entity having legal capacity, and the heirs, beneficiaries, executors, administrators or other legal representatives of a person in such capacity.

(d) Unless the context otherwise requires, wherever used herein the plural includes the singular, the singular includes the plural, and each of the masculine, feminine and neuter genders include all other genders.

(e) References to any standard, principle, agreement or document include (subject to all relevant approvals and any other provisions of this Custody Agreement concerning amendments) a reference to that standard, principle, agreement or document as amended, supplemented, restated, substituted, replaced, novated or assigned.

(f) The words in this Custody Agreement shall bear their natural meaning.

(g) References containing terms such as:

(i) "hereof", "herein", "hereto", "hereinafter", and other terms of like import are not limited in applicability to the specific provision within which such references are set forth but instead refer to this Custody Agreement taken as a whole; and

(ii) "includes" and "including", whether or not used with the words "without limitation" or "but not limited to", shall not be deemed limited by the specific enumeration of items but shall, in all cases, be deemed to be without limitation and construed and interpreted to mean "includes without limitation" and "including without limitation".

(h) In construing this Custody Agreement, the rule known as the *ejusdem generis* rule shall not apply nor shall any similar rule or approach to the construction of this Custody Agreement and, accordingly, general words introduced or followed by the word "other" or "including" or "in particular" shall not be given a restrictive meaning because they are followed or preceded (as the case may be) by particular examples intended to fall within the meaning of the general words.

(i) Where this Custody Agreement states that an obligation shall be performed "no later than" or "within" or "by" a stipulated date or event which is a prescribed number of days after a stipulated date or event, the latest time for performance shall be 5:00 p.m. on the last day for performance of the obligation concerned, or, if that day is not a Business Day, 5:00 p.m. on the next Business Day.

(j) Where this Custody Agreement states that an obligation shall be performed "on" a stipulated date, the latest time for performance shall be 5:00 p.m. on that day, or, if that day is not a Business Day, 5:00 p.m. on the next Business Day.

(k) Any reference to time of day or date means the local time or date in Toronto, Ontario.

(l) Unless otherwise indicated, time periods will be strictly construed.

(m) Whenever the terms "will" or "shall" are used in this Custody Agreement they shall be construed and interpreted as synonymous and to read "shall".

3. PROJECT CO'S DUTIES AND WARRANTIES

(a) The City will, together with Project Co, verify the identity and consistency of one copy of the Material, which shall be delivered by Project Co to the Custodian on the date of this Custody Agreement.

(b) Project Co shall at all times ensure that the Material as delivered to the Custodian is capable of being used to generate the latest version of the Financial Model issued to the City and shall deliver further copies of the Material to the Custodian as and when necessary.

(c) Upon creation of any new versions of the Financial Model and within 30 days from receipt of a notice served upon it by the Custodian under the provisions of Section 4(a)(v), the replacement copy of the Material shall be verified by the PA Parties in accordance with Section 3(a) and delivered by Project Co to the Custodian.

(d) Project Co warrants that:

(i) it owns the Intellectual Property Rights in the Material and has authority to enter into this Custody Agreement;

(ii) the use of the Materials by the City under the terms of this Custody Agreement shall not infringe any Intellectual Property Rights of any person; and

(iii) the Material delivered under Section 3(a) shall contain all information in human-readable form and on suitable media to enable a reasonably skilled programmer or analyst to understand, maintain and correct the Material without the assistance of any other person.

4. CUSTODIAN'S DUTIES

(a) The Custodian shall:

(i) hold in safe custody all versions of the Financial Model delivered to it pursuant to the terms hereof, and the provisions of this Custody Agreement shall apply (with any necessary changes being made) to any revised Financial Model;

(ii) hold the Material in a safe and secure environment;

(iii) inform Project Co and the City of the receipt of any copy of the Material;

(iv) at all times retain a copy of the latest verified deposit of the Material; and

(v) promptly notify Project Co and the City if it becomes aware at any time during the term of this Custody Agreement that any copy of the Material held by it has been lost, damaged or destroyed.

(b) The Custodian shall not be responsible for procuring the delivery of the Material in the event of failure by Project Co to do so.

(c) In accordance with Section 10, the Custodian shall allow the PA Parties, the Lenders' Agent and the auditor retained by the Lenders' Agent to inspect and audit the Financial Model from time to time.

5. PAYMENT

(a) In consideration of the Custodian performing the services contemplated by this Custody Agreement, Project Co shall pay the Custodian's fees as agreed from time to time between the Custodian and Project Co.

6. RELEASE EVENTS

(a) The Custodian shall hold the Material to the order of the PA Parties and shall honour the instructions and signatures of:

(i) the City Representative, as defined in the Project Agreement (the "**City Signatory**"); and

(ii) the President & CEO and designated signing officers of Project Co or such other person nominated by it and notified to the Custodian and the City in writing (the "**Project Co Signatory**");

and shall, subject to Section 6(b), upon receiving signed joint instructions from the City Signatory and the Project Co Signatory, release one copy of the Material to the person either named in such instructions or previously identified in writing by the City Signatory and the Project Co Signatory.

(b) The PA Parties each agree that they shall give joint instructions to the Custodian for the release of the Material, in accordance with Section 6(a), on each occasion that the Material is required to be released pursuant to the Project Agreement or that the Material must be released to allow the Material to be maintained and/or corrected.

(c) The Custodian shall release the Material to a duly authorized representative of the City on any termination of the Project Agreement prior to the Expiry Date.

7. RECORDS

(a) The PA Parties shall be entitled, at reasonable hours and upon giving the Custodian reasonable notice, to inspect any records kept by the Custodian in accordance with this Custody Agreement.

8. CONFIDENTIALITY

(a) The Material shall remain the confidential property of Project Co and, in the event that the Custodian provides a copy of the Material to the City, the City shall be permitted to use the Material only in accordance with the intellectual property and confidentiality obligations in the Project Agreement.

(b) The Custodian agrees for itself, its directors, officers, employees, sub-contractors and agents, to maintain all information and/or documentation in whatever form coming into its possession or to its knowledge under or in connection with this Custody Agreement in strictest confidence and secrecy. The Custodian further agrees not to make use of such information and/or documentation other than for the purposes of this Custody Agreement and will not disclose or release it other than in accordance with the terms of this Custody Agreement.

(c) In the event that the Material is released under Section 6, the City shall:

(i) use the Material only for the purpose of understanding, maintaining and correcting the Financial Model exclusively on behalf of the City;

(ii) not use the Material for any other purpose nor disclose it to any person, save such of its employees or contractors who need to know the same in order to understand, maintain and correct the Financial Model exclusively on behalf of the City;

(iii) hold all media containing the Material in a safe and secure environment when not in use; and

(iv) forthwith destroy the same should the City cease to be entitled to use the Financial Model.

9. INTELLECTUAL PROPERTY RIGHTS

(a) The release of the Material to the City and to the Custodian will not act as an assignment of any Intellectual Property Rights that Project Co possesses in the Material.

10. INSPECTION

(a) Subject to the following provisions of this Section 10, the Custodian shall bear no obligation or responsibility to any person, firm, company or entity whatsoever to determine the existence, relevance, completeness, accuracy, effectiveness or any other aspect of the Financial Model.

(b) The PA Parties shall be entitled, at reasonable hours and upon giving the Custodian reasonable notice, to inspect and audit or to procure the inspection and audit of the Financial Model in accordance with this Section 10.

(c) The Custodian shall, upon receiving duly signed instructions from both of the PA Parties (but only upon receiving such instructions), provide facilities for the City and/or Project Co and/or such person identified in the duly signed written instructions to inspect and audit the Financial Model.

(d) The Custodian shall maintain a record of any inspection and audit made pursuant to Section 10(b), including details of the person who made the inspection and/or audit and the date of the same.

11. CUSTODIAN'S LIABILITY AND INSURANCE

11.1 Custodian's Liability

(a) The Custodian shall not be liable for any loss or damage caused to Project Co or the City either jointly or severally except to the extent that such loss or damage is caused by the negligent acts or omissions of or a breach of any contractual duty by the Custodian, its employees, agents or sub-contractors.

(b) The Custodian shall in no circumstances be liable to Project Co or the City for indirect or consequential loss of any nature whatsoever whether for loss of profit, loss of business or otherwise.

(c) Subject to complying with the provisions of Section 6, and save in the case of manifest error, the Custodian shall be protected in acting upon any written request, waiver, consent, receipt or other document furnished to it pursuant to this Custody Agreement, not only in assuming its due execution and the validity and effectiveness of its provisions but also as to the truth and acceptability of any information contained in it, which the Custodian in good faith believes to be genuine and what it purports to be.

(d) The duties, responsibilities and obligations of the Custodian shall be limited to those expressly set forth herein and no duties, responsibilities or obligations shall be inferred or implied. The Custodian shall not be subject to, nor required to comply with, any other agreement between or among any or all of the other Parties or to which any Party is a party, even though reference thereto may be made herein, or to comply with any direction or instruction (other than those contained herein or delivered in accordance herewith). The Custodian shall not be required to expend or risk any of its own funds or otherwise incur any financial liability in the performance of any of its duties hereunder except ordinary corporate costs incurred in the performance of such duties.

(e) If at any time the Custodian is served with any judicial or administrative order, judgment, decree, writ or other form of judicial or administrative process which in any way affects the Material (including, but not limited to, orders of attachment or garnishment or other forms of levies or injunctions or stays relating to the transfer of property), the Custodian is authorized to comply therewith in any manner as it or its legal counsel deems appropriate, acting reasonably; provided that the Custodian, when so served, shall promptly notify Project Co and the City, in writing, of such process and the Custodian's intended action in order to provide Project Co and the City a reasonable opportunity to intervene or challenge such process in a court or tribunal of competent jurisdiction.

(f) The Custodian may consult with legal counsel (at the expense of Project Co and the City, unless the matter relates to the negligent acts or omissions of or a breach of any contractual duty by the Custodian, its employees, agents or sub-contractors, where such consultation will be at the Custodian's sole cost) as to any matter relating to this Custody Agreement, and the Custodian shall not incur any liability in acting in good faith in accordance with any advice from such counsel. All reasonable fees and disbursements incurred by the Custodian shall be added to the fees otherwise payable hereunder.

(g) The Custodian shall not incur any liability for not performing any act or fulfilling any duty, obligation or responsibility hereunder by reason of any occurrence beyond the control of the Custodian (including, but not limited to, any act or provision of any present or future law or regulation or governmental authority, any act of God or war, or the unavailability of any wire or communication facility).

(h) The Custodian shall not be responsible in any respect for the form or content of the Material delivered to it hereunder.

(i) In the event of any ambiguity or uncertainty hereunder or in any notice, instruction or other communication received by the Custodian hereunder, the Custodian shall notify Project Co and the City in writing of such ambiguity or uncertainty and request instructions to eliminate such ambiguity or uncertainty. The Custodian may, acting reasonably, refrain from taking any action other than to retain possession of the Material, unless the Custodian receives written instructions, signed by Project Co and the City, which eliminates such ambiguity or uncertainty.

(j) In the event of any dispute between or conflicting claims by or among the PA Parties and/or any other person or entity with respect to the Material, the Custodian shall be entitled, acting reasonably, to refuse to comply with any and all claims, demands or instructions with respect to the Material so long as such dispute or conflict shall continue, and the Custodian shall promptly notify Project Co and the City of its intention to do so. In such circumstances, the Custodian shall not be or become liable in any way to Project Co or the City for failure or refusal to comply with such conflicting claims, demands or instructions. The Custodian shall be entitled to refuse to act until, acting reasonably, either (i) such conflicting or adverse claims or demands shall have been determined by a final order, judgment or decree of a court of competent jurisdiction, which order, judgment or decree is not subject to appeal, or settled by agreement between the conflicting parties as evidenced in writing satisfactory to the Custodian or (ii) the

Custodian shall have received security or an indemnity satisfactory to it acting reasonably sufficient to hold it harmless from and against any and all losses which it may incur by reason of so acting. The Custodian may, in addition, elect, acting reasonably, to commence an interpleader action or seek other judicial relief or orders as it may deem, acting reasonably, necessary, including, without limiting the generality of the foregoing, depositing all or any part of the Material into court. The costs and expenses (including reasonable attorneys' fees and expenses) incurred in connection with such proceeding shall be paid by, and shall be deemed a joint and several obligation of, Project Co and the City.

(k) Each of Project Co and the City shall provide to the Custodian an incumbency certificate setting out the names and sample signatures of persons authorized to give instructions to the Custodian hereunder. The Custodian shall be entitled to rely on such certificate until a revised certificate is provided to it hereunder. The Custodian shall be entitled to refuse to act upon any instructions given by a party which are signed by any person other than a person described in the incumbency certificate provided to it pursuant to this section.

(l) The Custodian shall be entitled to rely, and act upon, on any direction, order, instruction, notice or other communication provided to it hereunder which is sent to it by facsimile transmission.

(m) This Section 11.1 shall survive the termination of this Custody Agreement.

11.2 Insurance

(a) The Custodian must have in place at all times during the term of this Custody Agreement such insurance as is customarily maintained by a reputable Canadian financial institution performing services similar to those provided by the Custodian pursuant to this Custody Agreement.

12. INDEMNITY

(a) Save for any claim falling within the provisions of Section 11.1(a), Project Co and the City, on a joint and several basis, shall be liable for and shall indemnify and hold harmless the Custodian, and its officers, directors and employees, from and against any and all claims, losses, liabilities, costs, damages or expenses (including reasonable attorneys' fees and expenses) arising from or in connection with or related to this Custody Agreement or acting as Custodian hereunder (including, but not limited to, losses incurred by the Custodian in connection with its successful defense of any claim of negligence or willful misconduct on its part).

(b) The indemnity provided in this Section 12 shall not extend to:

(i) losses caused by the negligent acts or omissions of or a breach of any contractual duty by the Custodian, its employees, agents or sub-contractors;

(ii) any action taken by the Custodian outside the scope of authority set forth in this Custody Agreement, or any part or parts hereof; or

(iii) any debt, cost, expense, claim or demand for which insurance proceeds are recoverable by the Custodian.

(c) Claims made by a third person against a party having, or claiming to have, the benefit of an indemnity pursuant to this Custody Agreement, shall be conducted in accordance with the conduct of claims procedure described in Appendix A – Conduct of Claims to this Custody Agreement.

13. TERMINATION

(a) The Custodian may terminate this Custody Agreement for failure by Project Co to pay any outstanding fee provided for herein within 30 days of receipt of written notice in respect thereof.

(b) The Custodian may terminate this Custody Agreement by giving 120 days prior written notice to Project Co and the City. In that event, Project Co and the City shall appoint a mutually acceptable new custodian on terms similar to those contained in this Custody Agreement.

(c) If the Custodian is not notified of the new custodian within the notice period given in Section 13(b), the Custodian will deliver the Material to Project Co. If the Custodian is unable to trace Project Co within 60 days of writing to the last registered address notified by Project Co to the Custodian, the Custodian will destroy the Material.

(d) The City may terminate this Custody Agreement by giving 30 days prior written notice to the Custodian and Project Co.

(e) Project Co may, with the prior written consent of the City, terminate this Custody Agreement by giving 30 days prior written notice to the Custodian and the City.

(f) This Custody Agreement shall terminate upon release of the Material to the City in accordance with Section 6(c).

(g) Upon termination under the provisions of Sections 13(a), 13(d) or 13(e), the Custodian will deliver one copy of the Material to Project Co and one copy of the Material to the City. If the Custodian is unable to trace Project Co within 60 days of writing to the last registered address notified by Project Co to the Custodian having used all reasonable endeavours to do so, the Custodian will destroy the copy of the Material that would have otherwise delivered to Project Co.

(h) **[Intentionally deleted]**

(i) The Custodian may forthwith terminate this Custody Agreement and destroy the copy of the Material that it would have otherwise delivered to Project Co if it is unable to trace Project Co within 60 days of writing to the last registered address notified by Project Co to the Custodian having used all reasonable endeavours to do so. In such event of termination, a copy of the Material will be delivered to the City within 30 days of such termination.

(j) The provisions of Sections 8, 11 and 12 shall continue in full force and effect after termination of this Custody Agreement.

(k) The Agreement shall terminate on the Expiry Date, at which time Project Co will write to the Custodian requesting the release of the Materials to it. The Custodian agrees that it will notify the City of Project Co's request and, failing receipt of any notice of objection from the City within 30 days of the receipt of the notice by the City, it shall release the Materials to Project Co.

(l) On termination of this Custody Agreement, Project Co shall remain liable to the Custodian for payment in full of any fee which has become due but which has not been paid as at the date of termination.

14. STEP-IN RIGHTS

(a) The Custodian shall, from time to time:

(i) permit the City to perform or discharge any obligation of Project Co under this Custody Agreement, where Project Co is in breach of the same;

(ii) permit Project Co to perform or discharge any obligation of the City under this Custody Agreement, where the City is in breach of the same, save and except for any obligation of the City to provide any consent or approval hereunder; and

(iii) following notification by the Lenders' Agent (who at the same time shall provide a copy of any such notification to the City), permit the Lenders' Agent or another person specified in such notice with effect from the date specified in the same to perform or discharge all the obligations of Project Co under this Custody Agreement, provided that the Lenders' Agent shall have the benefit of and be entitled to enforce against the Custodian any and all of the Custodian's obligations to Project Co under this Custody Agreement and the Custodian undertakes to perform such obligations in favour of the Lenders' Agent.

(b) Project Co consents to the performance or discharge of its obligations by the City pursuant to Section 14(a)(i).

(c) The City consents to the performance or discharge of its obligations by Project Co pursuant to Section 14(a)(ii).

(d) The PA Parties consent to the performance or discharge of Project Co's obligations by the Lenders' Agent pursuant to Section 14(a)(iii).

(e) The City or the Lenders' Agent shall be entitled to terminate the Lenders' Agent's obligations pursuant to Section 14(a)(iii) on giving the Custodian prior notice (the City or the Lenders' Agent at the same time shall provide a copy of any such notification to the other party) of at least 15 Business Days. On and from the date of expiry of such notice (the "**Step-Out Date**"), the Lenders' Agent, as applicable, shall be automatically released from all obligations pursuant to this Custody Agreement, except for any which have fallen due for performance or discharge on or before the Step-Out Date and which have not been fully and unconditionally performed or discharged.

(f) The occurrence of the Step-Out Date shall not affect the continuation of Project Co's obligations towards the Custodian under this Custody Agreement.

(g) The Lenders' Agent is a Party to this Custody Agreement solely for the purposes of taking the benefit of its rights under Section 4(c) of this Custody Agreement and this Section 14 and shall have no rights or obligations or liabilities hereunder, except pursuant to the operation of Section 4(c) of this Custody Agreement and this Section 14.

15. ASSIGNMENT

(a) This Custody Agreement shall be binding on, and enure to the benefit of, the Custodian, Project Co and the City and their respective successors and permitted transferees and assigns.

(b) Project Co may assign, transfer or otherwise dispose of the benefit of this Custody Agreement to any person to whom Project Co assigns, transfers or otherwise disposes of its interest in the Project Agreement pursuant to Section 59.1 of the Project Agreement.

(c) The City may assign, transfer or otherwise dispose of the benefit of this Custody Agreement to any person to whom the City assigns, transfers or otherwise disposes of its interest in the Project Agreement pursuant to Section 59.2 of the Project Agreement.

(d) The Custodian shall not, without the prior written consent of the PA Parties assign, transfer or otherwise dispose of the benefit of this Custody Agreement to any person.

(e) The Custodian acknowledges that Project Co has granted a security interest over its rights under this Custody Agreement to the Lenders' Agent.

16. NOTICES

(a) All notices, requests, demands, instructions, certificates, consents and other communications required or permitted under this Custody Agreement shall be in writing (whether or not "written notice" or "notice in writing" is specifically required by the applicable provision of this Custody Agreement) and served by sending the same by registered mail, facsimile or by hand, as follows:

If to the City:	City of Ottawa Finance Department, Supply Branch 100 Constellation Crescent 4th Floor, West Tower Ottawa, ON K2G 6J8 Fax No.: (613) 580-9688 Attn: Director, Rail Implementation Office
With a copy to:	Ontario Infrastructure and Lands Corporation 777 Bay Street 6th Floor Toronto, ON M5G 2C8 Fax No.: (416) 327-6387 Attn: Vice President, Civil Infrastructure
If to Project Co:	Rideau Transit Group General Partnership 1 First Canadian Place, Suite 6000 PO Box 367, 100 King Street West Toronto, Ontario M5X 1E2 Fax No.: (416) 365-7886 Attn: Eusebio Corregel
With a copy to:	ACS RTG Partner Inc. c/o ACS Infrastructure Canada Inc. 155 University Avenue, Suite 1800 Toronto, Ontario M5H 3B7 Fax No.: 1-786-272-7992 Attn: Nuria Haltiwanger
With a copy to:	EllisDon RTG Partner Inc. c/o 800-89 Queensway Avenue Mississauga, Ontario L5B 2V2 Fax No.: (905) 803-3059 Attn: Jody K. Becker
With a copy to:	SNC RTG Partner Inc. c/o 455 René-Lévesque Blvd. West Montreal, Quebec H2Z 1Z3 Fax No.: (514)866-0795 Attn: Gerry Grigoropoulos

If to the Custodian: BNY Trust Company of Canada
11th Floor, 320 Bay Street
Toronto, ON M5H 4A6

Fax No.: (416) 360-1711
Attn: Vice President, Transaction Management Group

If to the Lenders' Agent BNY Trust Company of Canada
11th Floor, 320 Bay Street
Toronto, ON M5H 4A6

Fax No.: (416) 360-1711
Attn: Vice President, Transaction Management Group

(b) Where any notice is provided or submitted to a Party via facsimile, an original of the notice sent via facsimile shall promptly be sent by regular mail or registered mail. For greater certainty, a notice given via facsimile shall not be invalid by reason only of a Party's failure to comply with this Section 16(b).

(c) Any Party to this Custody Agreement may, from time to time, change any of its contact information set forth in Section 16(a) by prior notice to the other Parties, and such change shall be effective on the Business Day that next follows the recipient Party's receipt of such notice unless a later effective date is given in such notice.

(d) Subject to Sections 16(e), 16(f) and 16(g):

(i) a notice given by registered mail shall be deemed to have been received on the third Business Day after mailing;

(ii) a notice given by hand delivery shall be deemed to have been received on the day it is delivered; and

(iii) a notice given by facsimile shall be deemed to have been received on the day it is transmitted by facsimile.

(e) If the Party giving the notice knows or ought reasonably to know of difficulties with the postal system which might affect negatively the delivery of mail, any such notice shall not be mailed but shall be made or given by personal delivery or by facsimile transmission in accordance with this Section 16.

(f) If any notice delivered by hand or transmitted by facsimile is so delivered or transmitted, as the case may be, either on a day that is not a Business Day or on a Business Day after 4:00 p.m. (recipient's local time), then such notice shall be deemed to have been received by such recipient on the next Business Day.

(g) A notice given by facsimile shall be deemed to have been received by the recipient on the day it is transmitted only if a facsimile transmission report (maintained by the sender) indicates that the transmission of such notice was successful.

17. RIGHT TO DESIGNATE

(a) At any time and from time to time, the City may designate any City Representative, as defined in the Project Agreement to carry out administrative responsibility for the rights and obligations of the City under this Custody Agreement and Project Co, the Custodian and the Lenders' Agent may deal exclusively with the designated person in respect of all such matters and are entitled to rely on the actions, directions, requests, notices, consents, approvals, waivers, comments relating to the review of documentation and other administrative matters and decisions determined by such designated person from time to time, until the City has notified Project Co, the Custodian and the Lenders' Agent in writing that such designated person is no longer the person designated by the City hereunder and such notice shall have effect on the later of the date of delivery of such notice and the date specified in the written notice. The City shall advise Project Co, the Custodian and the Lenders' Agent in writing of any designation hereunder. The rights and obligations of the Parties to this Custody Agreement shall be in no way affected by reason of any such designation. Project Co, the Custodian and the Lenders' Agent acknowledge the right of the City to delegate administrative responsibilities hereunder as set forth in this Section 17.

18. AMENDMENTS

(a) This Custody Agreement may not be varied, amended or supplemented except by an agreement in writing signed by duly authorized representatives of the Parties and stating on its face that it is intended to be an amendment, restatement or other modification, as the case may be, to this Custody Agreement.

19. WAIVER

(a) No waiver made or given by a Party under or in connection with this Custody Agreement shall be binding or effective unless the waiver is in writing, signed by an authorized representative of the Party giving such waiver, and delivered by such Party to the other Parties. No waiver made with respect to any right, power or remedy in one instance will be deemed to be a waiver with respect to any other instance involving the exercise of such right, power, or remedy or with respect to any other right, power, or remedy.

(b) Failure by any Party to exercise any of its rights, powers or remedies hereunder or its delay to do so shall not constitute a waiver of those rights, powers or remedies. The single or partial exercise of a right, power or remedy shall not prevent its subsequent exercise or the exercise of any other right, power or remedy.

20. RELATIONSHIP BETWEEN THE PARTIES

(a) The Parties are independent contractors. This Custody Agreement is not intended to and does not create or establish between the Parties any relationship as partners, joint venturers, trustee and beneficiary, employer and employee, master and servant, or principal and agent.

21. ENTIRE AGREEMENT

(a) Except where provided otherwise in this Custody Agreement, this Custody Agreement and the Project Agreement constitute the entire agreement between the Parties in connection with the subject matter of this Custody Agreement and supersede all prior representations, communications, negotiations and understandings, whether oral, written, express or implied, concerning the subject matter of this Custody Agreement.

22. SEVERABILITY

(a) Each provision of this Custody Agreement shall be valid and enforceable to the fullest extent permitted by law. If any provision of this Custody Agreement is declared invalid, unenforceable or illegal by the courts of a competent jurisdiction, such provision may be severed and such invalidity, unenforceability or illegality shall not prejudice or affect the validity, enforceability and legality of the remaining provisions of this Custody Agreement. If any such provision of this Custody Agreement is invalid, unenforceable or illegal, the Parties shall, acting in good faith, promptly negotiate new provisions to eliminate such invalidity, unenforceability or illegality and to restore this Custody Agreement as near as possible to its original intent and effect.

23. ENUREMENT

(a) This Custody Agreement shall enure to the benefit of, and be binding on, each of the Parties and their respective successors and permitted transferees and assigns.

24. GOVERNING LAW AND JURISDICTION

(a) This Custody Agreement shall be governed by and construed in accordance with the laws of Ontario and the laws of Canada applicable therein and shall be treated in all respects as an Ontario contract, without regard to conflict of laws principles.

(b) The Parties agree that the courts of the Province of Ontario and all courts competent to hear appeals therefrom shall have exclusive jurisdiction to hear and settle any action, suit, proceeding or dispute in connection with this Custody Agreement and hereby irrevocably attorn to the exclusive jurisdiction of such courts.

25. FURTHER ASSURANCE

(a) Each Party shall do all things, from time to time, and execute all further documents necessary to give full effect to this Custody Agreement.

26. LANGUAGE OF AGREEMENT

(a) Each Party acknowledges having requested and being satisfied that this Custody Agreement and related documents be drawn in English. Chacune des parties reconnaît avoir demandé que ces documents soient rédigés en anglais et s'en declare satisfaite.

27. PROOF OF AUTHORITY

(a) The City reserves the right to require any person executing this Custody Agreement on behalf of Project Co or the Lenders' Agent to provide proof, in a form acceptable to the City, that such person has the requisite authority to execute this Custody Agreement on behalf of and to bind Project Co or the Lenders' Agent, respectively.

28. COUNTERPARTS

(a) This Custody Agreement may be executed in one or more counterparts. Any single counterpart or a set of counterparts executed, in either case, by all the Parties shall constitute a full, original and binding agreement for all purposes. Counterparts may be executed either in original or faxed form provided that any Party providing its signature in faxed form shall promptly forward to such Party an original signed copy of this Custody Agreement which was so faxed.

[***This section intentionally left blank***]

IN WITNESS WHEREOF the parties have executed this Custody Agreement as of the date first above written.

CITY OF OTTAWA

Per: _____
Name: Kent Kirkpatrick
Title: City Manager

I have authority to bind the corporation.

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP, by its partners, ACS RTG PARTNER INC., SNC RTG PARTNER INC. and ELLISDON RTG PARTNER INC.

ACS RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

SNC RTG PARTNER INC.

Per: _____
Name:
Title:

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

ELLISDON RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

BNY TRUST COMPANY OF CANADA, in its capacity as custodian for and on behalf of the City and Project Co

Per: _____
Name:
Title:

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

BNY TRUST COMPANY OF CANADA, in its capacity as collateral agent for and on behalf of the Lenders

Per: _____
Name:
Title:

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

APPENDIX A

CONDUCT OF CLAIMS

This Appendix A shall apply to the conduct of claims, made by a third person against a party having, or claiming to have, the benefit of an indemnity pursuant to this Custody Agreement. The party having, or claiming to have, the benefit of the indemnity is referred to as the "**Beneficiary**" and the City and Project Co are referred to, collectively, as the "**Indemnifier**".

(1) If the Beneficiary receives any notice, demand, letter or other document concerning any claim for which it appears that the Beneficiary is, or may become entitled to, indemnification under Section 12 of the Custody Agreement, the Beneficiary shall give written notice to the Indemnifier as soon as reasonably practicable and in any event within 10 Business Days of receipt of the same. Such notice shall specify with reasonable particularity, to the extent that information is available, the factual basis for the claim and the amount of the claim.

(2) Subject to Sections (3), (4) and (5) of this Appendix A, on the giving of such notice by the Beneficiary, where it appears that the Beneficiary is or may be entitled to indemnification from the Indemnifier in respect of all, but not part only, of the liability arising out of the claim, the Indemnifier shall be entitled to dispute the claim in the name of the Beneficiary at the Indemnifier's own expense and take conduct of any defence, dispute, compromise, or appeal of the claim and of any incidental negotiations. In such case, the City may, but shall not be obligated to, assume (on prior written notice to Project Co) control of any such defence for and on behalf of itself and Project Co, and Project Co hereby consents to such assumption. The Beneficiary shall give the Indemnifier all reasonable cooperation, access and assistance for the purposes of considering and resisting such claim. The Beneficiary shall have the right to employ separate counsel in respect of such claim at its own cost and expense.

(3) With respect to any claim conducted by the Indemnifier:

(i) the Indemnifier shall keep the Beneficiary fully informed and consult with it about material elements of the conduct of the claim;

(ii) the Indemnifier shall not bring the name or reputation of the Beneficiary into disrepute;

(iii) the Indemnifier shall not pay, compromise or settle such claims without the prior consent of the Beneficiary, such consent not to be unreasonably withheld or delayed;

(iv) the Indemnifier shall not admit liability or fault to any third party without the prior consent of the Beneficiary, such consent not to be unreasonably withheld or delayed; and

(v) the Indemnifier shall use commercially reasonable efforts to have the Beneficiary named as a beneficiary under any release given by the persons bringing the claim to which this Section (3) relates.

(4) The Beneficiary shall be free to pay or settle any such claim on such terms as it thinks fit and without prejudice to its rights and remedies under this Custody Agreement if:

(i) the Indemnifier is not entitled to take conduct of the claim in accordance with Section (2); or

(ii) the Indemnifier fails to notify the Beneficiary of its intention to take conduct of the relevant claim as soon as reasonably practicable and in any event within 10 Business Days of the notice from the Beneficiary under Section (1) or the Indemnifier notifies the Beneficiary that the Indemnifier does not intend to take conduct of the claim.

(5) The Beneficiary shall be free at any time to give notice to the Indemnifier that the Beneficiary is retaining or taking over, as the case may be, the conduct of any defence, dispute, compromise or appeal of any claim, or of any incidental negotiations, to which Section (2) applies. On receipt of such notice the Indemnifier shall promptly take all steps necessary to transfer the conduct of such claim to the Beneficiary, and shall provide to the Beneficiary all relevant documentation and all reasonable cooperation, access and assistance for the purposes of considering and resisting such claim. If the Beneficiary gives any notice pursuant to this Section (5), then the Indemnifier shall be released from any liabilities arising under the applicable indemnity hereunder in respect of the applicable claim.

(6) If the Indemnifier pays to the Beneficiary an amount in respect of an indemnity and the Beneficiary subsequently recovers, whether by payment, discount, credit, saving, relief or other benefit or otherwise, a sum or anything else of value (the "**Recovery Amount**"), the Beneficiary shall forthwith repay to the Indemnifier whichever is the lesser of:

(i) an amount equal to the Recovery Amount less any out-of-pocket costs and expenses properly incurred by the Beneficiary in recovering the same; and

(ii) the amount paid to the Beneficiary by the Indemnifier in respect of the claim under the relevant indemnity,

provided that there shall be no obligation on the Beneficiary to pursue any Recovery Amount and that the Indemnifier shall be repaid only to the extent that the Recovery Amount, aggregated with any sum recovered from the Indemnifier, exceeds the loss sustained by the Beneficiary except, however, that if the Beneficiary elects not to pursue a Recovery Amount, the Indemnifier shall be entitled to require an assignment to it of the right to do so.

(7) Any person taking any of the steps contemplated by this Appendix A shall comply with the requirements of any insurer who may have an obligation to provide an indemnity in respect of any liability arising under this Custody Agreement.

SCHEDULE 4

LENDERS' DIRECT AGREEMENT

THIS AGREEMENT is made as of the 12th day of February, 2013

BETWEEN:

CITY OF OTTAWA

(the "**City**")

AND

BNY TRUST COMPANY OF CANADA, in its capacity as collateral agent for and on behalf of the Lenders

(the "**Lenders' Agent**")

AND

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP, a general partnership formed under the laws of the Province of Ontario

("**Project Co**")

WHEREAS:

A. The City and Project Co have entered into the Project Agreement.

B. The construction of the System and the Highway Work will provide an overall improvement to the quality of life of the citizens of the City of Ottawa and its outlying regions, as well as to visitors to the City.

C. Under the Lending Agreements, financing is to be provided to Project Co by the Lenders to finance the Project Scope, conditional on, among other things, Project Co granting the Security to the Lenders' Agent.

D. The Lenders' Agent has agreed to enter into this lenders' direct agreement (the "**Lenders' Direct Agreement**") with the City in relation to the Security, the exercise of its rights under the Security Documents and the remedying of breaches by Project Co under the Project Agreement.

E. With a view to ensuring that both the City and Project Co are able to properly and effectively discharge their respective duties, functions and responsibilities under Applicable Law, the Lenders' Agent and the Lenders commit to working collaboratively, responsibly and cooperatively with both the City and Project Co throughout the Project Term.

NOW THEREFORE in consideration of the mutual covenants and agreements of the Parties hereinafter contained and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties covenant and agree as follows:

1. DEFINITIONS

In this Lenders' Direct Agreement, unless the context otherwise requires:

(a) "**Affiliate**" has the meaning given in the Project Agreement.

(b) "**Appointed Representative**" means any of the following to the extent so identified in an Appointed Representative Notice:

(i) the Lenders' Agent, any Lender or any of their Affiliates;

(ii) a receiver or receiver and manager of Project Co appointed under the Security Documents;

(iii) a trustee in bankruptcy or court-appointed receiver of Project Co;

(iv) an administrator of Project Co;

(v) a person directly or indirectly owned or controlled by the Lenders' Agent and/or any of the Lenders; or

(vi) any other person approved by the City (such approval not to be unreasonably withheld or delayed).

(c) "**Appointed Representative Notice**" has the meaning given in Section 8(b).

(d) "**Business Day**" has the meaning given in the Project Agreement.

(e) "**Change in Control**" has the meaning given in the Project Agreement.

(f) "**Change in Ownership**" has the meaning given in the Project Agreement.

(g) "**City Party**" has the meaning given in the Project Agreement.

(h) "**City Project Documents**" means the Project Agreement and all other documents to which both the City and Project Co are parties pursuant to or in connection with the Project Agreement.

(i) "**Contracts**" has the meaning given in the Project Agreement.

(j) "**Contractors**" has the meaning given in the Project Agreement.

(k) "**Default Notice**" has the meaning given in Section 7(b)(i).

(l) "**Direct Agreements**" has the meaning given in the Project Agreement.

(m) "**Enforcement Action**" means any acceleration of amounts due and owing to the Lenders under any of the Lending Agreements and/or any enforcement proceeding or enforcement action commenced or taken under any of the Security Documents.

(n) "**Enforcement Event**" means an event of default as defined in the Lending Agreements that is continuing, or any other event which permits an Enforcement Action.

(o) "**Equity Capital**" has the meaning given in the Project Agreement.

(p) "**Exercise Date**" has the meaning given in Section 12(b).

(q) "**Failure Points**" has the meaning given in the Project Agreement.

(r) "**Governmental Authority**" has the meaning given in the Project Agreement.

(s) **"Highway"** has the meaning given in the Project Agreement.

(t) "**Indebtedness Notice**" has the meaning given in Section 7(b)(ii).

(u) "**Lender Representative**" means a representative (which may be the Lenders' Agent) acting as agent or trustee for and on behalf of all of the lenders lending to a Suitable Substitute.

(v) "**Lenders**" has the meaning given in the Project Agreement.

(w) "**Lenders' Agent**" means BNY Trust Company of Canada, acting as collateral agent for and on behalf of the Lenders.

(x) "**Lenders' Direct Agreement**" means this lenders' direct agreement.

(y) "**Lending Agreements**" has the meaning given in the Project Agreement.

(z) "**Longstop Date**" has the meaning given in the Project Agreement.

(aa) "**Monitoring Notice**" has the meaning given in the Project Agreement.

(bb) "**Notice Period**" means the period starting on the date of delivery of a Default Notice and ending 120 days later.

(cc) "**Novation Date**" has the meaning given in Section 10(a).

(dd) "**Novation Notice**" has the meaning given in Section 10(a).

(ee) "**Maintenance Contract**" has the meaning given in the Project Agreement.

(ff) "**Maintenance Contractor**" has the meaning given in the Project Agreement.

(gg) "**Party**" means any of the City, Project Co or the Lenders' Agent, and "**Parties**" means all of the City, Project Co and the Lenders' Agent.

(hh) "**Project**" has the meaning given in the Project Agreement.

(ii) "**Project Agreement**" means the project agreement made on or about the 12th day of February, 2013 between the City and Project Co.

(jj) "**Project Co**" means Rideau Transit Group General Partnership.

(kk) "**Project Co Event of Default**" has the meaning given in the Project Agreement.

(ll) "**Project Co Party**" has the meaning given in the Project Agreement.

(mm) "**Project Documents**" has the meaning given in the Project Agreement.

(nn) "**Project Scope**" has the meaning given in the Project Agreement.

(oo) "**Refinancing**" has the meaning given in the Project Agreement.

(pp) "**Restricted Person**" has the meaning given in the Project Agreement.

(qq) "**Revenue Service Availability Date**" has the meaning given in the Project Agreement.

(rr) "**Security**" means the security interests granted by Project Co to the Lenders' Agent pursuant to the Security Documents.

(ss) "**Security Documents**" means all documents pursuant to which security is granted to the Lenders (or any trustee or agent thereof, including the Lenders' Agent) pursuant to or in connection with the Lending Agreements, including but not limited to:

(i) the general security agreement made on or about the date hereof granted by Project Co, ACS RTG Partner Inc., SNC RTG Partner Inc. and EllisDon RTG Partner Inc. in favour of the Lenders' Agent;

(ii) the limited recourse guarantee and pledge agreement made on or about the date hereof granted by ACS OLRT Holdings Inc. in favour of the Lenders' Agent;

(iii) the limited recourse guarantee and pledge agreement made on or about the date hereof granted by SNC-Lavalin Capital Inc. in favour of the Lenders' Agent;

(iv) the limited recourse guarantee and pledge agreement made on or about the date hereof granted by EllisDon OLRT Holdings Inc. in favour of the Lenders' Agent;

(v) a general blocked accounts agreement made on or about the date hereof between Project Co, the Lenders' Agent and the Account Bank (as defined in the Credit Agreement);

(vi) a springing blocked accounts agreement made on or about the date hereof between Project Co, the Lenders' Agent and the Account Bank (as defined in the Credit Agreement); and

(vii) the Lenders' CC Direct Agreement and the Lenders' MC Direct Agreement (each as defined in the Credit Agreement).

(tt) "**Step-In Date**" means the date on which the City receives a Step-In Notice from the Lenders' Agent.

(uu) "**Step-In Notice**" means the notice given by the Lenders' Agent to the City pursuant to Section 8(a) stating that the Lenders' Agent is exercising its step-in rights under this Lenders' Direct Agreement.

(vv) "**Step-In Period**" means the period from the Step-In Date up to and including the earlier of:

(i) the Step-Out Date;

(ii) the Termination Date (provided that the City has complied with its obligations in Section 7 of this Lenders' Direct Agreement);

(iii) the date that a transfer of Project Co's rights and obligations under the City Project Documents to a Suitable Substitute pursuant to Section 10 becomes effective; and

(iv) if the Step-In Date occurs prior to the Revenue Service Availability Date, the earlier of:

(A) the date falling 180 days after the Longstop Date; or

(B) the date falling two years after the Step-In Date.

(ww) "**Step-Out Date**" means the date falling 30 days after the date on which the City receives a Step-Out Notice.

(xx) "**Step-Out Notice**" has the meaning given in Section 9(a).

(yy) "**Subsequent Indebtedness Notice**" has the meaning given in Section 7(c).

(zz) "**Suitable Substitute**" means a person, approved in writing by the City in accordance with Sections 10(b) and 10(c), which:

(i) has the legal capacity, power and authority to become a party to and perform the obligations of Project Co under the City Project Documents; and

(ii) employs individuals having the appropriate qualifications, experience and technical competence, and having the resources available to it (including committed financial resources and subcontracts) that are sufficient to enable it to perform the obligations of Project Co under the City Project Documents.

(aaa) "**System**" has the meaning given in the Project Agreement.

(bbb) "**Termination Date**" has the meaning given in the Project Agreement.

(ccc) "**Warning Notice**" has the meaning given in the Project Agreement.

2. INTERPRETATION

This Lenders' Direct Agreement shall be interpreted according to the following provisions, unless the context requires a different meaning:

(a) The headings in this Lenders' Direct Agreement are for convenience of reference only, shall not constitute a part of this Lenders' Direct Agreement, and shall not be taken into consideration in the interpretation of, or affect the meaning of, this Lenders' Direct Agreement.

(b) Unless the context otherwise requires, references to specific Sections, Clauses, Paragraphs, Subparagraphs, and other divisions are references to such Sections, Clauses, Paragraphs, Subparagraphs, or divisions of this Lenders' Direct Agreement and the terms "Section" and "Clause" are used interchangeably and are synonymous.

(c) Words importing persons or parties are to be broadly interpreted and include an individual, corporation, firm, partnership, joint venture, trust, unincorporated organization, Governmental Authority, unincorporated body of persons or association and any other entity having legal capacity, and the heirs, beneficiaries, executors, administrators or other legal representatives of a person in such capacity.

(d) Unless the context otherwise requires, wherever used herein the plural includes the singular, the singular includes the plural, and each of the masculine, feminine and neuter genders include all other genders.

(e) References to any standard, principle, agreement or document include (subject to all relevant approvals and any other provisions of this Lenders' Direct Agreement concerning amendments) a reference to that standard, principle, agreement or document as amended, supplemented, restated, substituted, replaced, novated or assigned.

(f) The words in this Lenders' Direct Agreement shall bear their natural meaning.

(g) References containing terms such as:

(i) "hereof", "herein", "hereto", "hereinafter", and other terms of like import are not limited in applicability to the specific provision within which such references are set forth but instead refer to this Lenders' Direct Agreement taken as a whole; and

(ii) "includes" and "including", whether or not used with the words "without limitation" or "but not limited to", shall not be deemed limited by the specific enumeration of items but shall, in all cases, be deemed to be without limitation and construed and interpreted to mean "includes without limitation" and "including without limitation".

(h) In construing this Lenders' Direct Agreement, the rule known as the *ejusdem generis rule* shall not apply nor shall any similar rule or approach to the construction of this Lenders' Direct Agreement and, accordingly, general words introduced or followed by the word "other" or "including" or "in particular" shall not be given a restrictive meaning because they are followed or preceded (as the case may be) by particular examples intended to fall within the meaning of the general words.

(i) Where this Lenders' Direct Agreement states that an obligation shall be performed "no later than" or "within" or "by" a stipulated date or event which is a prescribed number of days after a stipulated date or event, the latest time for performance shall be 5:00 p.m. on the last day for performance of the obligation concerned, or, if that day is not a Business Day, 5:00 p.m. on the next Business Day.

(j) Where this Lenders' Direct Agreement states that an obligation shall be performed "on" a stipulated date, the latest time for performance shall be 5:00 p.m. on that day, or, if that day is not a Business Day, 5:00 p.m. on the next Business Day.

(k) Any reference to time of day or date means the local time or date in Toronto, Ontario.

(l) Unless otherwise indicated, time periods will be strictly construed.

(m) Whenever the terms "will" or "shall" are used in this Lenders' Direct Agreement they shall be construed and interpreted as synonymous and to read "shall".

3. CONFLICT OF DOCUMENTS

In the event of any ambiguity, conflict or inconsistency between the provisions of this Lenders' Direct Agreement, the Project Agreement and either of the Direct Agreements, the provisions of this Lenders' Direct Agreement shall prevail and govern to the extent of such ambiguity, conflict or inconsistency.

4. TERM

(a) This Lenders' Direct Agreement shall terminate automatically on the earliest of:

(i) the date on which all amounts which may be or become owing to the Lenders under the Lending Agreements have been irrevocably paid in full;

(ii) the Termination Date (provided that the City has complied with its obligations in Section 7 of this Lenders' Direct Agreement); and

(iii) the date that any transfer of Project Co's rights and obligations under the City Project Documents to a Suitable Substitute pursuant to Section 10 becomes effective and the agreements contemplated in Section 10(e)(iii) are executed and delivered by the parties thereto.

(b) Within 30 days following its occurrence, the Lenders' Agent shall provide notice to the City of the date referred to in Section 4(a)(i).

5. AGREEMENTS AND SECURITY

(a) Project Co and the Lenders' Agent shall not amend or modify the Lending Agreements, or any of them, except where Project Co is permitted to do so pursuant to Section 7.3(a) of the Project Agreement.

(b) Project Co and the City shall not amend or modify the City Project Documents (other than in accordance with the terms of those agreements) without the prior written consent of the Lenders' Agent, not to be unreasonably withheld or delayed, which consent shall not be withheld if the relevant amendment or modification shall not (i) materially adversely affect the ability of the Lenders to exercise their rights under the Security, (ii) materially adversely affect the value of the Security, or (iii) increase the liability of the Lenders or Project Co under the relevant agreement. The Lenders' Agent shall respond to any request for consent under this Section 5(b) within 30 days of receipt thereof.

(c) Project Co acknowledges and consents to the arrangements set out in this Lenders' Direct Agreement, and agrees not to do or omit to do anything that may prevent any other Party from enforcing its rights under this Lenders' Direct Agreement.

(d) The Lenders' Agent acknowledges having received a copy of the Project Agreement.

(e) The City acknowledges having received copies of the Lending Agreements, and confirms that they are in form and substance satisfactory to the City as at the date of Financial Close.

(f) The City acknowledges notice of and consents to the Security, and confirms that it has not received notice of any other security interest granted over Project Co's rights under any of the City Project Documents.

(g) Project Co and the Lenders' Agent hereby authorize and instruct the City (and the City agrees) to pay all sums payable to Project Co under the Project Agreement as follows:

(i) in the case of Milestone Payments, Highway Milestone Payment, Highway Final Payment and the Revenue Service Availability Payment, to National Bank of Canada account number 11-453-23 at transit number 1417-1;

(ii) in the case of Lifecycle Payments, to National Bank of Canada account number 11-446-29 at transit number 1417-1; and

(iii) in the case of all other sums payable to Project Co under the Project Agreement, to National Bank of Canada account number 11-440-25 at transit number 1417-1,

and Project Co and the City agree that upon the occurrence of an Enforcement Event, if so directed in writing by the Lenders' Agent upon giving reasonable notice, the City shall pay any sum which it is obliged to pay to Project Co under the Project Agreement to a bank account specified by the Lenders' Agent.

(h) The City shall provide the Lenders' Agent with copies of any Warning Notice, Monitoring Notice, notice of lien under the CLA, notice of Encumbrance or notice of default given to Project Co under the Project Agreement at the same time such notice is given to Project Co, provided the Lenders' Agent and Project Co acknowledge and agree that the City shall have no liability to the Lenders' Agent, the Lenders, Project Co or any other Person for failure to provide to the Lenders' Agent any such notice of lien under the CLA or notice of Encumbrance.

(i) Prior to the irrevocable payment in full of all amounts owing to the Lenders under the Lending Agreements, the City shall not take any action to wind-up, liquidate, dissolve or appoint a receiver or receiver and manager of Project Co or to institute or sanction a voluntary arrangement or any other bankruptcy or insolvency proceedings in relation to Project Co.

(j) The City agrees that any enforcement by the Lenders' Agent of a security interest in the Equity Capital of Project Co granted in favour of the Lenders' Agent as part of the Security following an Enforcement Event shall not constitute a Change in Ownership, Change in Control or Project Co Event of Default under the Project Agreement.

6. ENFORCEMENT OF SECURITY BY LENDERS' AGENT

(a) The Lenders' Agent shall promptly notify the City of any Enforcement Event, any Enforcement Action, any notice from the Lenders to Project Co accelerating or threatening to accelerate the maturity of any amounts owing by Project Co to the Lenders under the Lending Agreements or any notice from the Lenders to Project Co demanding or threatening to demand repayment of any amounts owing by Project Co to the Lenders under the Lending Agreements.

(b) The Lenders' Agent may assign, transfer or otherwise dispose of any right, title or interest it may have in, or rights or obligations it may have pursuant to, the Security Documents to a successor agent in accordance with the terms of the Lending Agreements except where:

(i) such assignment, transfer or other disposition would constitute a Refinancing and the provisions of Schedule 28 - Refinancing to the Project Agreement have not been complied with in connection therewith; or

(ii) the person to whom such assignment, transfer or other disposition is to be made, or an Affiliate of such person, is a Restricted Person or a person whose standing or activities: (i) are inconsistent with the City's role (in the City's reasonable opinion); (ii) may compromise the reputation or integrity of the City and/or any City Party; or (iii) are inconsistent with the nature of the City or the Project, so as to affect public perception of the Project.

(c) Any Lender may assign, transfer or otherwise dispose of any right, title or interest it may have in, or rights or obligations it may have pursuant to, the Lending Agreements in accordance with the terms of the Lending Agreements.

7. TERMINATION OF PROJECT AGREEMENT BY THE CITY

(a) Subject only to the rights expressly afforded to the Lenders' Agent pursuant to, and the restrictions set forth in, this Section 7, the City may, at any time, serve notice terminating the Project Agreement if it is entitled to do so under the terms of the Project Agreement.

(b) At any time other than during the Step-In Period (with the restriction on termination during the Step-In Period set out in Section 7(d)), the City shall not exercise any right it may have to terminate or serve notice terminating the Project Agreement for a Project Co Event of Default unless:

(i) the City promptly delivers written notice (a "**Default Notice**") to the Lenders' Agent setting out the Project Co Event of Default in reasonable detail;

(ii) not later than 30 days after the date of a Default Notice, the City delivers written notice (an "**Indebtedness Notice**") to the Lenders' Agent setting out:

(A) all amounts owed by Project Co to the City and any other existing liabilities and unperformed obligations of Project Co to the City of which the City is aware (having made reasonable enquiry), in each case, as of the date on which the City sent the Default Notice; and

(B) all amounts which will become owing by Project Co to the City and any other liabilities and obligations of Project Co to the City of which the City is aware (having made reasonable enquiry), in each case, on or before the end of the Notice Period; and

(iii) the Notice Period has expired and the Lenders' Agent has not delivered a Step-In Notice.

(c) At any time after the City sends an Indebtedness Notice but before the City receives a Step-In Notice, if the City discovers amounts that have become owing by Project Co to the City or any other liabilities or obligations of Project Co to the City that have come due but which were not included in the Indebtedness Notice, the City shall deliver written notice (a "**Subsequent Indebtedness Notice**") to the Lenders' Agent setting out those amounts, liabilities or obligations.

(d) During the Step-In Period, the City shall not terminate the Project Agreement on grounds:

(i) that the Lenders' Agent has served a Step-In Notice or enforced any Security Document; or

(ii) arising prior to the Step-In Date of which the City was aware (having made due inquiry) and whether or not continuing at the Step-In Date unless:

(A) the grounds arose prior to the Revenue Service Availability Date, and the Revenue Service Availability Date does not occur on or before the date falling 180 days after the Longstop Date; or

(B) the grounds arose after the Revenue Service Availability Date, and neither the Appointed Representative nor Project Co, as the case may be, is diligently proceeding to cure any breach of the Project Agreement that:

(1) arose prior to the Step-In Date;

(2) is continuing and capable of being cured; and

(3) would have entitled the City to terminate the Project Agreement; or

(C) the grounds (whenever they first arose) did not give rise to any right to terminate the Project Agreement until after the Step-In Date; or

(iii) arising solely in relation to Project Co.

(e) The City shall be entitled to terminate the Project Agreement by written notice to Project Co and the Appointed Representative:

(i) if any amount referred to in Section 7(b)(ii)(A) has not been paid to the City on or before the Step-In Date;

(ii) if any amount referred to in Section 7(b)(ii)(B) has not been paid on or before the last day of the Notice Period;

(iii) if amounts included in a Subsequent Indebtedness Notice have not been paid on or before the date falling 30 days after the date on which the Subsequent Indebtedness Notice is delivered to the Lenders' Agent; or

(iv) on grounds arising after the Step-In Date in accordance with the terms of the Project Agreement, provided that, except as otherwise provided in Section 10, Failure Points and/or Warning Notices that arose prior to the Step-In Date shall not be taken into account during the Step-In Period but such Failure Points and Warning Notices (to the extent applicable under the terms of the Project Agreement) shall be taken into account after the Step-Out Date.

8. STEP-IN RIGHTS

(a) Subject to Section 8(b) and without prejudice to rights of the Lenders' Agent to enforce the Security, the Lenders' Agent may give the City a Step-In Notice at any time:

(i) during which a Project Co Event of Default is subsisting (whether or not a Default Notice has been served);

(ii) during the Notice Period; or

(iii) during which an Enforcement Event is subsisting.

(b) At least 5 Business Days before the Lenders' Agent delivers a Step-In Notice, the Lenders' Agent shall deliver written notice (an "**Appointed Representative Notice**") to the City of:

(i) its intention to deliver a Step-In Notice; and

(ii) the identity of its proposed Appointed Representative.

(c) Upon issuance of a Step-In Notice, the Appointed Representative shall assume, jointly with Project Co, all of Project Co's rights under the City Project Documents.

(d) During the Step-In Period, the City shall deal with the Appointed Representative instead of Project Co in connection with all matters related to the City Project Documents. Project Co agrees to be bound by all such dealings between the City and the Appointed Representative to the same extent as if they had been between the City and Project Co.

9. STEP-OUT RIGHTS

(a) The Appointed Representative may, at any time during the Step-In Period, deliver written notice (a "**Step-Out Notice**") to the City to terminate the Step-In Period on the Step-Out Date.

(b) On expiry of the Step-In Period:

(i) the rights and obligations of the Appointed Representative in relation to the City under the City Project Documents arising prior to the expiry of the Step-In Period will be assumed by Project Co to the exclusion of the Appointed Representative;

(ii) the City will no longer deal with the Appointed Representative and will deal with Project Co in connection with all matters related to the City Project Documents; and

(iii) the Appointed Representative and the City shall be and hereby are released from all obligations and liabilities to one another under the City Project Documents.

(c) There will not be more than one Step-In Period in respect of any one Default Notice.

10. NOVATION TO SUITABLE SUBSTITUTE

(a) Subject to Section 10(b), at any time:

(i) after an Enforcement Event has occurred;

(ii) during the Notice Period; or

(iii) during the Step-In Period,

the Lenders' Agent may deliver to the City and any Appointed Representative written notice (a "**Novation Notice**") that it wishes to transfer Project Co's rights and obligations

under the City Project Documents to a proposed transferee, together with all information reasonably necessary for the City to decide whether the proposed transferee is a Suitable Substitute. The Novation Notice shall specify a Business Day not less than 30 days from the date on which the City receives the Novation Notice ("**Novation Date**") for the transfer of Project Co's rights and obligations under the City Project Documents to the proposed transferee in accordance with the provisions of Section 10(e).

(b) The City shall promptly notify the Lenders' Agent of any additional information it requires in order to assess whether the proposed transferee is a Suitable Substitute. The City shall notify the Lenders' Agent, in writing, as to whether the person to whom the Lenders' Agent proposes to transfer Project Co's rights and liabilities under the City Project Documents is approved by the City as a Suitable Substitute, on or before the date falling 30 days after the later of the date of receipt by the City of the Novation Notice and the date of receipt of any additional information requested by the City. For greater certainty, if the City fails to respond within such period, the City shall be deemed not to have approved the proposed transferee.

(c) The City shall not unreasonably withhold or delay its approval of a proposed transferee as a Suitable Substitute, but it shall, without limitation, be reasonable for the City to withhold its approval if:

(i) there are unremedied breaches under the Project Agreement which are capable of being remedied by the Appointed Representative or the Suitable Substitute and there is no rectification plan acceptable to the City, acting reasonably, in respect of such breaches;

(ii) the proposed transferee is a Restricted Person or other person who is not permitted to be a Project Co Party pursuant to the Project Agreement; or

(iii) the proposed security interests to be granted by the Suitable Substitute to the Lender Representative are materially different from the Security, materially adversely affect the ability of the Suitable Substitute to perform under the City Project Documents or have the effect of increasing any liability of the City, whether actual or potential.

(d) If the City withholds its approval of a proposed transferee as a Suitable Substitute in accordance with Section 10(c), the Lenders' Agent may give one or more subsequent Novation Notices pursuant to the provisions of Section 10(a) containing changed particulars relating to the same proposed transferee or particulars relating to another proposed transferee which the Lenders' Agent has good cause to believe will be acceptable to the City, acting reasonably, provided that only one Novation Notice may be outstanding at any one time.

(e) On the Novation Date:

(i) Project Co and the City will be released from their obligations under the City Project Documents to each other, and the Suitable Substitute and the City will assume those same obligations towards each other;

(ii) each of the rights of Project Co against the City under the City Project Documents and the rights of the City against Project Co under the City Project Documents will be cancelled, and the Suitable Substitute and the City will acquire those same rights against each other;

(iii) the Parties will enter into, and the Lenders' Agent shall cause the Suitable Substitute and the Lender Representative to enter into, all such agreements or other documents as are reasonably necessary to give effect to the foregoing, including:

(A) an agreement between the City and the Suitable Substitute, on substantially the same terms as the Project Agreement; and

(B) an agreement among the City, the Suitable Substitute and the Lender Representative on substantially the same terms as this Lenders' Direct Agreement;

(iv) any Failure Points and Warning Notices that arose prior to the Novation Date shall be cancelled, provided that, where the City was entitled to make Deductions under Schedule 20 - Payment Mechanism arising from such Failure Points and Warning Notices and those Deductions have not yet been made against any payments to Project Co preceding the Novation Date, those outstanding Deductions shall still apply; and

(v) any subsisting ground for termination by the City of the Project Agreement will be deemed to have no effect and any subsisting Default Notice will be automatically revoked.

11. TRANSFERS

The City shall, at Project Co's cost and expense, take whatever action the Lenders' Agent, the Appointed Representative or a Suitable Substitute may reasonably require for perfecting any assumption or transfer of or release pursuant to Sections 8, 9 or 10, including the execution of any transfer or assignment, and the giving of any notice, order or direction and the making of any registration which, in each case, the Lenders' Agent, the Appointed Representative or the Suitable Substitute reasonably requires.

12. DIRECT AGREEMENTS

(a) Notwithstanding any provision in the Direct Agreements, the City hereby undertakes that it will not exercise any rights it may have under or arising out of any of the Direct Agreements, except as provided in Sections 12(b) to 12(e) inclusive.

(b) Following termination of the Project Agreement (other than as a result of a novation pursuant to this Lenders' Direct Agreement) in accordance with this Lenders' Direct Agreement, the City shall from such date (the "**Exercise Date**") be entitled to exercise its rights under the Direct Agreements to step into and/or novate the Contracts in accordance with the Direct Agreements.

(c) Following the Exercise Date, the City shall not do anything to prejudice the rights which are not transferred to it pursuant to the Direct Agreements.

(d) Where all amounts which may be or become owing by Project Co to the Lenders under the Lending Agreements have been irrevocably paid in full, the Lenders' Agent shall promptly release and discharge all Security in respect of Contracts assumed or novated by the City pursuant to a Direct Agreement.

(e) Notwithstanding the terms of the Direct Agreements and any other provisions of this Section 12, each of the Contractors (and any guarantors thereof) shall remain responsible, and be liable, to Project Co in respect of all costs, claims, damages, losses and liabilities which shall have arisen out of or in connection with the Contracts in respect of the period prior to the Exercise Date.

(f) Without prejudice to Sections 12(a) to 12(e) inclusive, the City shall not, prior to the date on which this Lenders' Direct Agreement terminates:

(i) claim, recover, retain or receive (or seek to claim, recover, retain or receive) any amount under the Direct Agreements (and/or any of the Contracts) from the applicable Contractor;

(ii) take any action to wind-up, liquidate, dissolve or appoint a receiver or receiver and manager of the applicable Contractor or to institute or sanction a voluntary arrangement or any other bankruptcy or insolvency proceedings in relation to the applicable Contractor; or

(iii) compete with the rights of the Lenders' Agent on a winding-up or other insolvency or bankruptcy of the applicable Contractor, nor claim to be subrogated to any rights of the Lenders' Agent or any Lender.

The City agrees and undertakes that if it receives any amount in contravention of the provisions of this Section 12(f), it will immediately make a payment of an equal amount to the Lenders' Agent for the account of the Lenders' Agent and the Lenders.

13. ASSIGNMENT

(a) No Party to this Lenders' Direct Agreement may assign, transfer or otherwise dispose of any part of its rights or obligations under this Lenders' Direct Agreement save as provided in this Section 13.

(b) Project Co may assign, transfer or otherwise dispose of the benefit of this Lenders' Direct Agreement to any person to whom Project Co assigns, transfers or otherwise disposes of its interest in the Project Agreement pursuant to Section 59.1 of the Project Agreement and the provisions of the Lending Agreements, and shall provide written notice to the City and the Lenders' Agent of such assignment, transfer or other disposition. Such assignee, as a condition precedent to any such assignment, transfer or other disposition, shall assume the obligations and acquire the rights of Project Co under this Lenders' Direct Agreement pursuant to an assumption agreement with, and in form and substance

satisfactory to, the City and the Lenders' Agent, each acting reasonably. The City and the Lenders' Agent shall, at Project Co's cost and expense, do all things and execute all further documents as may be necessary in connection therewith.

(c) The City may assign, transfer or otherwise dispose of the benefit of the whole or part of this Lenders' Direct Agreement to any person to whom the City assigns, transfers or otherwise disposes of its interest in the Project Agreement pursuant to Section 59.2 of the Project Agreement, and shall provide written notice to Project Co and the Lenders' Agent of such assignment, transfer or other disposition.

(d) The Lenders' Agent may only assign, transfer or otherwise dispose of any interest in this Lenders' Direct Agreement as permitted by the Lending Agreements, and shall provide written notice to Project Co and the City of such assignment, transfer or other disposition; provided that, notwithstanding any provision to the contrary in the Lending Agreements, the Lenders' Agent may not assign, transfer or otherwise dispose of any interest in this Lenders' Direct Agreement to a Restricted Person. The Lenders' Agent, as a condition precedent to any such assignment, transfer or other disposition, shall cause the assignee to enter into a new agreement with Project Co and the City on substantially the same terms as this Lenders' Direct Agreement and Project Co and the City shall enter into such new agreement with the assignee. Project Co and the City shall, at the Lenders' Agent's cost and expense, do all things and execute all further documents as may be necessary in connection therewith.

14. NOTICES

(a) All notices, requests, demands, instructions, certificates, consents and other communications required or permitted under this Lenders' Direct Agreement shall be in writing (whether or not "**written notice**" or "**notice in writing**" is specifically required by the applicable provision of this Lenders' Direct Agreement) and served by sending the same by registered mail or by hand, as follows:

If to the City:

City of Ottawa
Finance Department, Supply Branch
100 Constellation Crescent
4th Floor, West Tower
Ottawa, ON K2G 6J8

Fax No.: (613) 580-9688
Attn.: Director, Rail Implementation Office

With a copy to:

Ontario Infrastructure and Lands Corporation
777 Bay Street
6th Floor
Toronto, ON M5G 2C8

Fax No.: (416) 327-6387
Attn.: Vice President, Civil Infrastructure

If to the Lenders' Agent: BNY Trust Company of Canada
11th Floor, 320 Bay Street
Toronto, ON M5H 4A6

Fax No.: (416) 360-1711
Attn.: Vice President, Transaction Management Group

If to Project Co: Rideau Transit Group General Partnership
1 First Canadian Place, Suite 6000
PO Box 367, 100 King Street West
Toronto, Ontario M5X 1E2

Fax No.: (416) 365-7886
Attn: Eusebio Corregel

With a copy to: ACS RTG Partner Inc.
c/o ACS Infrastructure Canada Inc.
155 University Avenue, Suite 1800
Toronto, Ontario M5H 3B7

Fax No.: 1-786-272-7992
Attn.: Nuria Haltiwanger

With a copy to: EllisDon RTG Partner Inc.
c/o 800-89 Queensway Avenue
Mississauga, Ontario L5B 2V2

Fax No.: (905) 803-3059
Attn.: Jody K. Becker

With a copy to: SNC RTG Partner Inc.
c/o 455 René-Lévesque Blvd.
West Montreal, Quebec H2Z 1Z3

Fax No.: (514) 866-0795
Attn.: Gerry Grigoropoulos

(b) Any Party to this Lenders' Direct Agreement may, from time to time, change any of its contact information set forth in Section 14(a) by prior notice to the other Parties, and such change shall be effective on the Business Day that next follows the recipient Party's receipt of such notice unless a later effective date is given in such notice.

(c) Subject to Sections 14(d) and 14(e):

(i) a notice given by registered mail shall be deemed to have been received on the third Business Day after mailing; and

(ii) a notice given by hand delivery shall be deemed to have been received on the day it is delivered.

(d) If the Party giving the notice knows or ought reasonably to know of difficulties with the postal system which might affect negatively the delivery of mail, any such notice shall not be mailed but shall be made by personal delivery in accordance with this Section 14.

(e) If any notice delivered by hand is so delivered either on a day that is not a Business Day or on a Business Day after 4:00 p.m. (recipient's local time), then such notice shall be deemed to have been received by such recipient on the next following Business Day.

15. [INTENTIONALLY DELETED]

16. AMENDMENTS

This Lenders' Direct Agreement may not be varied, amended or supplemented except by an agreement in writing signed by duly authorized representatives of the Parties and stating on its face that it is intended to be an amendment, restatement or other modification, as the case may be, to this Lenders' Direct Agreement.

17. WAIVER

(a) No waiver made or given by a Party under or in connection with this Lenders' Direct Agreement shall be binding or effective unless the waiver is in writing, signed by an authorized representative of the Party giving such waiver, and delivered by such Party to the other Parties. No waiver made with respect to any right, power or remedy in one instance will be deemed to be a waiver with respect to any other instance involving the exercise of such right, power, or remedy or with respect to any other right, power, or remedy.

(b) Failure by any Party to exercise any of its rights, powers or remedies hereunder or its delay to do so shall not constitute a waiver of those rights, powers or remedies. The single or partial exercise of a right, power or remedy shall not prevent its subsequent exercise or the exercise of any other right, power or remedy.

18. RELATIONSHIP BETWEEN THE PARTIES

The Parties are independent contractors. This Lenders' Direct Agreement is not intended to and does not create or establish between the Parties any relationship as partners, joint venturers, employer and employee, master and servant, or, except as provided in this Lenders' Direct Agreement, of principal and agent.

19. ENTIRE AGREEMENT

Except where provided otherwise in this Lenders' Direct Agreement, this Lenders' Direct Agreement constitutes the entire agreement between the Parties in connection with its subject matter and supersedes all prior representations, communications, negotiations and

understandings, whether oral, written, express or implied, concerning the subject matter of this Lenders' Direct Agreement.

20. SEVERABILITY

Each provision of this Lenders' Direct Agreement shall be valid and enforceable to the fullest extent permitted by law. If any provision of this Lenders' Direct Agreement is declared invalid, unenforceable or illegal by the courts of a competent jurisdiction, such provision may be severed and such invalidity, unenforceability or illegality shall not prejudice or affect the validity, enforceability and legality of the remaining provisions of this Lenders' Direct Agreement. If any such provision of this Lenders' Direct Agreement is invalid, unenforceable or illegal, the Parties shall, acting in good faith, promptly negotiate new provisions to eliminate such invalidity, unenforceability or illegality and to restore this Lenders' Direct Agreement as near as possible to its original intent and effect.

21. ENUREMENT

This Lenders' Direct Agreement shall enure to the benefit of, and be binding on, each of the Parties and their respective successors and permitted transferees and assigns.

22. GOVERNING LAW AND JURISDICTION

(a) This Lenders' Direct Agreement shall be governed by and construed in accordance with the laws of Ontario and the laws of Canada applicable therein and shall be treated in all respects as an Ontario contract, without regard to conflict of laws principles.

(b) The Parties agree that the courts of the Province of Ontario and all courts competent to hear appeals therefrom shall have exclusive jurisdiction to hear and settle any action, suit, proceeding or dispute in connection with this Lenders' Direct Agreement and hereby irrevocably attorn to the exclusive jurisdiction of such courts.

23. DISPUTE RESOLUTION PROCEDURE

The Parties agree that the dispute resolution procedure provided for in Schedule 27 - Dispute Resolution Procedure to the Project Agreement shall not apply to any dispute under this Lenders' Direct Agreement.

24. FURTHER ASSURANCE

Each Party shall do all things, from time to time, and execute all further documents necessary to give full effect to this Lenders' Direct Agreement.

25. LANGUAGE OF AGREEMENT

Each Party acknowledges having requested and being satisfied that this Lenders' Direct Agreement and related documents be drawn in English. Chacune des parties reconnaît avoir demandé que ce document et ses annexes soient rédigés en anglais et s'en déclare satisfaite.

26. COUNTERPARTS

This Lenders' Direct Agreement may be executed in one or more counterparts. Any single counterpart or a set of counterparts executed, in either case, by all the Parties shall constitute a full, original and binding agreement for all purposes. Counterparts may be executed either in original or faxed form provided that any Party providing its signature in faxed form shall promptly forward to such Party an original signed copy of this Lenders' Direct Agreement which was so faxed.

27. CONFIDENTIALITY

The Lenders' Agent agrees to comply with the obligations imposed on Project Co by the provisions of Section 52 of the Project Agreement, *mutatis mutandis*, provided that the Lenders' Agent will be permitted to disclose to any relevant regulatory authority only such Confidential Information (as defined in the Project Agreement) as is necessary for the Lenders' Agent to comply with Applicable Law.

[*This section intentionally left blank*]

IN WITNESS WHEREOF the Parties have executed this Lenders' Direct Agreement as of the date first above written.

CITY OF OTTAWA

Per: _____
Name: Kent Kirkpatrick
Title: City Manager

I have authority to bind the corporation.

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP, by its partners, ACS RTG PARTNER INC., SNC RTG PARTNER INC. and ELLISDON RTG PARTNER INC.

ACS RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

SNC RTG PARTNER INC.

Per: _____
Name:
Title:

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

ELLISDON RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

BNY TRUST COMPANY OF CANADA, in its capacity as collateral agent for and on behalf of the Lenders

Per: _____
Name:
Title:

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

SCHEDULE 5

CONTRACTOR'S DIRECT AGREEMENT

THIS AGREEMENT made as of the 12th day of February, 2013

BETWEEN:

CITY OF OTTAWA

(the "**City**")

AND

[If for the Maintenance Contractor: "RIDEAU TRANSIT MAINTENANCE GENERAL PARTNERSHIP, a general partnership consisting of **ACS RT MAINTENANCE PARTNER INC.** ("**ACS**"), a corporation organized under the laws of British Columbia, **ELLISDON RT MAINTENANCE PARTNER INC.** ("**EllisDon**"), a corporation organized under the laws of Ontario, and **PROTRANS RT MAINTENANCE PARTNER INC.** ("**SNC**"), a corporation organized under the laws of Canada (each a "**Contractor Member**" and together the "**Contractor**")**"]**

[If for the Construction Contractor:

DRAGADOS CANADA, INC. ("**Dragados**"), a corporation organized under the laws of Canada,

AND

ELLISDON CORPORATION ("**EllisDon**"), a corporation organized under the laws of Ontario,

AND

SNC-LAVALIN CONSTRUCTORS (PACIFIC) INC. ("**SNC**"), a corporation organized under the laws of Canada,

(each of Dragados, EllisDon and SNC being a "**Contractor Member**" and together being the "**Contractor**")**]**

AND

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP, a general partnership formed under the laws of the Province of Ontario

("**Project Co**")

RECITALS:

WHEREAS the City and Project Co have entered into an agreement dated February 12, 2013, with respect to the System (the "**Project Agreement**").

AND WHEREAS Project Co and the Contractor have entered into an agreement dated February 12, 2013 (the "**Contract**") with respect to the **[if for the Maintenance Contract: "MC Activities", and if for the Construction Contract: "CC Activities"]** in accordance with the Contract (the "**Contract Scope**") as such agreement may be amended in writing, solely in conformity with Section 7.2(a) of the Project Agreement;

AND WHEREAS in consideration of the City entering into the Project Agreement with Project Co, the Contractor agrees to enter into this agreement with the City;

AND WHEREAS all terms used herein and not defined shall have the meaning ascribed to them in the Project Agreement.

NOW THEREFORE, in consideration of the mutual covenants and agreements set forth in this Agreement and the sum of Ten Dollars paid by each of the parties hereto to the other for good and other valuable consideration (the receipt and sufficiency of which is hereby acknowledged), the parties hereto covenant and agree as follows:

1. INTERPRETATION

This Agreement shall be interpreted according to the following provisions, unless the context requires a different meaning:

(a) The headings in this Agreement are for convenience of reference only, shall not constitute a part of this Agreement, and shall not be taken into consideration in the interpretation of, or affect the meaning of, this Agreement.

(b) Unless the context otherwise requires, references to specific Sections, clauses, Paragraphs, Subparagraphs, and other divisions are references to such Sections, Clauses, Paragraphs, Subparagraphs, or divisions of this Agreement and the terms "Section" and "Clause" are used interchangeably and are synonymous.

(c) Words importing persons or parties are to be broadly interpreted and include an individual, corporation, firm, partnership, joint venture, trust, unincorporated organization, Governmental Authority, unincorporated body of persons or association and any other entity having legal capacity, and the heirs, beneficiaries, executors, administrators or other legal representatives of a person in such capacity.

(d) Unless the context otherwise requires, wherever used herein the plural includes the singular, the singular includes the plural, and each of the masculine, feminine and neuter genders include all other genders.

(e) References to any standard, principle, agreement or document include (subject to all relevant approvals and any other provisions of this Agreement concerning amendments) a reference to that standard, principle, agreement or document as amended, supplemented, restated, substituted, replaced, novated or assigned.

(f) The words in this Agreement shall bear their natural meaning.

(g) References containing terms such as:

(i) "hereof", "herein", "hereto", "herinafter", and other terms of like import are not limited in applicability to the specific provision within which such references are set forth but instead refer to this Agreement taken as a whole; and

(ii) "includes" and "including", whether or not used with the words "without limitation" or "but not limited to", shall not be deemed limited by the specific enumeration of items but shall, in all cases, be deemed to be without limitation and construed and interpreted to mean "includes without limitation" and "including without limitation".

(h) In construing this Agreement, the rule known as the *ejusdem generis* rule shall not apply nor shall any similar rule or approach to the construction of this Agreement and, accordingly, general words introduced or followed by the word "other" or "including" or "in particular" shall not be given a restrictive meaning because they are followed of preceded (as the case may be) by particular examples intended to fall within the meaning of the general words.

(i) Where this Agreement states that an obligation shall be performed "no later than" or "within" or "by" a stipulated date or event which is a prescribed number of days after a stipulated date or event, the latest time for performance shall be 5:00 p.m. on the last day for performance of the obligation concerned, or, if that day is not a Business Day, 5:00 p.m. on the next Business Day.

(j) Where this Agreement states than an obligation shall be performed "on" a stipulated date, the latest time for performance shall be 5:00 p.m. on that day, or, if that day is not a Business Day, 5:00 p.m. on the next Business Day.

(k) Any reference to time of day or date means the local time or date in Toronto, Ontario

(l) Unless otherwise indicated, time periods will be strictly construed.

(m) Whenever the terms "will" or "shall" are used in this Agreement they shall be construed and interpreted as synonymous and to read "shall".

2. CONFLICT IN DOCUMENTS

(a) In the event of ambiguities, conflicts or inconsistencies between or among this Agreement, the Project Agreement and the Construction Contract, this Agreement shall prevail.

(b) In the event of ambiguities, conflicts or inconsistencies between or among this Agreement and the Lenders' Direct Agreement, the Lenders' Direct Agreement shall prevail.

3. REPRESENTATIONS AND WARRANTIES

(a) The Contractor represents and warrants to the City that as of Commercial Close:

(i) **[If for the Construction Contractor: "the Construction Contractor is an unincorporated joint venture comprised of the Contractor Members and:**

(A) Dragados is a duly incorporated and validly existing company under the laws of Canada, and has all the requisite power and authority to own its properties and assets, to carry on its business as it is currently being conducted and to enter into this Agreement and to duly observe and perform its obligations hereunder;

(B) SNC is a duly incorporated and validly existing company under the laws of Canada, and has all the requisite power and authority to own its properties and assets, to carry on its business as it is currently being conducted and to enter into this Agreement and to duly observe and perform its obligations hereunder;

(C) EllisDon is a duly incorporated and validly existing company under the laws of Ontario, and has all the requisite power and authority to own its properties and assets, to carry on its business as it is currently being conducted and to enter into this Agreement and to duly observe and perform its obligations hereunder;"

If for the Maintenance Contractor: "the Maintenance Contractor is a general partnership comprised of the Contractor Members; and

(A) ACS is a duly incorporated and validly existing company under the laws of British Columbia, and has all the requisite power and authority to own its properties and assets, to carry on its business as it is currently being conducted and to enter into this Agreement and to duly observe and perform its obligations hereunder.

(B) SNC is a duly incorporated and validly existing company under the laws of Canada, and has all the requisite power and authority to own its properties and assets, to carry on its business as it is currently being conducted and to enter into this Agreement and to duly observe and perform its obligations hereunder.

(C) EllisDon is a duly incorporated and validly existing company under the laws of Ontario, and has all the requisite power and authority to own its properties and assets, to carry on its business as it is currently being conducted and to enter into this Agreement and to duly observe and perform its obligations hereunder;"]

(ii) the Contractor has the required ability, experience, skill and capacity to perform the activities contemplated by the Contract in a timely and professional manner;

(iii) the Contractor has the requisite power, authority and capacity to execute, deliver and perform and to do all acts and things, and execute, deliver and perform all other agreements and undertakings as required by the Contract to be done, executed, delivered or performed;

(iv) no steps or proceedings have been taken or are pending to supersede or amend the constating documents, articles or bylaws of the Contractor in a manner that would impair or limit the ability of the Contractor to perform the obligations of the Contractor under this Agreement or the Contract;

(v) this Agreement and the Contract have been duly authorized, executed and delivered on behalf of the Contractor and constitute binding legal obligations of the Contractor in accordance with each of their terms, subject only to:

(A) limitations with respect to the enforcement of remedies by bankruptcy, insolvency, moratorium, winding up, arrangement, reorganization, fraudulent preference and conveyance and other laws of general application affecting the enforcement of creditors' rights generally; and

(B) general equitable principles and the fact that the availability of equitable remedies is in the discretion of a court and that a court may stay proceedings or the execution of judgments;

(vi) the execution, delivery and performance by the Contractor of this Agreement and the Contract do not and will not violate or conflict with, or constitute a default under:

(A) the constating, formation or organizational documents, including any bylaws of the Contractor Members;

(B) any Applicable Law; or

(C) any covenant, contract, agreement or understanding to which it is a party or by which it or any of its properties or assets is bound or affected;

(vii) there are no actions, suits, proceedings, or investigations pending or threatened against the Contractor or, to the Contractor's knowledge, at law or in equity before any Governmental Authority or arbitral body (whether or not covered by insurance) that individually or in the aggregate could reasonably be expected (if determined adversely) to have any material adverse effect on the business, properties, or assets, or the condition, financial or otherwise, of the Contractor or in any impairment of the Contractor's ability to perform its obligations under this agreement, and the Contractor has no knowledge of any violation or default with respect to any order, writ, injunction, or decree of any Governmental Authority or arbitral body that could result in any such material adverse effect or impairment; and

(viii) there has been no material change to any of the information including the financial information provided by the Contractor to the City as provided in the Response and there is no Change in Control with respect to the Contractor.

(b) The City represents and warrants to the Contractor that as of Commercial Close:

(i) the execution and delivery of this Agreement and all documents, instruments and agreements required to be executed and delivered by the City pursuant to this Agreement, and the completion of the transactions contemplated by this Agreement, have been duly authorized, and this Agreement has been duly executed and delivered by the City and constitutes a legal, valid and binding obligation of the City enforceable in accordance with its terms, except as may be limited by laws of general application affecting the enforceability of remedies and rights of creditors and except that equitable remedies such as specific performance and injunction are in the discretion of a court and except as may be subject to the special jurisdiction and powers of the Ontario Municipal Board over defaulting municipalities under the *Municipal Affairs Act*, R.S.O. 1990c. M.46, as amended;

(ii) the City has full power and capacity to enter into and carry out the transactions contemplated by and duly observe and perform all of its obligations contained in this Agreement;

(iii) there are no third party consents required for the execution by the City of, and performance of its obligations under this Agreement; and

(iv) other than any proceeding under the *Expropriations Act*, (Ontario) which could delay the acquisition by the City of the Lands and/or the After Acquired Lands and/or Real Property Interests, Construction Easements and/or Permanent Easements therein, there are no current and, to the Knowledge of the City, there are no pending or threatened actions, claims, demands, lawsuits, assessments, arbitrations, judgments, awards, decrees, orders, injunctions, prosecutions, or other proceedings of, by, against, or relating to, the City which could have a material adverse effect on the ability of the City to perform its obligations under this Agreements and the City does not have Knowledge of any basis for any such action, claim, demand, lawsuit, assessment, arbitration, judgment, award, decree, order, injunction, prosecution or other proceeding.

4. EVENTS OF DEFAULT

The Contractor confirms that the Contract contains provisions respecting events of default (the "**Contractor Events of Default**") and cure periods (the "**Cure Periods**") substantially the same as the events of default and cure periods contained in the Project Agreement respecting Project Co, with such amendments, deletions or substitutions as shall be reasonable to reflect the circumstances and obligations of the Contract and corresponding rights and remedies in favour of Project Co substantially similar to the rights and remedies in favour of the City against Project Co in the Project Agreement, with such amendments, deletions, additions and substitutions as reasonable in the context of the Contract between Project Co and the Contractor (the "**Contract Remedies**").

5. NOTICE OF DEFAULT

Following a Project Co Event of Default with respect to obligations in the Project Agreement included within the Contract Scope (the "**Relevant Default**"), the City shall contemporaneously provide the Contractor with a copy of the notice delivered to Project Co pursuant to Section 45.2 of the Project Agreement (the "**Notice of Default**").

6. CITY'S RIGHTS ON DEFAULT

(a) For the purposes of this Agreement:

(i) "**Default Enforcement Date**" means the last to occur of:

(A) the expiry of the Notice Period and any Step-In-Period (as defined in the Lender's Direct Agreement) respecting the Relevant Default;

(B) the expiry of the Contractor Cure Period respecting the Relevant Default; and

(C) Project Co having failed to cure or cause the Contractor to cure the Relevant Default prior to the expiry of the Contractor Cure Period contained in the Contract with respect to the Relevant Default;

(ii) "**Contractor Cure Period**" means the later of:

(A) the expiry of the 30 day period following the Notice of Default;

(B) the expiry of all cure periods regarding the Relevant Default provided for under the Contract; and

(C) the expiry of such greater period as shall be reasonable to cure the Relevant Default as shall be reasonable in the circumstances, such greater period to be agreed to by the City acting reasonably.

(b) Following the Default Enforcement Date and provided that the Relevant Default is continuing, the City may by notice in writing to the Contractor, no later than 45 days following the Default Enforcement Date, (the "**Enforcement Notice**"), thereupon enforce against the Contractor the obligations and liabilities of the Contractor whether outstanding, current or future, under the Contract as if the City were the original party thereto by notice in writing to the Contractor. In the event that the City elects to send the Enforcement Notice, the City shall thereafter be responsible for obligations subject to the provisions of Subsection 6(c) hereof, and shall be entitled to the rights and benefits of Project Co under the Contract arising following the Enforcement Notice.

(c) In addition, following the Enforcement Notice, the City shall make payments to the Contractor on account of the work performed by the Contractor within the Contract Scope with respect to (i) the period prior to the Enforcement Notice (the "**Pre-Notice Work**"); and (ii) the period following the Enforcement Notice (the "**Post-Notice Work**") pursuant to the Contract as follows:

(i) the City shall make payments with respect to Post-Notice Work to the Contractor in accordance with the provisions of the Contract;

(ii) subject to Subsection (iii) the City shall make a payment to the Contractor for any amount due and owing and unpaid with respect to Pre-Notice Work (the "**Pre-Notice Arrears**");

(iii) notwithstanding Subsection (ii) the payment by the City on account of the Pre-Notice Arrears shall be reduced by the amount, if any, previously paid by the City to Project Co with respect to the work done by the Contractor for which the Pre-Notice Arrears, or a portion thereof, is owing to the Contractor;

(iv) any payments made to the Contractor by the City pursuant to this Subsection 6(c) shall be taken into account to reduce any future Milestone

Payments otherwise payable by the City with respect to a Milestone that includes the Contract Scope;

(v) notwithstanding anything herein before contained, payments made to the Contractor pursuant to the provisions of this Subsection 6(c) with respect to the Contract Scope within any Milestone shall not exceed the amount of the Milestone Payment with respect to such Milestone; and

(vi) all information and deliveries required to be delivered to the Contractor's lender by the Contractor under any financing and/or security agreements with respect to the work being done under the Contract, shall contemporaneously be delivered to the City.

7. PAST DUE OBLIGATIONS

If, as at the date of the Enforcement Notice (the "**Trigger Date**"), there are any monies owing or any other outstanding unfulfilled obligations required to have been performed by the City to Project Co relating directly to the Contract Scope (the "**Relevant Past Due Obligations**"), the Contractor shall be entitled to receive the benefit of the satisfaction by the City of such Relevant Past Due Obligations, and Project Co shall thereupon no longer be entitled to directly receive any benefit with respect to the Relevant Past Due Obligations. For greater certainty, at the Trigger Date, where there are any monies owing or any other outstanding unfulfilled obligations required to have been performed by Project Co to the Contractor under the Contract ("**Unfulfilled Drop-Down Obligations**"), but the corresponding monies owing or corresponding other obligations have been performed by the City to Project Co under the Project Agreement, the Contractor shall not have any claim against the City in respect of the Unfulfilled Drop-Down Obligations. The foregoing shall not be construed as a release of Project Co from any claims against it by the Contractor for such Unfulfilled Drop-Down Obligations.

8. FUTURE OBLIGATIONS

From and after the Trigger Date:

(a) if, there are any future obligations required to be performed by the City to Project Co pursuant to the Project Agreement relating directly to the Contract Scope (the "**Relevant Future Obligations**"), the Contractor shall be entitled to receive directly the benefit of the satisfaction by the City of such Relevant Future Obligations and Project Co shall thereupon no longer be entitled to receive any benefit with respect to the Relevant Future Obligations;

(b) Project Co and the Contractor will be deemed to be released from their existing and future obligations under the Contract to each other (except with respect to any and all indemnities from Project Co or the Contractor to the other in respect of the period prior to the Trigger Date), and the City and the Contractor will be deemed to assume those same existing and future obligations towards each other, subject to the provisions of Subsection 6(c), (except in respect of the aforesaid indemnities); and

(c) The existing and future rights of Project Co against the Contractor under the Contract and vice versa will be deemed to be cancelled (except with respect to any and all indemnities from Project Co or the Contractor to the other in respect of the period prior to the Trigger Date), and the City and the Contractor will be deemed to acquire those same existing and future rights against each other (except in respect of the aforesaid indemnities and subject to the provisions of Subsection 6(c)).

9. ENFORCEABILITY OF OBLIGATIONS

The liability of the Contractor to the City under this Agreement to perform all of its obligations contained in the Contract shall be absolute and unconditional irrespective of:

(a) the invalidity, unenforceability, illegality or termination in whole or in part of the Contract by Project Co or any agreements relating thereto (other than a termination of the Contract resulting from a valid termination of the Project Agreement by Project Co);

(b) any defence, counterclaim or right of set off available to Project Co under the Project Agreement except those to which Project Co is entitled to under the Project Agreement with respect to the Contract Scope. For greater certainty nothing contained in this Section 9 shall preclude the Contractor from claiming any defence, counterclaim or right of set off available to the Contractor under the Contract, where an equivalent defence, counterclaim or right of set off is available to Project Co as against the City under the Project Agreement with respect to the Contract Scope;

(c) any change in the name, objects, capital, constating documents or by-laws of Project Co;

(d) any act or omission of either the Contractor or Project Co under the Contract; or

(e) any other circumstances which might otherwise constitute, in whole or in part, a defence available to or a discharge of the Contractor, except (subject to the provisions of Section 7 of this Agreement) those expressly set out in the Contract as of the date of execution of the Contract.

10. AMENDMENTS TO CONTRACT

Without the prior express written consent of the City (to the extent required under the Project Agreement):

(a) no amendment, modification, restatement or replacement (in whole or in part) of the Contract shall be valid, effective or binding upon the City for the purposes of this Agreement;

(b) no termination by Project Co of the Contract shall be valid, effective or binding upon the City; and

(c) no waiver of any of Project Co's rights pursuant to the Contract shall be effective for the purposes of this Agreement.

11. EXERCISING REMEDIES

(a) Subject to the Default Enforcement Date having occurred, the City shall not be bound to seek or exhaust its recourse against Project Co, or any other Person, before being entitled to enforce performance of the Contractor's obligations under the Contract, and the Contractor renounces all benefit of discussion or division.

(b) Each of the Contractor Members shall be jointly and severally liable for all obligations under this Agreement.

12. GRANTING EXTENSIONS

The City may, in consultation with the Contractor, where these matters relate to the Contract Scope, grant extensions of time and other indulgences, release any undertaking, property or assets of Project Co, and otherwise deal or fail to deal with Project Co, all as the City may see fit, without prejudice to or in any way discharging or diminishing the liability of the Contractor.

13. CONTINUING RIGHTS TO ENTER

No invalidity, irregularity or unenforceability by reason of any bankruptcy, insolvency or reorganization of Project Co or similar law or any law or order of any government or agency thereof purporting to reduce, amend or otherwise affect the liability of Project Co to the City shall affect or impair the obligations of the Contractor to the City hereunder. If one or more of the provisions contained herein shall be invalid, illegal or unenforceable in any respect, such provision shall be deemed to be severable and the validity, legality and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

14. PRIORITY OF CLAIMS

In the event of any liquidation, winding up or bankruptcy of Project Co (whether voluntary or compulsory) or in the event that Project Co shall make a bulk sale of any of its assets within the bulk transfer provisions of any applicable legislation or any composition with creditors or scheme of arrangement, the City shall have the right to rank in priority to the Contractor for its claims in respect of the obligations of Project Co contained in the Project Agreement, and to receive payments in respect thereof until its claim has been paid in full or without prejudice to its claim against the Contractor who shall continue to be liable for any remaining obligations contained herein or pursuant to the Contract.

15. AMENDMENTS TO PROJECT AGREEMENT

The City may modify, extend, amend the Project Agreement and any other agreements between the City and Project Co which amendments and extensions may be agreed upon directly between the City and Project Co without notice to the Contractor and without the requirement of any concurrence from the Contractor.

16. REMEDIES

The City shall be deemed to have the same right to enforce the Contract Remedies against the Contractor as are available to Project Co under the Contract, provided that:

(a) the Default Enforcement Date shall have occurred and the City having first delivered an Enforcement Notice in accordance with Section 5;

(b) the City shall have such other rights and remedies as contained in this Agreement; and

(c) in the event that the Contract is terminated in breach of Section 10 hereof or otherwise, the City shall, notwithstanding such termination, be deemed to have the same rights and remedies as are available to Project Co by virtue of the Contract Remedies against the Contractor, subject to Subsection (a) of this Section 16.

17. ASSIGNMENT BY CONTRACTOR

This Agreement may not be assigned by the Contractor without the prior written consent of the City, which consent shall be in the Discretion of the City.

18. ASSIGNMENT BY CITY

The City may, without the consent of the Contractor, assign this Agreement to a permitted assignee of the City's rights under the Project Agreement in accordance with the terms thereof.

19. CONTRACTOR INDEMNITIES TO CITY

(a) Following the delivery of the Enforcement Notice to the Contractor, the Contractor shall indemnify and save harmless the City, each City Party and each of their respective directors, officers, employees, agents and representatives from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, or arising out of any one or more of the following:

(i) any physical loss of or damage to all or any part of the Site and the System, or to any equipment, assets or other property related thereto;

(ii) the death or personal injury of any person;

(iii) any physical loss of or damage to property or assets of any third party; or

(iv) any other loss or damage of any third party, including injurious affection arising from or in consequence of any act or omission of the Contractor in respect of the Design and Construction Works that are not in compliance with the requirements set out in the Construction Contract and in the Applicable Law including the City's by-laws;

in each case, arising, directly or indirectly, out of, or in consequence of, or involving or relating to, the performance or breach of this Agreement or the Contract by the Contractor or any act or omission of the Contractor, except to the extent caused, or contributed to, by:

(i) the breach of the Project Agreement by the City; or

(ii) any deliberate or negligent act or omission of the City or any City Party; or

(iii) a deliberate or negligent act or omission of a System User that results in undue interference with the Contractor's performance of the Contract Scope and the Contractor has been unable to take commercially reasonable steps necessary to prevent, negate or mitigate the undue interference due to acting in accordance with a recommendation or instruction of the City or an appropriate City Party, except to the extent the System User is acting in accordance with a direction, recommendation or instruction of the Contractor;

(iv) the performance by the City under the Project Agreement not in accordance with or in breach of the requirements of any Permits, Licences and Approvals, Applicable Law or requirements of Governmental Authorities, or the failure of the City to obtain any necessary Contractor Permits, Licences and Approvals in accordance with its obligations under the Project Agreement,

except to the extent that such Direct Losses are caused, or contributed to, by the breach of the Project Agreement or this Agreement by the City or by any act or omission of the City or any the City Party.

(b) Notwithstanding anything contained in Subsection 19(a) to the contrary, the indemnification by the Contractor of the City under this Agreement inclusive of applicable insurance proceeds received by the City under the terms of any insurance policy under the Project Agreement or the Contract shall be limited to the amount of $50 million Adjusted by Inflation**,** less any amounts previously paid by Project Co to the City on account of the provisions of Section 56.1 of the Project Agreement.

(c) Notwithstanding anything contained in Subsection 19(a) to the contrary, the indemnities under this Agreement shall not apply and there shall be no right to claim damages for breach of this Agreement, in tort or on any other basis whatsoever, to the extent that any loss claimed by either Party is an Indirect Loss.

20. CITY INDEMNITIES TO CONTRACTOR

(a) Following the delivery of the Enforcement Notice to the Contractor, the City shall indemnify and save harmless the Contractor, its Subcontractors and its directors,

officers, employees, agents and representatives (collectively, the "**Contractor Indemnified Parties**") from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, or arising out of any one or more of the following:

(i) the death or personal injury of any person arising, directly or indirectly, out of, or in consequence of, or involving or relating to, the performance or breach of the Project Agreement by the City or any act or omission of any City Party, except to the extent caused, or contributed to, by the breach of the Project Agreement by Project Co or the Contract by the Contractor;

(ii) any physical loss of or damage to all or any part of any property or assets of the Contractor, arising, directly or indirectly, out of, or in consequence of, or involving or relating to, breach of this Project Agreement by the City or any deliberate or negligent act or omission of any City Party, except to the extent caused, or contributed to, by the breach of the Project Agreement or the Contract by the Contractor or by any act or omission of the Contractor; and

(iii) any physical loss of or damage to property or assets of any third party, or any other loss or damage of any third party, arising, directly or indirectly, out of, or in consequence of, or involving or relating to, breach of the Project Agreement by the City or any deliberate or negligent act or omission of any City Party, except to the extent caused, or contributed to, by the breach of the Project Agreement or this Agreement by the Contractor or by any act or omission of the Contractor,

provided that there shall be excluded from the indemnity given by the City any liability for the occurrence of risks against which Project Co is required to insure under this Project Agreement to the extent of the proceeds available or that should have been available but for a failure by Project Co to comply with its obligations to properly insure under this Project Agreement.

(b) The obligations of the City to indemnify the Contractor Indemnified Parties provided in Subsection 20(a) shall be reduced with respect to any Claim:

(i) to the extent that insurance proceeds are paid to the Contractor under the terms of any insurance policy under the Project Agreement or the Contract;

(ii) by the percentage at fault that the Claim was attributable to any negligence or wilful misconduct of any of the Contractor Indemnified Parties, or any Subcontractor of the Contractor; or

(iii) by the percentage at fault that the Claim related to a breach by the Contractor or omission of any Contractor Indemnified Party or any

Subcontractor of the Contractor of any of the obligations of the Contractor under the Contract.

(c) Notwithstanding anything contained in this Agreement to the contrary the total liability of the City to the Contractor with respect to indemnification, Direct Losses or other liability shall be limited to the amount of $50,000,000, less any insurance proceeds paid to the Contractor under the terms of any insurance policy and less any amounts previously paid by the City to Project Co on account of the provisions of Section 56.2 of the Project Agreement.

21. CLAIMS

(a) Notwithstanding any other provision of this Agreement, neither Party will be entitled to recover Compensation or make a Claim for Compensation under the Contract, this Agreement or any other agreement in relation to the Project in respect of any loss that it has incurred (or any failure of the other party) to the extent that it has already been compensated in respect of that loss or failure pursuant to the Contract, this Agreement, the Project Agreement or otherwise (including, without limitation, pursuant to an indemnity from another party).

(b) The City acknowledges that it holds substantially identical indemnities from Project Co and the Contractor with respect to the Work (as such term is defined in the Contract) by the Contractor as Subcontractor to Project Co. To the extent that a Claim by the City against the Contractor in accordance with Section 19 (a "**City Direct Claim**") is substantially the same as any equivalent Claim by the City against Project Co under the Project Agreement or by Project Co against or the Contractor under the Contract (such Claim by the City or Project Co being a "**City Equivalent Claim**"), any payment by the Contractor in or towards settlement of such City Direct Claim shall be deemed to equally settle the City Equivalent Claim, provided that no admission of liability, settlement, compromise, waiver, release or other agreement (a "**Settlement**") by the Contractor in relation to such City Direct Claim shall bind Project Co in respect of its City Equivalent Claim against the Contractor unless the Settlement is approved in writing by Project Co (however, Project Co shall not be entitled to recover from the Contractor under Project Co's City Equivalent Claim against the Contractor an amount equal to the Direct Losses paid by the Contractor to the City to the extent that such Direct Losses relate to the same Claim by Project Co against the Contractor under the City Equivalent Claim).

(c) To the extent that a Claim by the Contractor against the City in accordance with Section 20 (a "**Contractor Direct Claim**") is substantially the same as any equivalent Claim by the Contractor against Project Co under the Contract or by Project Co against the City under the Project Agreement (such Claim by the Contractor or Project Co being a "**Contractor Equivalent Claim**"), any payment by the City in or towards settlement of such Contractor Direct Claim shall be deemed to equally settle the Contractor Equivalent Claim (in the case of a Claim by the Contractor against Project Co, only to the extent of the amount of Direct

Losses recovered by the Contractor from the City), provided that no Settlement by the City in relation to such Contractor Direct Claim shall bind Project Co in respect of its Contractor Equivalent Claims against the City unless the Settlement is approved in writing by Project Co.

22. CONDUCT OF CLAIMS

The conduct of any Claims under this Agreement shall be conducted in the same manner, mutatis mutandis as provided for in Section 56.3 of the Project Agreement.

23. RELATIONSHIP OF THE PARTIES

The parties expressly disclaim any intention to create a partnership or joint venture or to constitute the other party as its agent. Nothing in this Agreement shall constitute the parties, partners or joint venturers, nor constitute one party, the agent of the other party.

24. CONTRACTOR RELATIONSHIP TO PROJECT CO

Nothing contained in this Agreement shall constitute the Contractor as the guarantor, surety, co-debtor, partner or joint venturer of Project Co and the liability and obligations of the Contractor to the City hereunder shall, save to the extent provided in this Agreement not be greater than the Contractor's liability and obligations to Project Co in accordance with the Contract.

25. NOTICES

Any notice, approval, election, demand, direction, consent, designation, request, agreement, instrument, certificate, report or other communication required or permitted to be given or made under this Agreement (each, a "**Notice**") to a party must be given in writing. A Notice may be given by delivery to an individual or by electronically by fax or electronic mail, and will be validly given if delivered on a Business Day at the following address, or, if transmitted on a Business Day by fax addressed to the following party:

If to the City:

City of Ottawa
Finance Department, Supply Branch
100 Constellation Crescent
4th Floor West Tower
Ottawa, ON K2G 6J8

Fax: (613) 580-9688

Attn.: Director, Rail Implementation

With a copy to:	Ontario Infrastructure and Lands Corporation 777 Bay Street, 6th Floor Toronto, ON M5G 2C8 Fax: (416) 327-6387 Attn.: Vice President, Civil Infrastructure
If to Project Co:	Rideau Transit Group General Partnership 1 First Canadian Place, Suite 6000 P.O. Box 367, 100 King Street West Toronto, ON M5X 1E2 Fax: (416) 365-7886 Attn.: Eusebio Corregel
With a copy to:	ACS RTG Partner Inc. c/o ACS Infrastructure Canada Inc. 155 University Avenue, Suite 1800 Toronto, ON M5H 3B7 Fax: (786) 272-7992 Attn.: Nuria Haltiwanger
With a copy to:	EllisDon RTG Partner Inc. c/o 800-89 Queensway Avenue Mississauga, ON L5B 2V2 Fax: (905) 803-3059 Attn.: Jody K. Becker
With a copy to:	SNC RTG Partner Inc. c/o 455 René-Lévesque Blvd. West Montreal, QC H2Z 1Z3 Fax: (514) 866-0795 Attn.: Gerry Grigoropoulos

If to the **[Construction/Maintenance]** Contractor:	**[●]**
	Fax: **[●]**
	Attn.: **[●]**
With a copy to:	**[●]**
	Fax: **[●]**
	Attn.: **[●]**

26. WAIVER

No waiver of any provision of this Agreement is binding unless it is in writing and signed by all the parties to this Agreement except that any provision which does not give rights or benefits to particular parties may be waived in writing, signed only by those parties who have rights under, or hold the benefit of, the provision being waived if those parties promptly send a copy of the executed waiver to all other parties. No failure to exercise, and no delay in exercising, any right or remedy under this Agreement will be deemed to be a waiver of that right or remedy. No waiver of any breach of any provision of this Agreement will be deemed to be a waiver of any subsequent breach of that provision or of any similar provision.

27. FURTHER ASSURANCES

Each party will promptly execute and deliver all further documents and take all further action reasonably necessary or appropriate to give effect to the provisions and intent of this Agreement and to complete the transactions contemplated by this Agreement.

28. COUNTERPARTS

This Agreement and all documents contemplated by or delivered under or in connection with this Agreement may be executed and delivered in any number of counterparts with the same effect as if all parties had all signed and delivered the same document and all counterparts will be construed together to be an original and will constitute one and the same agreement.

29. DELIVERY BY FACSIMILE

Any party may deliver an executed copy of this Agreement by fax but that party will immediately dispatch by delivery in person to the other party an originally executed copy of this Agreement.

30. AMENDMENTS

No amendment, supplement, restatement or termination of any provision of this Agreement is binding unless it is in writing and signed by each party to this Agreement at the time of the amendment, supplement, restatement or termination.

31. DISPUTE RESOLUTION PROCEDURE

The Parties hereby incorporate by reference the provisions of Schedule 27 (Dispute Resolution Procedure) to the Project Agreement. Except as aforesaid, each of the parties irrevocably submits to the exclusive jurisdiction of the courts of Ontario in any suit, action, or other proceeding in any way related to or arising out of this Agreement commenced in the courts of Ontario and all courts having appellate jurisdiction over those courts, by any party to this Agreement against any other party to this Agreement (a "**Permitted Action**") and each party to this Agreement waives, and will not assert by way of motion, as a defence, or otherwise, in any Permitted Action, any Claim that:

(a) that party is not subject to the jurisdiction of the courts of Ontario;

(b) the Permitted Action is brought in an inconvenient forum;

(c) the venue of the Permitted Action is improper; or

(d) any subject matter of the Permitted Action may not be enforced in or by the courts of Ontario.

In any suit or action brought to obtain a judgment for the recognition or enforcement of any final judgment rendered in a Permitted Action, no party to this Agreement will seek any review with respect to the merits of any Permitted Action, whether or not that party appears in or defends the Permitted Action.

32. ENTIRE AGREEMENT

This Agreement and all documents contemplated by or delivered under or in connection with this Agreement or referred to in this Agreement, constitute the entire agreement between the parties with respect to the subject matter of this Agreement and supersede all prior agreements, negotiations, discussions, undertakings, representations, warranties and understandings, whether written or oral, express or implied, statutory or otherwise.

33. PROJECT CO CONFIRMATION

The parties acknowledge and agree that Project Co is executing and delivering this Agreement solely for the purpose of confirming its agreement to be bound by the provisions contained in Sections 5 and 6 of this Agreement.

34. ENUREMENT

This Agreement enures to the benefit of and binds the parties and their respective successors and permitted assigns.

[Signature pages follow]

IN WITNESS WHEREOF the parties have executed this Agreement as of the day and year first above written.

CITY OF OTTAWA

Per: _____
Name: Kent Kirkpatrick
Title: City Manager

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP, by its partners, ACS RTG PARTNER INC., SNC RTG PARTNER INC. and ELLISDON RTG PARTNER INC.

ACS RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

SNC RTG PARTNER INC.

Per: _____
Name:
Title:

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

ELLISDON RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

[CONTRACTOR]

By: _____
Name:
Title:

By: _____
Name:
Title:

I/We have authority to bind the corporation.

SCHEDULE 6

INDEPENDENT CERTIFIER AGREEMENT

THIS AGREEMENT is made as of the 12th day of February, 2013

BETWEEN:

CITY OF OTTAWA

(the "**City**")

AND

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP

("**Project Co**")

AND

ALTUS GROUP LIMITED

(the "**Independent Certifier**")

WHEREAS:

A. The City and Project Co (collectively, the "**PA Parties**" and each, a "**PA Party**") have entered into the Project Agreement.

B. Pursuant to the terms of the Project Agreement, the PA Parties wish to appoint the Independent Certifier, and the Independent Certifier wishes to accept such appointment, to perform certain services in connection with the Project Agreement.

C. The PA Parties and the Independent Certifier wish to enter into this Independent Certifier Agreement in order to record the terms by which the Independent Certifier shall perform such services.

NOW THEREFORE in consideration of the mutual covenants and agreements of the PA Parties and the Independent Certifier herein contained and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the PA Parties and the Independent Certifier covenant and agree as follows:

1. DEFINITIONS

1.1 Definitions

(a) In this Independent Certifier Agreement, including the recitals and appendices, unless the context indicates a contrary intention, terms which are defined in the Project Agreement (and not otherwise defined in this Independent Certifier Agreement) shall have meanings given to them in the Project Agreement and the following terms shall have the following meanings:

(i) "**Certification Services**" means:

(A) all of the functions and obligations described in the Project Agreement as being the responsibility of the Independent Certifier;

(B) all of the functions and obligations conferred on the Independent Certifier under this Independent Certifier Agreement, including the functions described in Appendix A to this Independent Certifier Agreement; and

(C) all other things or tasks which the Independent Certifier must do to comply with its obligations under this Independent Certifier Agreement.

(ii) "**Certification Services Variation**" is any change to the Certification Services.

(iii) "**Contract Material**" means all material:

(A) provided to the Independent Certifier or created or required to be created by either PA Party; and

(B) provided by or created or required to be created by the Independent Certifier as part of, or for the purpose of, performing the Certification Services,

including documents, equipment, reports, technical information, plans, charts, drawings, calculations, tables, schedules and data (stored and recorded by any means).

(iv) **[intentionally deleted]**

(v) "**Fee**" means the fees payable by the City and Project Co to the Independent Certifier for the Certification Services, as such fees are specified and made payable in Appendix B to this Independent Certifier Agreement.

(vi) "**HST**" means the value-added tax payable and imposed pursuant to Part IX of the *Excise Tax Act* (Canada), and any successor legislation thereto.

(vii) "**Intellectual Property**" means discoveries, research, developments, designs, industrial designs, improvements, innovations, inventions, software, computer programs and code of all types, layouts, interfaces, applications, tools, databases, hardware, methods, concepts, processes, know-how, formulae, mask works, works subject to copyright, and other technologies, works and creations now existing or developed in the future, whether or not registered or registrable, patentable or non-patentable, or confidential or non confidential.

(viii) "**Intellectual Property Rights**" means all intellectual property rights of any kind whatsoever, whether or not registered or registrable, including copyright, patents and patent applications, database rights, industrial design registrations, rights in respect of trademarks, trade names, domain names, mask works, trade secrets and confidential information, and all applications, registrations, renewals, extensions, continuations, divisions, reissues, and restorations relating to any such rights (where applicable) now or hereafter in force and effect throughout all or any part of the universe.

(ix) "**Lenders**" has the meaning given in the Project Agreement.

(x) "**PA Parties**" means both the City and Project Co, and "**PA Party**" means either the City or Project Co, as the context requires.

(xi) "**Project Agreement**" means that certain project agreement made on or about the date hereof between the City and Project Co with respect to the design, construction, financing, maintenance and rehabilitation of the System.

2. INTERPRETATION

2.1 Interpretation

(a) In this Independent Certifier Agreement, unless the context indicates a contrary intention:

(i) words denoting the singular number include the plural and vice versa;

(ii) words denoting individuals include corporations and vice versa;

(iii) headings are for convenience only and do not affect interpretation;

(iv) references to Clauses, Sections or Parts are references to Clauses, Sections or Parts of this Independent Certifier Agreement;

(v) references to this Independent Certifier Agreement or any contract, agreement or instrument are deemed to include references to this Independent Certifier Agreement or such other contract, agreement or instrument as amended, novated, supplemented, varied or replaced from time to time;

(vi) references to any party to this Independent Certifier Agreement includes its successors or permitted assigns;

(vii) words denoting any gender include all genders;

(viii) references to any legislation or to any section or provision of any legislation include any statutory modification or re-enactment of any statutory provision substituted for legislation, section or provision, and ordinances, by-laws, regulations and other statutory instruments issued under that legislation, section or provision;

(ix) a reference to "$" is to Canadian currency;

(x) the terms "including" and "include" mean "including" or "include" (as applicable) without limitation;

(xi) if a word or phrase is defined, then other parts of speech and grammatical forms of that word or phrase have a corresponding meaning; and

(xii) unless otherwise indicated, all time periods will be strictly construed.

2.2 Obligations and Exercise of Rights by PA Parties

(a) The obligations of the PA Parties under this Independent Certifier Agreement shall be several.

(b) Except as specifically provided for in this Independent Certifier Agreement or the Project Agreement, the rights of the PA Parties under this Independent Certifier Agreement shall be jointly exercised by the PA Parties.

3. ROLE OF THE INDEPENDENT CERTIFIER

3.1 Engagement

(a) The PA Parties hereby appoint the Independent Certifier, and the Independent Certifier hereby accepts such appointment, to carry out the Certification Services in accordance with this Independent Certifier Agreement. The Independent Certifier shall perform the Certification Services in accordance with this Independent Certifier Agreement.

(b) Nothing in this Independent Certifier Agreement will be interpreted as giving the Independent Certifier any responsibility for performance of the design or construction, or for the certifications of the professionals of record.

(c) Neither PA Party shall, without the prior written consent of the other PA Party, enter into any separate agreement with the Independent Certifier in connection with the Project, and Project Co shall ensure that no Project Co Party enters into any separate agreement with the Independent Certifier in connection with the Project.

(d) The Independent Certifier shall make such observations and evaluations of any Design and Construction Works pursuant to a Variation in order to certify any payment to Project Co of the value of work performed, provided the Independent Certifier shall be entitled to a Certification Services Variation Order pursuant to Section 9.4 and 9.5 of this Independent Certifier Agreement.

3.2 Acknowledgement of Independent Certifier

(a) The Independent Certifier hereby acknowledges in favour of the PA Parties that it has received a copy of the Project Agreement.

3.3 Standard of Care

(a) The Independent Certifier must exercise the standard and skill, care and diligence in the performance of the Certification Services that would be expected of an expert professional experienced in providing services in the nature of the Certification Services for projects similar to the Project.

3.4 Duty of Independent Judgment

(a) In exercising its Certification Services, the Independent Certifier must:

(i) act impartially, honestly and independently in representing the interests of both PA Parties in accordance with the terms of the Project Agreement and this Independent Certifier Agreement;

(ii) act reasonably and professionally;

(iii) act in a timely manner:

(A) in accordance with the times prescribed in this Independent Certifier Agreement and the Project Agreement; or

(B) where no times are prescribed, the lesser of 10 days or such earlier time so as to enable the PA Parties to perform their respective obligations under the Project Agreement; and

(iv) act in accordance with the joint directions of the PA Parties provided that the directions are not inconsistent with the other terms of this Independent Certifier Agreement or the terms of the Project Agreement and do not vary or prejudice the Independent Certifier's authority or responsibilities or the exercise by the Independent Certifier of its professional judgment under this Independent Certifier Agreement.

(b) Although the Independent Certifier may take account of any opinions or representations made by the PA Parties, the Independent Certifier shall not be bound to comply with any

opinions or representations made by either of them in connection with any matter on which the Independent Certifier is required to exercise its professional judgment.

(c) The Independent Certifier acknowledges that the PA Parties may rely on the Certification Services, including determinations, findings and certifications made by the Independent Certifier, and accordingly, the Independent Certifier will use its best skill and judgment in providing the Certification Services.

(d) The Independent Certifier acknowledges that all Certification Services, Contract Material and all determinations, findings, reports, certificates and other information delivered by the Independent Certifier to the City pursuant to the Project Agreement may be relied upon by HMQ, represented by the Ministry of Transportation and the Government of Canada, represented by the Ministry of Transport, Infrastructure and Communities, and that the Independent Certifier shall owe each an equal duty of care as is owed to the City hereunder, notwithstanding the fact that HMQ, represented by the Ministry of Transportation and the Government of Canada, represented by the Ministry of Transport, Infrastructure and Communities are not parties to this Independent Certifier Agreement and/or the Project Agreement. The Independent Certifier will confirm the foregoing directly to either Contribution Agreement Party, if requested by the City.

3.5 Authority to Act

(a) The Independent Certifier:

(i) is an independent consultant and is not, and must not purport to be, a partner, joint venturer or agent of either PA Party;

(ii) other than as expressly set out in this Independent Certifier Agreement or the Project Agreement, has no authority to give any directions to a PA Party or its officers, directors, members, employees, contractors, consultants or agents; and

(iii) has no authority to waive or alter any terms of the Project Agreement, nor to discharge or release a party from any of its obligations under the Project Agreement unless jointly agreed by the PA Parties in writing.

3.6 Knowledge of the PA Parties' Requirements

(a) The Independent Certifier warrants that:

(i) it has informed and will be deemed to have informed itself fully of the requirements of the Project Agreement;

(ii) it will inform itself fully of the requirements of such other documents and materials as may become relevant from time to time to the performance of the Certification Services;

(iii) without limiting Sections 3.6(a)(i) or 3.6(a)(ii), it has and will be deemed to have informed itself fully of all time limits and other requirements for any Certification Service which the Independent Certifier carries out under the Project Agreement and this Independent Certifier Agreement;

(iv) it has and will be deemed to have informed itself completely of the nature of the work necessary for the performance of the Certification Services and the means of access to and facilities at the System and Site including restrictions on any such access or protocols that are required; and

(v) it has satisfied itself as to the correctness and sufficiency of its proposal for the Certification Services and that the Fee covers the cost of complying with all of the obligations under this Independent Certifier Agreement and of all matters and things necessary for the due and proper performance and completion of the Certification Services.

3.7 Co-ordination and Information by Independent Certifier

(a) The Independent Certifier must:

(i) fully cooperate with the PA Parties;

(ii) carefully co-ordinate the Certification Services with the work and services performed by the PA Parties;

(iii) without limiting its obligations under Sections 3.4 and 3.7(a)(ii), perform the Certification Services so as to avoid unreasonably interfering with, disrupting or delaying the work and services performed by the PA Parties;

(iv) provide copies to the PA Parties of all reports, communications, certificates and other documentation that it provides to either PA Party; and

(v) provide a copy of the Contract Material to each of HMQ, represented by the Ministry of Transportation and the Government of Canada, represented by the Ministry of Transport, Infrastructure and Communities at the same time as it is provided to the PA Parties. In respect of such Contract Material, HMQ, represented by the Ministry of Transportation or the Government of Canada, represented by the Ministry of Transport, Infrastructure and Communities as applicable, may make inquiries of the Independent Certifier and request further investigation or clarification in connection with, and subject to, its Contribution Agreement.

3.8 Conflict of Interest

(a) The Independent Certifier warrants that:

(i) at the date of signing this Independent Certifier Agreement, no conflict of interest exists or is likely to arise in the performance of its obligations under this Independent Certifier Agreement, and the Independent Certifier further warrants that it has not been retained, in respect of the Project Agreement, as an advisor to either of the PA Parties or as a technical advisor to the Lenders; and

(ii) if, during the term of this Independent Certifier Agreement, any such conflict or risk of conflict of interest arises, the Independent Certifier will notify the PA Parties immediately in writing of that conflict or risk of conflict and take such steps as may be required by either of the PA Parties to avoid or mitigate that conflict or risk.

3.9 Independent Certifier Personnel

(a) The Independent Certifier shall make reasonable efforts to ensure that the individuals listed in Appendix C remain involved in the performance of the Certification Services and, in particular, will not, for the duration of this Independent Certifier Agreement, require or request any such person to be involved in any other project on behalf of the Independent Certifier if, in the reasonable opinion of the PA Parties, such involvement would have a material adverse effect on the performance of the Certification Services. The PA Parties and the Independent Certifier confirm that any change to the individuals listed in Appendix C is an amendment to this Agreement which is subject to Section 12.9(c).

(b.1) The Independent Certifier shall ensure that its personnel providing Certification Services have any required security clearances, including a minimum level II (secret) clearance with Public Works and Government Services Canada in order to access documentation from Public Works and Government Services Canada.

(b) The Independent Certifier shall ensure that its personnel providing the Certification Services in respect of the Project Co Commissioning shall:

(i) possess a current professional designation of not less than membership in Professional Engineers Ontario, the Ontario Association of Certified Engineering Technicians and Technologists or such similar professional designation recognized in North America;

(ii) have demonstrated competence in the commissioning of comparable facilities and in having completed or monitored the commissioning of a comparable light rail transit system;

(iii) have an understanding of the appropriate standards, guidelines and policies related to commissioning for light rail transit systems , as well as other applicable transit commissioning standards; and

(iv) have an understanding of any documentation to be provided pursuant to this Independent Certifier Agreement and the Project Agreement, including not only the start-up procedures but any pre-commissioning and post-commissioning activities.

(c) The Independent Certifier shall furnish the PA Parties with evidence satisfactory to the PA Parties of any such personnel's compliance with the foregoing requirements within a reasonable time prior to the proposed commencement of the Project Co Commissioning.

3.10 Minimize Interference

(a) The Independent Certifier shall perform the Certification Services in such a way as to minimize any undue interference with the progress of the Design and Construction Works.

4. ROLE OF THE PA PARTIES

4.1 Assistance

(a) The PA Parties agree to cooperate with and provide reasonable assistance to the Independent Certifier to familiarize the Independent Certifier with all necessary aspects of the Project to enable the Independent Certifier to carry out its obligations under this Independent Certifier Agreement.

4.2 Instructions in Writing

(a) Unless otherwise provided in this Independent Certifier Agreement or the Project Agreement, all instructions to the Independent Certifier by the PA Parties shall be given in writing and accepted or endorsed by both of the PA Parties.

4.3 Information and Services

(a) The PA Parties shall make available to the Independent Certifier, as soon as practicable from time to time, all information, documents and particulars necessary for the Independent Certifier to carry out the Certification Services, including such information, documents and particulars required in order for the Independent Certifier to determine whether any Milestone Acceptance, Substantial Completion, Revenue Service Availability and Final Completion have occurred, and shall provide copies of all such information, documents and particulars to the other party hereto.

4.4 Additional Information

(a) If any information, documents or particulars are reasonably required to enable the Independent Certifier to perform the Certification Services and have not been provided by the PA Parties, then:

(i) the Independent Certifier must give notice in writing to the Project Co Representative or the City Representative, as the case may be, of the details of the information, documents or particulars demonstrating the need and the reasons why they are required; and

(ii) Project Co or the City, as the case may be, must arrange the provision of the required information, documents or particulars.

4.5 Right to Enter and Inspect

(a) Upon giving reasonable notice to the Project Co Representative, the Independent Certifier (and any person authorized by it) may enter and inspect the Site, System or Design and Construction Works at any reasonable time in connection with the exercise or proposed exercise of rights under this Independent Certifier Agreement, subject to:

(i) observance of the reasonable rules of Project Co as to safety and security for the Site, the System and the Design and Construction Works;

(ii) not causing unreasonable delay to the carrying out of the Design and Construction Works by reason of its presence at the Site, the System and the Design and Construction Works; and

(iii) not causing any damage to the Site, the System or the Design and Construction Works.

4.6 PA Parties Not Relieved

(a) Neither PA Party shall be relieved from performing or observing its obligations, or from any other liabilities, under the Project Agreement as a result of either the appointment of, or any act or omission by, the Independent Certifier.

4.7 PA Parties not Liable

(a) On no account will a PA Party be liable to another PA Party for any act or omission by the Independent Certifier whether under or purportedly under a provision of the Project Agreement, this Independent Certifier Agreement or otherwise, provided that any such act or omission shall not extinguish, relieve, limit or qualify the nature or extent of any right or remedy of either PA Party against or any obligation or liability of either PA Party to the other PA Party which would have existed regardless of such act or omission.

5. CERTIFICATION QUALITY PLAN

5.1 Certification Quality Plan

(a) The Independent Certifier must:

(i) develop and implement a certification quality plan identifying the processes and outcomes of the Certification Services that complies with all requirements of the Independent Certifier's quality assurance accreditation, and is otherwise satisfactory to each of the City Representative and the Project Co Representative;

(ii) within 14 days after the date of this Independent Certifier Agreement, provide such certification quality plan to each of the City Representative and the Project Co Representative;

(iii) if satisfactory to each of the City Representative and the Project Co Representative, implement such certification quality plan; and

(iv) if not satisfactory to each of the City Representative and the Project Co Representative, within 7 days after receiving notice thereof from either PA Party to that effect, revise and resubmit the certification quality plan to each of the City Representative and the Project Co Representative, and implement it if satisfactory to each of the City Representative and the Project Co Representative.

5.2 Certification Quality Plan not to Relieve Independent Certifier

(a) The Independent Certifier will not be relieved of any responsibilities or obligations in respect of the performance of the Certification Services and will remain solely responsible for them notwithstanding:

(i) the obligation of the Independent Certifier to develop and implement a certification quality plan; or

(ii) any comment or direction upon, review or acceptance of, approval to proceed with or request to vary any part of the certification quality plan by either the City Representative or the Project Co Representative.

6. SUSPENSION

6.1 Notice

(a) The Certification Services (or any part) may be suspended at any time by the PA Parties:

(i) if the Independent Certifier fails to comply with its obligations under this Independent Certifier Agreement, immediately by the PA Parties giving joint notice in writing to the Independent Certifier; or

(ii) in any other case, by the PA Parties giving 7 days joint notice in writing to the Independent Certifier.

6.2 Costs of Suspension

(a) The Independent Certifier will:

(i) subject to the Independent Certifier complying with Article 9, be entitled to recover the extra costs incurred by the Independent Certifier by reason of a suspension directed under Section 6.1(a)(ii) valued as a Certification Services Variation under Section 9; and

(ii) have no entitlement to be paid any costs, expenses, losses or damages arising from a suspension under Section 6.1(a)(i).

6.3 Recommencement

(a) The Independent Certifier must immediately recommence the carrying out of the Certification Services (or any part) on receipt of a joint written notice from the PA Parties requiring it to do so.

7. INSURANCE AND LIABILITY

7.1 Independent Certifier's Insurance

(a) The Independent Certifier must have in place at all times during the term of this Independent Certifier Agreement:

(i) professional liability insurance:

(A) in the amount of $2,000,000 per claim and $4,000,000 in the aggregate, a deductible of not more than $25,000 per claim and from an insurer and on terms satisfactory to each of the PA Parties; and

(B) covering liability which the Independent Certifier might incur as a result of a breach by it of its obligations owed by the Independent Certifier in a professional capacity to the PA Parties, or either of them, under or in connection with this Independent Certifier Agreement or the provision of the Certification Services; and

(ii) commercial general liability insurance in the amount of $5,000,000 per claim and in the aggregate, no deductible for personal injury or bodily injury, a deductible of not more than $5,000 per occurrence for property damage and from an insurer and on terms satisfactory to each of the PA Parties.

(b) The Independent Certifier must provide copies of its insurance policies to each of the PA Parties upon execution of this Independent Certifier Agreement, and, at least 5 Business Days prior to the expiry date of any such insurance policy, the Independent Certifier must provide evidence of the renewal of any such insurance policy satisfactory to the PA Parties, acting reasonably.

7.2 Workers' Compensation Insurance

(a) The Independent Certifier must, at its own cost and at all times during the term of this Independent Certifier Agreement, insure its liability (including its common law liability) as required under any applicable workers compensation statute or regulation in relation to its employees engaged in the Certification Services.

8. PAYMENT FOR SERVICES

8.1 Payment of Fee

(a) In consideration of the Independent Certifier performing the Certification Services in accordance with this Independent Certifier Agreement, each PA Party shall pay one-half of the Fee to the Independent Certifier in accordance with the payment schedule specified in Appendix B.

(b) The obligation of each PA Party to pay one-half of the Fee to the Independent Certifier is a several obligation, and neither PA Party shall have any liability in respect of the non-payment by the other PA Party of any fees or costs payable by such other PA Party under this Independent Certifier Agreement.

(c) The Fee includes all taxes (except for HST), overheads and profit, all labour and materials, insurance costs and all other overhead including any fees or other charges required by law to perform the Certification Services. For clarity, all travel expenses are to be included in the Fee.

(d) The PA Parties acknowledge and agree that if any approved amount due and payable by the PA Parties to the Independent Certifier in excess of $50,000 is outstanding for more than 180 days, the Independent Certifier shall not have any obligation to make any certification under the Project Agreement.

9. CERTIFICATION SERVICES VARIATIONS

9.1 Notice of Certification Services Variation

(a) If the Independent Certifier believes, other than a "Certification Services Variation Order" under Section 9.4(c), that any direction by the PA Parties constitutes or involves a Certification Services Variation it must:

(i) within 7 days after receiving the direction and before commencing work on the subject matter of the direction, give notice to the PA Parties that it considers the direction constitutes or involves a Certification Services Variation; and

(ii) within 21 days after giving the notice under Section 9.1(a)(i), submit a written claim to each of the City Representative and the Project Co Representative which includes detailed particulars of the claim, the amount of the claim and how it was calculated.

(b) Regardless of whether the Independent Certifier considers that such a direction constitutes or involves a Certification Services Variation, the Independent Certifier must continue to perform the Certification Services in accordance with this Independent Certifier Agreement and all directions, including any direction in respect of which notice has been given under this Section 9.1.

9.2 No Adjustment

(a) If the Independent Certifier fails to comply with Section 9.1, the Fee will not be adjusted as a result of the relevant direction.

9.3 External Services

(a) In the event that external personnel or consultants are required for expert opinion with respect to a Certification Services Variation, then, with the prior written approval of the PA Parties, any additional fees relating to such external personnel or consultants will be payable by the PA Parties at the agreed upon amount.

9.4 Certification Services Variation Procedure

(a) The City Representative and the Project Co Representative may jointly issue a document titled "Certification Services Variation Price Request" to the Independent Certifier which will set out details of a proposed Certification Services Variation which the PA Parties are considering.

(b) Within 7 days after the receipt of a "Certification Services Variation Price Request", the Independent Certifier must provide each of the City Representative and the Project Co Representative with a written notice in which the Independent Certifier sets out the effect which the proposed Certification Services Variation will have on the Fee.

(c) Each of the City Representative and the Project Co Representative may then jointly direct the Independent Certifier to carry out a Certification Services Variation by written document titled "Certification Services Variation Order" which will state either that:

(i) the Fee is adjusted as set out in the Independent Certifier's notice; or

(ii) the adjustment (if any) to the Fee will be determined under Section 9.5.

9.5 Cost of Certification Services Variation

(a) Subject to Section 9.2, the Fee will be adjusted for all Certification Services Variations or suspensions under Section 6.1(a)(ii) carried out by the Independent Certifier by:

(i) the amount (if any) stated in the "Certification Services Variation Order" in accordance with Section 9.4(c);

(ii) if Section 9.5(a)(i) is not applicable, an amount determined pursuant to the fee schedule in Appendix B; or

(iii) where such rates or prices are not applicable, a reasonable amount to be agreed between the PA Parties and the Independent Certifier or, failing agreement, determined by the City Representative and the Project Co Representative jointly.

(b) Any reductions in the Fee shall be calculated on the same basis as any increases.

10. TERM AND TERMINATION

10.1 Term

(a) Subject to earlier termination, this Independent Certifier Agreement will commence on the date of the Project Agreement and continue in full force until:

(i) the completion of the Design and Construction Works and the performance of the Certification Services set forth herein; or

(ii) such other date as may be mutually agreed between the PA Parties and the Independent Certifier.

10.2 Notice of Breach

(a) If the Independent Certifier commits a breach of this Independent Certifier Agreement, the PA Parties may give written notice to the Independent Certifier:

(i) specifying the breach; and

(ii) directing its rectification in the period specified in the notice being a period not less than 7 days from the date of service of the notice.

10.3 Termination for Breach

(a) If the Independent Certifier fails to rectify the breach within the period specified in the notice issued under Section 10.2, the PA Parties may, without prejudice to any other rights of the PA Parties or either of them, immediately terminate this Independent Certifier Agreement.

10.4 Termination for Financial Difficulty or Change in Control

(a) The PA Parties may, without prejudice to any other rights which the PA Parties or either of them may have, terminate this Independent Certifier Agreement immediately if:

(i) events have occurred or circumstances exist which, in the opinion of the PA Parties, may result in or have resulted in an insolvency or a Change in Control of the Independent Certifier; or

(ii) the Independent Certifier has communications with its creditors with a view to entering into, or enters into, any form of compromise, arrangement or moratorium of any debts whether formal or informal, with its creditors.

10.5 Termination for Convenience

(a) Notwithstanding anything to the contrary in this Independent Certifier Agreement, the PA Parties may, at any time, jointly terminate this Independent Certifier Agreement upon 30 days written notice to the Independent Certifier. The PA Parties and the Independent Certifier agree that, notwithstanding the 30 days' notice of termination, the Independent Certifier shall continue on a day-to-day basis thereafter until a new Independent Certifier is appointed.

10.6 Independent Certifier's Rights upon Termination for Convenience

(a) Upon a termination under Section 10.5, the Independent Certifier will:

(i) be entitled to be reimbursed by the PA Parties for the value of the Certification Services performed by it to the date of termination; and

(ii) not be entitled to any damages or other compensation in respect of the termination and (without limitation) any amount in respect of:

(A) the lost opportunity to earn a profit in respect of the Certification Services not performed at the date of termination; and

(B) any lost opportunity to recover overheads from the turnover which would have been generated under this Independent Certifier Agreement but for it being terminated.

10.7 Procedure upon Termination

(a) Upon completion of the Independent Certifier's engagement under this Independent Certifier Agreement or earlier termination of this Independent Certifier Agreement (whether under Section 10.3, 10.4 or 10.5 or otherwise), the Independent Certifier must:

(i) cooperate with the PA Parties with respect to the transition of the Certification Services to a replacement certifier;

(ii) deliver to the PA Parties all Contract Material and all other information concerning the Project held or prepared by the Independent Certifier during the execution of work under this Independent Certifier Agreement; and

(iii) as and when required by the PA Parties, meet with them and such other persons nominated by them with a view to providing them with sufficient information to enable the PA Parties to execute the Project or the persons nominated to provide the Certification Services.

10.8 Effect of Termination

(a) Except as otherwise expressly provided in this Independent Certifier Agreement, termination of this Independent Certifier Agreement shall be without prejudice to any accrued rights and obligations under this Independent Certifier Agreement as at the date of termination (including the right of the PA Parties to recover damages from the Independent Certifier).

10.9 Survival

(a) Termination of this Independent Certifier Agreement shall not affect the continuing rights and obligations of the PA Parties and the Independent Certifier under Sections 7, 8, 10.6, 10.7, 10.8, 11, 12.7, 12.8 12.9 and this Section 10.9 or under any other provision which is expressed to survive termination or which is required to give effect to such termination or the consequences of such termination.

11. INDEMNITY

11.1 PA Parties to Save Independent Certifier Harmless

(a) The PA Parties hereby indemnify and save the Independent Certifier completely harmless from any actions, causes of action, suits, debts, costs, damages, expenses, claims and demands whatsoever, at law or in equity, arising directly or indirectly in whole or in part out of any action taken by the Independent Certifier within the scope of its duties or authority hereunder.

(b) The indemnity provided under this Section 11.1 shall not extend:

(i) to any breach of this Independent Certifier Agreement, or any part or parts hereof, by the Independent Certifier, its employees, servants, agents or persons for whom it is in law responsible, or any negligent or unlawful act or omission or wilful misconduct of the Independent Certifier, its employees, servants or persons for whom it is in law responsible (in respect of which the Independent Certifier shall indemnify the PA Parties, as referred to in Section 11.2);

(ii) to any action taken by the Independent Certifier outside the scope of authority set forth in this Independent Certifier Agreement, or any part or parts hereof; or

(iii) to any debt, cost, expense, claim or demand for which insurance proceeds are recoverable by the Independent Certifier.

(c) This indemnity shall survive the termination of this Independent Certifier Agreement.

11.2 Independent Certifier to Save PA Parties Harmless

(a) The Independent Certifier hereby indemnifies and saves the PA Parties, and their affiliated entities, subsidiaries and their respective directors, officers, employees, agents,

permitted successors and assigns, completely harmless from any actions, causes of action, suits, debts, costs, damages, expenses, claims and demands whatsoever, at law or in equity, arising directly or indirectly in whole or in part out of any breach of this Independent Certifier Agreement, or any part or parts hereof, by the Independent Certifier, its employees, servants, agents or persons for whom it is in law responsible, or any negligent or unlawful act or omission or willful misconduct of the Independent Certifier, its employees, servants or persons for whom it is in law responsible.

(b) The indemnity provided under this Section 11.2 to a PA Party shall not extend:

(i) to any negligent or unlawful act or omission or willful misconduct of such PA Party, its employees, servants or persons for whom it is in law responsible (in respect of which such PA Parties shall indemnify the Independent Certifier, as referred to in Section 11.1); or

(ii) to any debt, cost, expense, claim or demand for which insurance proceeds are recoverable by such PA Party.

(c) This indemnity shall survive the termination of this Independent Certifier Agreement.

11.3 Conduct of Claims

(a) Claims made by a third person against a party having, or claiming to have, the benefit of an indemnity pursuant to this Independent Certifier Agreement shall be conducted in accordance with the conduct of claims procedure described in Appendix D – Conduct of Claims to this Independent Certifier Agreement.

12. GENERAL

12.1 Entire Agreement

(a) Except where provided otherwise in this Independent Certifier Agreement, this Independent Certifier Agreement constitutes the entire agreement between the parties in connection with its subject matter and supersedes all prior representations, communications, negotiations and understandings, whether oral, written, express or implied, concerning the subject matter of this Independent Certifier Agreement.

12.2 Negation of Employment

(a) The Independent Certifier, its officers, directors, members, employees, servants and agents and any other persons engaged by the Independent Certifier in the performance of the Certification Services will not by virtue of this Independent Certifier Agreement or the performance of the Certification Services become in the service or employment of the PA Parties for any purpose.

(b) The Independent Certifier will be responsible for all matters requisite as employer or otherwise in relation to such officers, directors, members, employees, servants and agents and other persons who are engaged by the Independent Certifier.

12.3 Waiver

(a) No waiver made or given by a party under or in connection with this Independent Certifier Agreement shall be binding or effective unless the waiver is in writing, signed by an authorized representative of the party giving such waiver, and delivered by such party to the other parties. No waiver made with respect to any right, power or remedy in one instance will be deemed to be a waiver with respect to any other instance involving the exercise of such right, power, or remedy or with respect to any other right, power, or remedy.

(b) Failure by any party to exercise any of its rights, powers or remedies hereunder or its delay to do so shall not constitute a waiver of those rights, powers or remedies. The single or partial exercise of a right, power or remedy shall not prevent its subsequent exercise or the exercise of any other right, power or remedy.

12.4 Notices

(a) All notices, requests, demands, instructions, certificates, consents and other communications required or permitted under this Independent Certifier Agreement shall be in writing (whether or not "written notice" or "notice in writing" is specifically required by the applicable provision of this Independent Certifier Agreement) and served by sending the same by registered mail, facsimile or by hand, as follows:

If to the City:	City of Ottawa Finance Department Supply Branch 100 Constellation Crescent 4th Floor, West Tower Ottawa, ON K2G 6J8 Fax: (613) 580-9688 Attn.: Director, Rail Implementation
With a copy to:	Ontario Infrastructure and Lands Corporation 777 Bay Street, 6th Floor Toronto, ON M5G 2C8 Fax: (416) 327-6387 Attn.: Vice President, Civil Infrastructure
Solely for the purposes of Section 3.7(a)(v), with a copy to:	HMQ, represented by the Ministry of Transportation

	777 Bay Street, 30th Floor Toronto, Ontario M7A 2J8 Fax: (416) 585-7343 Attn.: Director, Transit Policy Branch
Solely for the purposes of Section 3.7(a)(v), with a copy to:	Government of Canada, represented by the Ministry of Transport, Infrastructure and Communities Program Operations Branch Infrastructure Canada 1100-180 Kent Street Ottawa, Ontario K1P 0B6 and Fax: (613) 960-9423 Attn.: Assistant Deputy Minister Transport Canada Place de Ville, 330 Sparks St. Ottawa, Ontario K1A 0N5 Fax: (613) 990-9639 Attn.: Director General, Surface Infrastructure Programs
If to Project Co:	Rideau Transit Group General Partnership 1 First Canadian Place, Suite 6000 PO Box 367, 100 King Street West Toronto, Ontario M5X 1E2 Fax: (416) 365-7886 Attn: Eusebio Corregel
And a copy to:	ACS RTG Partner Inc. c/o ACS Infrastructure Canada Inc. 155 University Avenue, Suite 1800 Toronto, ON M5H 3B7 Fax: (786) 272-7992 Attn.: Nuria Haltiwanger
And a copy to:	EllisDon RTG Partner Inc.

c/o 800-89 Queensway Avenue
Mississauga, ON L5B 2V2

Fax: (905) 803-3059
Attn.: Jody K. Becker

And a copy to:

SNC RTG Partner Inc.
c/o 455 René-Lévesque Blvd. West
Montreal, QC H2Z 1Z3

Fax: (514) 866-0795
Attn.: Gerry Grigoropoulos

If to the Independent Certifier:

Altus Group Limited
33 Yonge Street, Suite 500
Toronto, ON M5E 1G4

Fax: Mehran Avini, Director – Infrastructure
Attn.: (416) 641-9500

(b) Where any notice is provided or submitted to a party via facsimile, an original of the notice sent via facsimile shall promptly be sent by regular mail or registered mail. For greater certainty, a notice given via facsimile shall not be invalid by reason only of a party's failure to comply with this Section 12.4(b).

(c) Any party to this Independent Certifier Agreement may, from time to time, change any of its contact information set forth in Section 12.4(a) by prior notice to the other Parties, and such change shall be effective on the Business Day that next follows the recipient party's receipt of such notice unless a later effective date is given in such notice.

(d) Subject to Sections 12.4(e), 12.4(f) and 12.4(g):

(i) a notice given by registered mail shall be deemed to have been received on the third Business Day after mailing;

(ii) a notice given by hand delivery shall be deemed to have been received on the day it is delivered; and

(iii) a notice given by facsimile shall be deemed to have been received on the day it is transmitted by facsimile.

(e) If the party giving the notice knows or ought reasonably to know of difficulties with the postal system which might affect negatively the delivery of mail, any such notice shall not be mailed but shall be made or given by personal delivery or by facsimile transmission in accordance with this Section 12.4.

(f) If any notice delivered by hand or transmitted by facsimile is so delivered or transmitted, as the case may be, either on a day that is not a Business Day or on a Business Day after 4:00 p.m. (recipient's local time), then such notice shall be deemed to have been received by such recipient on the next Business Day.

(g) A notice given by facsimile shall be deemed to have been received by the recipient on the day it is transmitted only if a facsimile transmission report (maintained by the sender) indicates that the transmission of such notice was successful.

12.5 Transfer and Assignment

(a) The Independent Certifier:

(i) must not assign, transfer, mortgage, charge or encumber any right or obligation under this Independent Certifier Agreement without the prior written consent of the PA Parties, which each PA Party may give or withhold in its Discretion (including, in respect of the City, if so required pursuant to a Contribution Agreement); and

(ii) agrees that any assignment, transfer, mortgage, charge or encumbrance will not operate to release or discharge the Independent Certifier from any obligation or liability under this Independent Certifier Agreement.

(b) For the purposes of this Section 12.5, an assignment will be deemed to have occurred where there is a Change in Control of the Independent Certifier after the date of this Independent Certifier Agreement.

(c) Each of the PA Parties may assign, transfer, mortgage, charge or encumber any right or obligation under this Independent Certifier Agreement in accordance with the terms of the Project Agreement.

12.6 Governing Laws and Jurisdictions

(a) This Independent Certifier Agreement shall be governed by and construed in accordance with the laws of Ontario and the laws of Canada applicable therein and shall be treated in all respects as an Ontario contract, without regard to conflict of laws principles.

(b) The PA Parties and the Independent Certifier agree that the courts of the Province of Ontario and all courts competent to hear appeals therefrom shall have exclusive jurisdiction to hear and settle any action, suit, proceeding or dispute in connection with this Independent Certifier Agreement and hereby irrevocably attorn to the exclusive jurisdiction of such courts.

12.7 Compliance and Good Standing

(a) The Independent Certifier shall comply with all present and future laws, statutes, regulations, by-laws, treaties, judgments, decrees and binding judgments of relevant

courts of law having the force of law, all present and future official directives, rules, consents, approvals, authorizations, guidelines, orders and policies of any Canadian government, including any federal, provincial or municipal government, and any government agency, ministry, tribunal, commission or other authority including any regulated or other utility exercising executive, legislative, judicial, regulatory or administrative functions of, or pertaining to, government and shall obtain and at all times maintain and keep in good standing, any and all permits, certificates, authorizations, licenses and other similar authorizations.

12.8 Confidentiality

(a) The Independent Certifier must ensure that:

(i) neither it nor any of its officers, directors, members, employees, servants and agents disclose, or otherwise make public, any Contract Material or any other information or material acquired in connection with or during the performance of the Certification Services without prior written approval of the PA Parties; and

(ii) no Contract Material is used, copied, supplied or reproduced for any purpose other than for the performance of the Certification Services under this Independent Certifier Agreement.

(b) The PA Parties may at any time require the Independent Certifier to give and to arrange for its officers, directors, members, employees, servants and agents engaged in the performance of the Certification Services to give written undertakings, in the form of confidentiality agreements on terms required by the PA Parties, relating to the non disclosure of confidential information, in which case the Independent Certifier must promptly arrange for such agreements to be made.

12.9 Contract Material

(a) The PA Parties and the Independent Certifier agree that the Independent Certifier does not and will not have any rights, including any Intellectual Property, in any Contract Material provided to the Independent Certifier or created or required to be created by either PA Party.

(b) As between the PA Parties and the Independent Certifier, all title and ownership, including all Intellectual Property, in and to the Contract Material created or required to be created by the Independent Certifier as part of, or for the purposes of performing the Certification Services, is hereby assigned jointly to the PA Parties on creation, or where such title, ownership and Intellectual Property cannot be assigned before creation of the Contract Material, it will be assigned to the PA Parties on creation. In addition, to the extent that copyright may subsist in such Contract Material so created by the Independent Certifier, the Independent Certifier hereby waives all past, present and future moral rights therein and the Independent Certifier shall ensure that any agent or employee of Independent Certifier shall have waived all such moral rights. The PA Parties

acknowledge and agree that as between the PA Parties, title, ownership and other rights to the foregoing shall be governed by the Project Agreement.

(c) The Independent Certifier will do all such things and execute all such documents as reasonably requested by either of the PA Parties in order to confirm or perfect the assignment of Intellectual Property in the Contract Material referred to in Section 12.9(b).

12.10 Amendment

(a) This Independent Certifier Agreement may not be varied, amended or supplemented except by an agreement in writing signed by duly authorized representatives of the PA Parties (provided that, in respect of the City, such agreement may be subject to its obligations under a Contribution Agreement and require the consent of a Contribution Agreement Party) and the Independent Certifier and stating on its face that it is intended to be an amendment, restatement or other modification, as the case may be, to this Independent Certifier Agreement.

12.11 Severability

(a) Each provision of this Independent Certifier Agreement shall be valid and enforceable to the fullest extent permitted by law. If the courts of a competent jurisdiction shall declare any provision of this Independent Certifier Agreement invalid, unenforceable or illegal, such provision may be severed and such invalidity, unenforceability or illegality shall not prejudice or affect the validity, enforceability and legality of the remaining provisions of this Independent Certifier Agreement. If any such provision of this Independent Certifier Agreement is invalid, unenforceable or illegal, the parties shall, acting in good faith, promptly negotiate new provisions to eliminate such invalidity, unenforceability or illegality and to restore this Independent Certifier Agreement as near as possible to its original intent and effect.

12.12 Enurement

(a) This Independent Certifier Agreement shall enure to the benefit of, and be binding on, each of the parties and their respective successors and permitted transferees and assigns.

12.13 Counterparts

(a) This Independent Certifier Agreement may be executed in one or more counterparts. Any single counterpart or a set of counterparts executed, in either case, by all the parties shall constitute a full, original and binding agreement for all purposes. Counterparts may be executed either in original or faxed form provided that any party providing its signature in faxed form shall promptly forward to such party an original signed copy of this Independent Certifier Agreement which was so faxed.

12.14 Maintenance of Records

(a) The Independent Certifier shall retain and maintain in safe storage, at its expense, all records related to this Independent Certifier Agreement for a minimum period of the greater of:

(i) 7 years;

(ii) 6 years following the Revenue Service Availability Date; and

(iii) such period as ends on December 31, 2026,

or such longer period as required by Applicable Law.

(b) All such records shall be available to the PA Parties and, at the written request of the City, the Contribution Agreement Parties.

[This Section intentionally left blank]

IN WITNESS WHEREOF the parties have executed this Independent Certifier Agreement as of the date first above written.

CITY OF OTTAWA

Per:

Name: Kent Kirkpatrick
Title: City Manager

I have authority to bind the Corporation

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP, by its partners, ACS RTG PARTNER INC., SNC RTG PARTNER INC. and ELLISDON RTG PARTNER INC.

ACS RTG PARTNER INC.
Per: _____
Name:
Title:

I have authority to bind the corporation.

SNC RTG PARTNER INC.
Per: _____
Name:
Title:

Per: _____
Name:
Title:

I / We have authority to bind the corporation.

ELLISDON RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

ALTUS GROUP LIMITED

Per:

Name: Michael Commons
Title: Senior Executive Vice President

I have authority to bind the corporation.

APPENDIX A

CERTIFICATION SERVICES

Without limiting the other provisions of this Independent Certifier Agreement and the Project Agreement, the Independent Certifier shall provide the following:

(a) Receive and monitor drawings and documents related to the development of the design as necessary for the Independent Certifier to be informed as to the progress of the Design and Construction Works and to provide an opinion in the event of a Dispute related to the development of the design.

(b) Receive and monitor progress reports as necessary for the Independent Certifier to be informed as to the progress of the Design and Construction Works and the Queen Street Work, Albert Street Work, Rock Stabilization Work, Utilities Work and CSST Work.

(c) Review information relating to Delay Events and Compensation Events.

(d) Review information relating to Variation Enquiries, Project Co Variation Notices, Variations, Estimates, claims for extension of time and compensation and consultation with the relevant party.

(e) In accordance with Section 11.1(b) of the Project Agreement, attend meetings and participate, as necessary, in the activities of the Works Committee.

(f) Prepare monthly reports to be submitted prior to Works Committee meetings.

(g) Prior to any certification, consider the views and comments of both Project Co and the City in relation to the satisfaction of the conditions for certification.

(h) Conduct inspections of the Design and Construction Works and the Queen Street Work, Albert Street Work, Rock Stabilization Work, Utilities Work and CSST Work as necessary for the Independent Certifier to be satisfied that the Design and Construction Works and the Queen Street Work, Albert Street Work, Rock Stabilization Work, Utilities Work and CSST Work are proceeding in accordance with the requirements of the Project Agreement.

(i) Review relevant documentation, including the Final Design Development Submittals, certificates and approvals, Permits, Licences and Approvals, certifications, test results, quality assurance audits, letters of assurance from professionals, schedules of equipment and staff profile schedules provided to the Independent Certifier pursuant to the Project Agreement.

(j) Monitor the requirements, progress and results of all Project Co Commissioning.

(k) Upon receipt of notice from Project Co requesting the issuance of certification of any Request for Civic Works Payment Approval, certification of Substantial Completion of

the Civic Works, a Milestone Acceptance Certificate in respect of a particular Milestone, the Substantial Completion Certificate, the Revenue Service Availability Certificate or the Final Completion Certificate, as applicable, consider such request and, within the time period set out in the Project Agreement and in accordance with the Project Agreement, either:

(i) issue the applicable certificate; or

(ii) issue a report detailing the matters that the Independent Certifier considers are required to be performed prior to issuing the applicable certificate.

(l) Upon notice from Project Co that the matters required to be performed prior to issuing the applicable certificate have been completed, re-inspect the Design and Construction Works, the Queen Street Work, Albert Street Work, Rock Stabilization Work, Utilities Work and CSST Work or re-consider the matters specified to be performed, and repeat the procedures in Section (k) of this Appendix A until the issuance of the applicable certificate.

(m) Prepare, in consultation with Project Co and the City, as soon as reasonably practicable and, in the case of Milestones, Substantial Completion and Final Completion, in any event within, the time period specified in Section 26.4(a) of the Project Agreement, the Minor Deficiencies List, which Minor Deficiencies List will include an estimate of the cost and the time for rectifying the Minor Deficiencies and a schedule for the completion and rectification of the Minor Deficiencies.

(n) [Intentionally Deleted]

(o) Review and observe installation of all equipment, fixtures, information technology, communication equipment, telephone equipment and anything similar to the foregoing (collectively, the "**Installed Equipment**") into the System by the City or any agent or contractor of the City either before or after Revenue Service Availability and provide a report to the City and Project Co identifying any damage to the System which has been caused as a result of the installation of such Installed Equipment into the System by the City, its contractors and/or agents.

(p) Provide any determinations contemplated in the Project Agreement, which determinations may be subject to final resolution between the PA Parties pursuant to Schedule 27 – Dispute Resolution Procedure to the Project Agreement.

(q) Participate in and give the PA Parties and their counsel reasonable cooperation, access and assistance (including providing or making available documents, information and witnesses for attendance at hearings and other proceedings) in connection with any proceedings between the PA Parties that relate to the Certification Services.

(r) In accordance with Section 20.6a) of the Project Agreement, review any self-certification/testing carried out by Project Co, and any subsequent test results.

(s) Prior to the issuance of the Revenue Service Availability Certificate ensure that all safety and regulatory documentation is complete and approved, including but not limited to Security Assessments, Hazard Analyses, Safety Case and any supplementary regulatory requirements.

(t) Measure and verify any Bus Rapid Transit (BRT) Closures and Lane Closures during the Design and Construction Works in accordance with Schedule 37 – Mobility Matters to the Project Agreement.

(u) Validation of the trial running acceptance in accordance with Schedule 14 – Commissioning to the Project Agreement.

(v) Project Co Commissioning review and coordination in accordance with Schedule 14 – Commissioning, which shall include:

(i) review of test, verification and performance test forms;

(ii) review of commissioning progress management forms and performance testing;

(iii) review of the Commissioning Plan;

(iv) review of the Commissioning Schedule;

(v) sample witnessing of tests and performance testing;

(vi) review of the training agenda and scheduling;

(vii) review of the operations and maintenance manuals;

(viii) sample witnessing of seasonal performance testing;

(ix) review of the commissioning reports;

(x) attending commissioning meetings; and

(xi) report to City regarding the progress of commissioning.

(w) Provide advice on other matters that may arise that both PA Parties may jointly require;

(x) To the extent not already contemplated in the other Certification Services or otherwise in this Agreement, review and certify the determination of eligible costs under the Contribution Agreements to the Contribution Agreement Parties, including:

(i) conducting a due diligence assessment of the proposed Milestone and Revenue Service Availability payment schedule and certifying that this schedule is achievable, reviewing and certifying that eligible costs are reasonable and meet the eligible cost criteria in a Contribution Agreement, and reviewing and

certifying the percentage of a Contribution Agreement Party's eligible costs of the total eligible costs under a Contribution Agreement;

(ii) reviewing and certifying that Milestone and Revenue Service Availability requirements have not changed in scope and have been completed in accordance with the Contribution Agreement;

(iii) reviewing and certifying a claim by the City under a Contribution Agreement, including interim claims, that all costs are eligible costs and that the work has been constructed and completed in accordance with the terms and conditions of the Contribution Agreement;

(iv) confirming that all information provided and/or submitted to the PA Parties and/or the Contribution Agreement Parties in this Agreement is true and accurate and prepared in good faith to the best of its skill, judgement and knowledge to the Contribution Agreement Parties;

(v) confirming its commitments made to the PA Parties and/or the Contribution Agreement Parties in this Agreement to the Contribution Agreement Parties; and

(vi) executing and delivering certificates in the form attached hereto as Appendix F (as may be amended by the City) when requested by the City.

APPENDIX B

INDEPENDENT CERTIFIER FEE

1. Fee for all Certification Services (other than Certification Services identified in Item (w) of Appendix A to this Independent Certifier Agreement)

Breakdown of the Total Fixed Fee for all Certification Services (other than the Certification Services identified in Item (w) of Appendix A to this Independent Certifier Agreement).

	CERTIFICATION SERVICES (as a reference to items in Appendix A to this Independent Certifier Agreement)	Fixed Fee per section
1.	Item (a) of Appendix A to this Independent Certifier Agreement	
2.	Item (b) of Appendix A to this Independent Certifier Agreement	
3.	Item (c) of Appendix A to this Independent Certifier Agreement	
4.	Item (d) of Appendix A to this Independent Certifier Agreement	
5.	Item (e) of Appendix A to this Independent Certifier Agreement	
6.	Item (f) of Appendix A to this Independent Certifier Agreement	
7.	Item (g) of Appendix A to this Independent Certifier Agreement	
8.	Item (h) of Appendix A to this Independent Certifier Agreement	
9.	Item (i) of Appendix A to this Independent Certifier Agreement	
10.	Item (j) of Appendix A to this Independent Certifier Agreement	
11.	Item (k) of Appendix A to this Independent Certifier Agreement	
12.	Item (l) of Appendix A to this Independent Certifier Agreement	
13.	Item (m) of Appendix A to this Independent Certifier Agreement	
14.	Item (o) of Appendix A to this Independent Certifier Agreement	
15.	Item (p) of Appendix A to this Independent Certifier Agreement	
16.	Item (q) of Appendix A to this Independent Certifier Agreement	
17.	Item (r) of Appendix A to this Independent Certifier Agreement	

18.	Item (s) of Appendix A to this Independent Certifier Agreement	
19.	Item (t) of Appendix A to this Independent Certifier Agreement	
20.	Item (u) of Appendix A to this Independent Certifier Agreement	
21.	Item (v) of Appendix A to this Independent Certifier Agreement	
22.	Item (x) of Appendix A to this Independent Certifier Agreement	
	TOTAL FIXED FEE	$ **699,984.00**

The fee for all Certification Services (other than the Certification Services identified at item (w) of Appendix A of this Independent Certifier Agreement) will be payable monthly in arrears, subject to the PA Parties receiving invoices reflecting the Certification Services which is in form and substance satisfactory to the PA Parties and subject to (i) the fee for all Certification Services (other than the Certification Services identified in item (w) of Appendix A to this Independent Certifier Agreement) not exceeding, in aggregate, the Total Fixed Fee of Cdn$699,984.00 (the "**Total Fixed Fee**"), and (ii) the fee for each individual Certification Service identified in items (a) through (and including) (x) of Appendix A to this Independent Certifier Agreement not exceeding, individually, the fee set forth above in respect of such individual Certification Service. The Total Fixed Fee includes all travel and travel-related expenses.

Invoices submitted by the Independent Certifier for Certification Services (other than the Certification Services identified in item (w) of Appendix A to this Independent Certifier Agreement) shall apportion all fees to reflect the Certification Services performed in respect of each of the elements of the Project Scope.

2. Hourly Rate for Certification Services Contemplated in Item (w) of Appendix A to the Independent Certifier Agreement for each Independent Certifier team member

TEAM MEMBER	HOURLY RATE
Director - Senior	
Consultant - Senior	
Technical Specialists	
Technical Specialist	
Technical Support	
Administration	

The hourly rates include all travel and travel-related expenses.

The fee for the Certification Services identified in item (w) of Appendix A of this Independent Certifier Agreement will be payable monthly in arrears, subject to the PA Parties receiving invoices reflecting the performance of such Certification Services which is in form and substance satisfactory to the PA Parties; provided that, for certainty, the hourly rate chargeable for such Certification Services shall not exceed the hourly rates set out in the table in this Section 2 of Appendix B.

Invoices submitted by the Independent Certifier for Certification Services identified in item (w) of Appendix A of this Independent Certifier Agreement shall apportion all fees to reflect the Certification Services performed in respect of each of the elements of the Project Scope.

3. Disbursements

All disbursements of the Independent Certifier, including, without limitation, travel and travel-related expenses are included in the Total Fixed Fee and hourly rates payable for the Certification Services contemplated in Item (w) of Appendix A to this Independent Certifier Agreement, and the Independent Certifier shall not be entitled to any reimbursement for any such disbursements.

For clarity, disbursements for hospitality, food and/or incidentals are not reimbursable.

APPENDIX C

INDEPENDENT CERTIFIER PERSONNEL

The following personnel shall be involved in the performance of the Certification Services:

TEAM MEMBER	ROLE
Mehran Avini	Team Leader (Independent Certifier)
Monica Sechiari	Back-up Team Leader / Certification Manager, Commissioning Lead

APPENDIX D

CONDUCT OF CLAIMS

This Appendix D shall apply to the conduct of claims, made by a third person against a party having, or claiming to have, the benefit of an indemnity pursuant to this Independent Certifier Agreement. The party having, or claiming to have, the benefit of the indemnity is referred to as the "**Beneficiary**" and a party giving the indemnity is referred to as an "**Indemnifier**".

(1) If the Beneficiary receives any notice, demand, letter or other document concerning any claim for which it appears that the Beneficiary is, or may become entitled to, indemnification under Section 11 of the Independent Certifier Agreement, the Beneficiary shall give written notice to each Indemnifier potentially obligated in respect thereof, as soon as reasonably practicable and in any event within 10 Business Days of receipt of the same. Such notice shall specify with reasonable particularity, to the extent that information is available, the factual basis for the claim and the amount of the claim.

(2) Subject to Sections (3), (4) and (5) of this Appendix D, on the giving of such notice by the Beneficiary, where it appears that the Beneficiary is or may be entitled to indemnification from an Indemnifier in respect of all, but not part only, of the liability arising out of the claim, such Indemnifier shall (subject to providing the Beneficiary with a secured indemnity to the Beneficiary's reasonable satisfaction against all costs and expenses that the Beneficiary may incur by reason of such action) be entitled to dispute the claim in the name of the Beneficiary at the Indemnifier's own expense and take conduct of any defence, dispute, compromise, or appeal of the claim and of any incidental negotiations. The Beneficiary shall give such Indemnifier all reasonable cooperation, access and assistance for the purposes of considering and resisting such claim. The Beneficiary shall have the right to employ separate counsel in respect of such claim and the reasonable fees and expenses of such counsel shall be to the account of the Indemnifier only where representation of both the Indemnifier and the Beneficiary by common counsel would be inappropriate due to any actual or potential conflicting interests between the Indemnifier and the Beneficiary. If and to the extent that both the City and Project Co are given notice in respect of the same claim, they shall cooperate in the conduct of the claim and give each other such reasonable access and assistance as may be necessary or desirable for purposes of considering, resisting and defending such claim.

(3) With respect to any claim conducted by an Indemnifier:

(i) the Indemnifier shall keep the Beneficiary fully informed and consult with it about material elements of the conduct of the claim;

(ii) the Indemnifier shall not bring the name or reputation of the Beneficiary into disrepute;

(iii) the Indemnifier shall not pay, compromise or settle such claims without the prior consent of the Beneficiary, such consent not to be unreasonably withheld or delayed;

(iv) the Indemnifier shall not admit liability or fault to any third party without the prior consent of the Beneficiary, such consent not to be unreasonably withheld or delayed; and

(v) the Indemnifier shall use commercially reasonable efforts to have the Beneficiary named as a beneficiary under any release given by the persons bringing the claim to which this Section (3) relates.

(4) The Beneficiary shall be free to pay or settle any such claim on such terms as it thinks fit and without prejudice to its rights and remedies under this Independent Certifier Agreement if:

(i) none of the Indemnifiers is entitled to take conduct of the claim in accordance with Section (2);

(ii) none of the Indemnifiers notifies the Beneficiary of its intention to take conduct of the relevant claim as soon as reasonably practicable and in any event within 10 Business Days of the notice from the Beneficiary under Section (1) or each of the Indemnifiers notifies the Beneficiary that it does not intend to take conduct of the claim; or

(iii) none of the Indemnifiers complies in any material respect with Section (3).

(5) The Beneficiary shall be free at any time to give notice to the applicable Indemnifier that the Beneficiary is retaining or taking over, as the case may be, the conduct of any defence, dispute, compromise or appeal of any claim, or of any incidental negotiations, to which Section (2) applies. For greater certainty, the Independent Certifier acknowledges and agrees that where the City is the Beneficiary, the City may retain or take over such conduct in any matter involving Personal Information (as it is defined in the Project Agreement) or any matter involving public policy. On receipt of such notice the applicable Indemnifier shall promptly take all steps necessary to transfer the conduct of such claim to the Beneficiary, and shall provide to the Beneficiary all relevant documentation and all reasonable cooperation, access and assistance for the purposes of considering and resisting such claim. If the Beneficiary gives any notice pursuant to this Section (5), then the applicable Indemnifier shall be released from any liabilities arising under the applicable indemnity hereunder in respect of the applicable claim.

(6) If an Indemnifier pays to the Beneficiary an amount in respect of an indemnity and the Beneficiary subsequently recovers, whether by payment, discount, credit, saving, relief or

other benefit or otherwise, a sum or anything else of value (the "**Recovery Amount**") which is directly referable to the fact, matter, event or circumstances giving rise to the claim under the indemnity, the Beneficiary shall forthwith repay to that Indemnifier whichever is the lesser of:

(i) an amount equal to the Recovery Amount less any out-of-pocket costs and expenses properly incurred by the Beneficiary in recovering the same; and

(ii) the amount paid to the Beneficiary by such Indemnifier in respect of the claim under the relevant indemnity,

provided that there shall be no obligation on the Beneficiary to pursue any Recovery Amount and that the Indemnifier shall be repaid only to the extent that the Recovery Amount, aggregated with any sum recovered from the Indemnifier, exceeds the loss sustained by the Beneficiary except, however, that if the Beneficiary elects not to pursue a Recovery Amount, the Indemnifier shall be entitled to require an assignment to it of the right to do so.

(7) Any person taking any of the steps contemplated by this Appendix D shall comply with the requirements of any insurer who may have an obligation to provide an indemnity in respect of any liability arising under this Independent Certifier Agreement.

APPENDIX E

TIME TASK MATRIX

The fee for all Certification Services (other than the Certification Services identified at item (w) of Appendix A of this Independent Certifier Agreement) is based on this time-task matrix in Appendix E. For greater certainty, anytime in excess of the time noted in the Time Task Matrix which is given by the persons noted therein shall be included in the Total Fixed Fee.

The sections noted below, refer to Appendix A of the Project Agreement Schedule 6.

	[redacted]	[redacted]
1	Appendix A, (a) Design Review & Monitor	[redacted]
2	Appendix A, (b) Review Progress Reports from Project Team	[redacted]
3	Appendix A, (c) Review Information due to Delay & Compensation events	[redacted]
4	Appendix A, (d) Review Information relating to Variation Enquiries, Project Co Variation Notices	[redacted]
5	Appendix A, (e) Attendance at Project / Works Committee Meetings	[redacted]
6	Appendix A, (f) Prepare monthly reports	[redacted]
7	Appendix A, (g) Consider the views and comments of both Project Co and the City in relation to the satisfaction of the conditions for certification	[redacted]
8	Appendix A, (h) Conduct inspections of the Design and Construction Works and the Queen Street Work, Albert Street Work, Rock Stabilization Work, Utilities Work and CSST Work as necessary to be satisfied that the Works are proceeding in accordance to the Project Agreement.	[redacted]
9	Appendix A, (i) Review all relevant Project Documentation provided to the Independent Certifier pursuant to Project Agreement.	[redacted]
10	Appendix A, (j) Monitor the requirements, progress and results of all Project Co Commissioning	[redacted]
11	Appendix A, (k) Certify Request for Civic Works Payment Approval, Substantial Completion of Civic Works, Milestone Acceptance, Substantial Completion, Revenue Service Availability or the Final Completion, and issue applicable certificate, or report	[redacted]
12	Appendix A, (l) Repeat item (k) until issuance of the applicable certificate	[redacted]
13	Appendix A,(m) Prepare Minor Deficiencies List, and perform all tasks required by Independent Certifier	[redacted]
14	Appendix A,(n) Intentionally deleted	[redacted]
15	Appendix A,(o) Review, observe and report installation of Installed Equipment either before or after Revenue Service Availability	[redacted]
16	Appendix A, (p) Provide any Determinations	[redacted]
17	Appendix A, (q) Provide assistance to PA Parties in connection with any proceedings	[redacted]
18	Appendix A, (r) Review any self-certification/testing carried out by Project Co and any subsequent test results	[redacted]
19	Appendix A, (s) Ensure all safety and regulatory documentation is complete prior to issuance of Revenue Service Availability Certificate	[redacted]
20	Appendix A, (t) Measure and verify any Bus Rapid Transit Closures and Lane Closures during the works	[redacted]
21	Appendix A, (u) Validation of trial running acceptance in accordance with Schedule 14	[redacted]
22	Appendix A, (v) Review Project Co Commissioning in accordance with Schedule 14	[redacted]
23	Appendix A, (x) Review and certify the determination of eligible costs under the Contribution Agreements	[redacted]
	[redacted]	[redacted]

[redacted]

APPENDIX F

CONTRIBUTION AGREEMENT CERTIFICATES

[see attached]

SCHEDULE D.1 – RECIPIENT DECLARATION

In the matter of the Agreement entered into between Her Majesty the Queen, in right of Canada, as represented by the Minister of Transport and the City of Ottawa ("Ottawa"), as represented by the Mayor of Ottawa on_____, concerning the Ottawa Light Rail Transit Project (the "Agreement").

I, _____(name), of the City of_____(City),__Province of (Province), declare as follows:

1. That I hold the position of _____ with the Recipient and as such have knowledge of the matters set forth in this declaration.
2. a) That I have received the following documents from [INSERT NAME OF ARCHITECT OR ENGINEER] for those construction related parts of the Project procured by the Conventional Procurement Contracts:
   i) [LIST APPROPRIATE AND APPLICABLE NAME OF DOCUMENT(S), i.e. Certificate of Completion, etc.];
   ii) (…).

   b) That based on the above documents and the representations made to me by the [NAME OF ARCHITECT OR ENGINEER], I declare to the best of my knowledge and belief that those parts of the Project procured by Conventional Procurement Contracts:

   i) have been substantially completed as described in Schedule B.1. of the Agreement, dated on the _____ day of _____ 20__;
   ii) were carried out by _____ (*the prime contractor*), between the dates _____ (*start date*) and _____ (*completion date)*

3. That I have received the following documents from [INSERT NAME OF ENVIRONMENTAL CONSULTANT OR OTHER APPROPRIATE PERSON], and based on these documents and representations made to me by [INSERT NAME OF ENVIRONMENTAL CONSULTANT OR OTHER APPROPRIATE PERSON], I declare to the best of my knowledge and belief that those parts of the Project procured by Conventional Procurement Contracts conform with applicable environmental legislation, and that all mitigation measures have been implemented:
   i) [LIST DOCUMENT(S)];
   ii) (…).
4. That I have received the following documents from [INSERT NAME OF CONSULTANT/APPROPRIATE PERSON], and based on these documents and representations made to me by [INSERT NAME OF CONSULTANT/APPROPRIATE PERSON], I declare to the best of my knowledge and belief that the work conforms with the guidelines referenced in subsection 3.6 of the Agreement or any other equivalent provincially sanctioned guidelines approved by the Committee established under the Agreement:
   i) [LIST DOCUMENT(S)];
   ii) (…).

Declared at _____ (city), in the Province of _____ this _____ day of _____, 20_____.

_____
Signature

SCHEDULE D.2 – MILESTONE INDEPENDENT ENGINEER DECLARATION OF COMPLETION

In the matter of the Agreement entered into between Her Majesty the Queen, in right of Canada, as represented by the Minister of Transport and the City of Ottawa, as represented by the Mayor and the City Manager on _____ concerning the Ottawa Light Rail Transit Project (the "Agreement").

I, _____, a Registered Professional Engineer in the Province of Ontario declare as follows:

1. That I am the Independent Engineer for the Ottawa Light Rail Transit Project and as such have knowledge of the matters set forth in this declaration;
2. That the work identified under the Ottawa Light Rail Transit Project as described in the Agreement has been completed as of the _____ day of _____ 201__, in accordance with Schedule B.2 of this Agreement.
3. That the Milestone has not changes in scope, unless such scope change has been approved in advance and in writing by the Committee.
4. That the costs claimed in respect of each Milestone are Eligible Costs; and
5. That the work has been completed as per the standards indicated in subsection 3.6.

Declared at ___(city)_____, in the Province of Ontario

this _____day of _____, 20___

_____
(Signature)

SCHEDULE G.1

CERTIFICATE/PAYMENT REQUEST
FROM RECIPIENT CO-CHAIR OR SENIOR OFFICIAL

Ministry of Transportation File No.: _____

TO: Ministry of Transportation
Transit Infrastructure Policy Office
Suite 3000, 30th Floor
777 Bay Street
Toronto, ON M7A 2J8

Attention: Director
Telephone No.: (416) 585-7347
Facsimile No.: (416) 585-7343

FROM: **[Insert Address of the Recipient Co-chair or senior official]**

Attention: **[Insert name and title of Recipient Co-chair or senior official]**
Telephone No.:**[Insert telephone number of Recipient Co--chair or senior official]**
Facsimile No.: **[Insert facsimile number of Recipient Co-chair or senior official]**

RE: **Contribution Agreement for the City of Ottawa Light Rail Transit Project**

In the matter of the Contribution Agreement for the City of Ottawa Light Rail Transit Project entered into between Her Majesty the Queen in right of Ontario, represented by the Minister of Transportation for the Province of Ontario, and the City of Ottawa (the "Recipient"), on _____, 2011 (the "Agreement").

I, _____ **[Insert name and title of the Recipient Co-chair or senior official]**, having made such inquiries as I have deemed necessary for this certificate, hereby certify that to the best of my knowledge, information and belief:

1. On and as of the date set out below:

   a. all representations and warranties contained in Article 11 (Recipient Representations and Warranties) of the Agreement are true and correct;

   b. the Recipient is in compliance with all the terms and conditions of the Agreement and no event of default, as described in the Agreement, has occurred and is continuing;

   c. the Recipient has not incurred a cost overrun for the Project; and

   d. the Recipient has complied with all provisions of the *Construction Lien Act* and no person is entitled to claim a lien under that Act.

2. Attached is [are] the [Project quarterly progress status report and] Claim Statement that relate[s] to the request for payment, which is [are] true and accurate and relate[s] to costs on account of the Project. **[Note: The Project quarterly progress status report is only required for general Eligible Costs claims pursuant to Schedule G (Claim and Payment Procedures), Paragraph G.3 c), of the Agreement.]**

3. The Eligible Costs and other costs set out in the Claim Statement have been paid to _____ **[Insert legal name of Concessionaire or Third Party]** during the period commencing _____ and ending _____.

4. The payment will only and entirely be used for the Project and in accordance with the Agreement.

CAN_DMS: \128157959\1

The Recipient hereby requests a payment in the amount of $_____on account of the Ministry's contribution towards the Eligible Costs of the Project Implementation pursuant to Paragraph 3.1 a) of the Agreement.

Declared at _____ (city) in the Province of Ontario this _____ day of _____, 20_____.

(Signatures)

_____	_____
Name:	Witness Name:
Title:	Title:

SCHEDULE G.2

CERTIFICATE FROM INDEPENDENT ENGINEER

Ministry of Transportation File No.: _____

TO: Ministry of Transportation
Transit Infrastructure Policy Office
Suite 3000, 30th Floor
777 Bay Street
Toronto, ON M7A 2J8

Attention: Director

Telephone No.: (416) 585-7347
Facsimile No.: (416) 585-7343

FROM: **[Insert Address of the Independent Engineer]**

Attention: **[Insert name and title of Independent Engineer]**
Telephone No.: **[Insert telephone number of Independent Engineer]**
Facsimile No.: **[Insert facsimile number of Independent Engineer]**

RE: **Contribution Agreement for the City of Ottawa Light Rail Transit Project**

In the matter of the Contribution Agreement for the City of Ottawa Light Rail Transit Project entered into between Her Majesty the Queen in right of Ontario, represented by the Minister of Transportation for the Province of Ontario, and the City of Ottawa (the "Recipient"), on _____, 2011 (the "Agreement").

I, _____ **[Insert name and title of the Independent Engineer]**, having made such inquiries as I have deemed necessary for this certificate, hereby certify that to the best of my knowledge, information and belief:

On and as of the date set out below:

1. in the case of a claim for Eligible Costs incurred and paid by the Recipient pursuant to a Concession Agreement, the _____ Milestone, as described in Schedule B (Project Description), Article B.3 (Project Milestones) of the Agreement:

   a. has been completed; and
   b. has not changed, unless such change has been approved, in advance and in writing by the Ministry; and

2. the costs claimed are Eligible Costs;

3. the work has been completed as per the standards contemplated in Section 13.16 (Compliance with Laws & Relevant Industry Standards) of the Agreement.

Declared at _____ (city) in the Province of Ontario this _____ day of _____, 20_____.

(Signatures)

_____	_____
Name:	Witness Name:
Title:	Title:

CAN_DMS: \128157959\1

SCHEDULE G.3
SOLEMN DECLARATION OF SUBSTANTIAL COMPLETION

Ministry of Transportation File No.: _____

TO: Ministry of Transportation
Transit Infrastructure Policy Office
Suite 3000, 30th Floor
777 Bay Street
Toronto, ON M7A 2J8

Attention: Director

Telephone No.: (416) 585-7347
Facsimile No.: (416) 585-7343

FROM: **[Insert Address of the Independent Engineer]**

Attention: **[Insert name and title of Independent Engineer]**
Telephone No.: **[Insert telephone number of Independent Engineer]**
Facsimile No.: **[Insert facsimile number of Independent Engineer]**

RE: **Contribution Agreement for the City of Ottawa Light Rail Transit Project**

In the matter of the Contribution Agreement for the City of Ottawa Light Rail Transit Project entered into between Her Majesty the Queen in right of Ontario, represented by the Minister of Transportation for the Province of Ontario, and the City of Ottawa (Recipient), on _____, 2011 (the "Agreement").

I, _____, a professional engineer duly licensed in the province of Ontario and the Independent Engineer retained by the Recipient pursuant to the Agreement, having made such inquiries as I have deemed necessary for this declaration, do solemnly declare as follows:

3. I am the _____(title, department, organization), and as such have knowledge of the matters set forth in this affidavit;
4. The work identified as Project _____ in the Agreement _____ (has / has not) reached Substantial Completion as defined in the Agreement, dated on the _____ day of _____ 20___ (the "Substantial Completion Date").
5. The value (dollar amount) of substantially completed work on the Project is _____ (dollars).
6. The work:
   a. was carried out by _____ (the prime contractor), between _____ (start date) and _____ (completion date);
   b. was supervised and inspected by qualified staff;
   c. conforms with the plans, specifications and other documentation for the work;
   d. conforms with applicable environmental legislation, and appropriate mitigation measures have been implemented; and
   e. conforms with the requirements set out in Subsection 13.16 b) of the Agreement to comply with industry standards.

Declared at _____ (city), in the Province of Ontario this _____ day of _____, 20_____.

(Signatures)

_____	_____
Name:	Witness Name:
Title:	Title:

CAN_DMS: \128157959\1

SCHEDULE 7

[Intentionally Deleted]

SCHEDULE 8
ENERGY MATTERS

PART 1
ENERGY MATTERS – MSF

1. DEFINITIONS

In this Part 1 of Schedule 8, the following definitions shall have the following meanings:

1.1 "**Aggregate Actual Consumption**" means the actual consumption of all Energy Utilities at the MSF as invoiced by the relevant utility companies for each Contract Year, excluding all Energy Utilities consumed by Traction Power.

1.2 "**Aggregate Energy Target**" or "**AET**" means the target total energy consumption at the MSF, excluding the energy consumption by Traction Power, set forth in the Energy Target Letter submitted by Project Co at Commercial Close and which has been accepted by the City. The AET shall include and account for all requirements of Schedule 15 – Output Specifications of the Project Agreement including standard HVAC and lighting loads, and any systems that are installed by Project Co as part of the Works and that will be maintained by Project Co as part of the Project Co Services.

1.3 "**Aggregate Energy Model**" means the energy model used for determining the AET.

1.4 "**Annual Review Meeting**" means meetings between City Representatives and Project Co Representatives to occur within 90 days of each anniversary of the Revenue Service Availability Date (or such other date as may be agreed between the City and Project Co) to discuss Energy Services.

1.5 "**Average Annual Cooling Degree Days**" means the most recent average annual cooling degree days for Ottawa, Ontario calculated over a 30 year period, based on data published by Environment Canada.

1.6 "**Average Annual Heating Degree Days**" means the most recent average annual heating degree days for Ottawa, Ontario calculated over a 30 year period, based on data published by Environment Canada.

1.7 "**Average Unit Rate Price**" means the average price for each standard unit of each discrete Energy Utility in a Contract Year as reported by the applicable utility companies responsible for the supply of such Energy Service.

1.8 "**BOMA BESt**" means the Building Operators and Managers Association of Canada's framework for recognizing environmental best practices in existing buildings.

1.9 "**Corrected Aggregate Energy Consumption**" means, for a Contract Year, the sum of CAECH for each discrete Energy Service and CAECC for each discrete Energy Service plus all non-heating and non-cooling Energy Utilities consumption at the MSF for such Contract Year, excluding all Energy Utilities consumed by Traction Power for such Contract Year.

1.10 "**Corrected Aggregate Energy Consumption Cooling**" or "**CAECC**" means the sum of the Corrected Discrete Energy Consumption for each of the discrete Energy Utilities at the MSF for cooling energy, calculated in accordance with Part 1, Section 3.4(f)(ii).

1.11 "**Corrected Aggregate Energy Consumption Heating**" or "**CAECH**" means the sum of the Corrected Discrete Energy Consumption for each of the discrete Energy Utilities at the MSF for heating energy, calculated in accordance with Part 1, Section 3.4(f)(i).

1.12 "**Corrected Discrete Energy Consumption**" means the Discrete Energy Service Actual Consumption for each discrete Energy Service (calculated for each discrete Energy Service) corrected for each Contract Year in accordance with this Schedule 8 to reflect the climatic conditions for that Contract Year.

1.13 "**Discrete Energy Service Actual Consumption**" means the actual consumption of an individual Energy Service at the MSF as invoiced by the relevant utility company for each Contract Year.

1.14 "**Discrete Energy Targets**" or "**DET**" means the target consumption of individual Energy Services set forth in the Energy Target Letter submitted by Project Co at Commercial Close and which have been accepted by the City.

1.15 "**Energy Analysis Report**" has the meaning given to it in Part 1, Section 3 of this Schedule 8.

1.16 "**Energy Service**" means any metered provision of Energy Utilities at the MSF, other than the metered provision of Energy Utilities for the Traction.

1.17 "**Energy Target Letter**" means the letter submitted by Project Co at Commercial Close setting forth the AET and the DET.

1.18 "**Energy Utilities**" means energy/power including electricity, natural gas, fuel, oil and any other energy source used at the MSF.

1.19 "**Gainshare Adjustment**" means the amount payable by the City to Project Co (which amount will be included in the calculation of the Monthly Service Payment for the Contract Month following the date in which such adjustment has been determined in accordance with this Schedule 8) based on Energy Utilities consumption for each discrete Energy Service at the MSF that falls outside the set bands set out in Part 1, Section 5 of this Schedule 8.

1.20 "**High Cost Measures**" means, in respect of a Contract Year, energy saving measures that incur capital expenditure with a Simple Payback of greater than 36 months.

1.21 "**International Performance Measurement and Verification Protocol**" or "**IPMVP**" means IPMVP Volume III: Concepts and Options for Determining Energy Savings in New Construction, 2003.

1.22 "**Low Cost Measures**" means, in respect of a Contract Year, energy saving measures that incur capital expenditure with a Simple Payback of no greater than 36 months and are considered to be revenue items as opposed to capital investment measures.

1.23 "**Model National Energy Code for Buildings**" or "**MNECB**" means the current code and updates as developed by the National Research Council of Canada. Compliance to this code is demonstrated by using a performance based computer simulation tool and by following the "EE4 Modelling Guide, v 1.7".

1.24 "**MSF**" has the meaning given to it in Schedule 1 – Definitions and Interpretation.

1.25 "**No Cost Measures**" means energy savings measures, including those related to good house-keeping, involving no material additional expenditure and/or no capital expenditure to carry out.

1.26 "**Painshare Adjustment**" means the deduction which may be claimed by the City from Project Co (which amount will be deducted from the calculation of the Monthly Service Payment for the Contract Month following the date in which such adjustment has been determined in accordance with this Schedule 8) based on Energy Utilities consumption for each discrete Energy Service at the MSF which falls outside the bands set out in Part 1, Section 5 of this Schedule 8.

1.27 "**Simple Payback**" means the number of years after which an investment will have paid for itself. Simple Payback is calculated by dividing the initial cost of the retrofit by the energy cost savings per year. Those projects with the shortest paybacks are assumed to be the most cost effective. Simple Payback = initial cost of energy retrofit / annual energy savings.

1.28 "**Traction Power**" means power used as metered at the primary side of the Traction Power transformer used for providing energy to the Light Rail Vehicles for locomotion and any power drawn from the secondary side of the Traction Power transformer.

2. PROCEDURES FOR DETERMINING ENERGY COST SHARING

2.1 All Energy Utilities consumed or used for Traction Power shall not be subject to the calculation of the Gainshare Adjustment or the Painshare Adjustment as provided in Part 1, Section 5 of this Schedule 8.

2.2 The Discrete Energy Targets shall form the normalized 30 year benchmark for calculating the Energy Services cost sharing in respect of each discrete Energy Service at the MSF. The Discrete Energy Service Actual Consumption for each discrete Energy

Service shall be corrected to reflect actual degree days for each Contract Year. The Corrected Discrete Energy Consumption for each discrete Energy Service shall be used to calculate Painshare Adjustments and Gainshare Adjustments. The Aggregate Energy Target and the Discrete Energy Targets shall not be altered or adjusted except by the process described in Part 1, Section 4 of this Schedule 8.

2.3 The measurement and verification of energy use in the MSF must adhere to IPMVP. At Final Completion, Project Co shall provide the City with a Measurement and Verification Plan, as described in IPMVP Volume III, Section 3.2, including, without limitation, a metering schedule of all proposed energy end-uses. All subsequent Energy Analysis Reports are to be based on this plan.

2.4 Project Co shall provide the City with a draft Energy Analysis Report within 60 days following the end of each Contract Year, which report shall include copies of all working papers to fully support the draft Energy Analysis Report. The draft Energy Analysis Report shall be consistent with the format and content requirements set out in Part 1, Section 3 of this Schedule 8.

2.5 As soon as practicable and in any event within 80 days following the end of each Contract Year, Project Co and the City shall convene an Annual Review Meeting to be attended by the Project Co Representative and the City Representative. At the Annual Review Meeting Project Co shall present the draft Energy Analysis Report to the City, and the City and Project Co shall discuss the Aggregate Actual Consumption and the Discrete Energy Service Actual Consumption for each discrete Energy Service for the preceding Contract Year.

2.6 Project Co shall assist the City Representative and afford the City Representative such information and access to the MSF, building management system records, utility meters, and by other means as may reasonably be required for the City Representative to confirm the draft Energy Analysis Report provided by Project Co to determine the Aggregate Actual Consumption and the Discrete Energy Service Actual Consumption for each separate Energy Service at the MSF for the Contract Year. The City shall promptly notify Project Co of the details of any disagreement of all or any aspect of the Energy Analysis Report, and the Parties shall then seek to agree to any matters in dispute, but where matters cannot be resolved within such 20 Business Day period (or such other period as may be otherwise agreed by the City Representative, acting reasonably) it shall be dealt with in accordance with the Dispute Resolution Procedure.

(a) Within 20 Business Days following each Annual Review Meeting, or within such period as may be otherwise agreed between the City Representative and the Project Co Representative, acting reasonably:

(i) The City shall confirm its acceptance of all or any aspect of the Energy Analysis Report

(b) Subject to Part 1, Section 2.6(c), Project Co or the City, as the case may be, shall be entitled annually to a Gainshare Adjustment or a Painshare Adjustment, as the case may be, calculated in accordance with Part 1, Section 5 of this Schedule 8.

(c) Claims made by either Project Co or the City for a Gainshare Adjustment or a Painshare Adjustment shall be made at an Annual Review Meeting. If Project Co makes a claim for Gainshare Adjustment, Project Co shall within 10 Business Days after acceptance of the Energy Analysis Report by the City Representative or within such other period as may be agreed by the City Representative and Project Co, acting reasonably, submit an account to the City setting out its calculation and justifying the quantification of the Gainshare Adjustment. If the City makes a claim for a Painshare Adjustment, the City shall, within 10 Business Days after acceptance of the Energy Analysis Report by the City Representative or within such other period as may be agreed by the City Representative and Project Co, acting reasonably, submit an account to Project Co setting out its calculations and justifying the quantification of the Painshare Adjustment.

(d) If either Project Co or the City wishes to dispute any account presented pursuant to Part 1, Section 2.6(c) of this Schedule 8, it must do so by notice to the other Party within 10 Business Days of receipt of such account. The City Representative and the Project Co Representative shall use reasonable efforts to resolve the dispute for an additional 10 Business Days. If there is no agreement within a further 10 Business Days then either Party may refer the matter to the Dispute Resolution Procedure. If neither Party objects in accordance with this Section 2.6(d) or, following final determination of the disputed account in accordance with this Section 2.6(d), Project Co shall include the relevant Gainshare Adjustment or Painshare Adjustment as a separate item within the next invoice prepared by Project Co in accordance with Section 32.6(a) of the Project Agreement. No adjustments shall be made to the Monthly Service Payment for any claimed Gainshare Adjustment or Painshare Adjustment except in accordance with the procedure set out in Part 1, Section 5 of this Schedule 8.

2.7 At Commercial Close, Project Co shall deliver to the City an Energy Target Letter in form and substance satisfactory to the City, which such Energy Target Letter shall reflect the design of the MSF as at Commercial Close. In addition, Project Co shall deliver to the City for review in accordance with Schedule 10 – Review Procedure, an updated final Energy Target Letter together with a supporting Aggregate Energy Model 3 months prior to Revenue Service Availability. Any changes to the Energy Target Letter after Commercial Close shall be approved by the City and shall constitute a Variation.

3. CONTENT AND FORMAT OF THE ENERGY ANALYSIS REPORT

3.1 The Energy Analysis Report shall adhere to the IPMVP.

3.2 The Energy Analysis Report shall present findings of Aggregate Actual Consumption and the Discrete Energy Service Actual Consumption for each separate Energy Service for the relevant Contract Year and shall include the following:

(a) a summary of actual usage, degree days, and breakdown by utility in megajoules and cubic meters, or other utility rate units. The summary should also highlight any exceptional changes (being changes of plus or minus 10% in consumption or pattern of use) in consumption or pattern of use since any previous survey;

(b) accurate and precise consumption data as provided by utility metering;

(c) identification of potential cost savings in respect of Energy Utilities usage at the MSF, other than the Traction Power and provide an estimate of potential Energy Service consumption savings broken down by fuel type, implementation costs, Simple Payback periods and projected savings along with identifying potential risks associated with each proposed cost savings measure. Project Co shall categorize these cost savings measures in the following categories: No Cost Measures, Low Cost Measures and High Cost Measures. Project Co shall also advise the City of projected Energy Utilities usage at the MSF, other than the Traction Power for the next 5 years and cost projections in respect of such projected Energy Utilities usage along with pricing trends and potential risks associated with each.

3.3 The objectives of the Energy Analysis Report are to confirm Aggregate Actual Consumption and Discrete Energy Service Actual Consumption for each individual Energy Service at the MSF in the relevant Contract Year and to provide data to calculate Corrected Aggregate Energy Consumption, Corrected Discrete Energy Consumption for each individual Energy Service and Gainshare Adjustment or Painshare Adjustment for each individual Energy Service.

3.4 Consistent with the objectives set out in Part 1, Section 3.3 of this Schedule 8, Project Co shall ensure that the Energy Analysis Report has the following components:

(a) presentation of Aggregate Actual Consumption, Discrete Energy Service Actual Consumption for each individual Energy Service, and calculation of Corrected Discrete Energy Consumption for each individual Energy Service and the Corrected Aggregate Energy Consumption;

(b) presentation of degree day data for the relevant Contract Year;

(c) establishment of a basis for continued monitoring of energy and utility consumption and adjustments to the Aggregate Energy Target and/or the Discrete Energy Targets;

(d) utility data collected by Project Co shall be presented in the table set out in Appendix A to this Schedule 8;

(e) detailed analysis of all submetered end-uses;

(f) procedure for determining the Corrected Discrete Energy Consumption for each individual Energy Service will be calculated using the following formula (with

separate calculations to be conducted and provided for each discrete Energy Service):

(i) Corrected Discrete Energy Consumption for the discrete Energy Service for heating energy ("**CAECH**") = Discrete Energy Service Actual Consumption (Mega Joules) x Average Annual Heating Degree Days / heating degree days published by Environment Canada for the Contract Year;

(ii) Corrected Discrete Energy Consumption for the discrete Energy Service for cooling energy ("**CAECC**") = Discrete Energy Services Actual Consumption (Mega Joules) x Average Annual Cooling Degree Days / cooling degree days published by Environment Canada for the Contract Year;

(g) outline any outstanding issues from any previous Energy Analysis Report;

(h) adjustments to the Aggregate Energy Target and Discrete Energy Target(s);

(i) table showing the percentage variation in Energy Utilities consumption against the Discrete Energy Target(s) and the Discrete Actual Energy Consumption for each discrete Energy Service;

(j) tables and graphs showing the consumption, unit costs, and total costs for all purchased Energy Utilities for the previous 12 months. Breakdown of Energy Utilities types and costs for each energy use described in Part 1, Sections 3.3 and 3.4 of this Schedule 8 and any other major energy use for the previous 12 months;

(k) appendices – The appendices shall include graphs, calculations and miscellaneous data that are relevant to the Energy Analysis Report; and

(l) summary tables from all previous Energy Analysis Reports delivered by Project Co to the City.

3.5 Project Co shall, and it agrees that it will participate in the BOMA BESt Program. As part of the BOMA BESt Program implementation, Project Co will be required to conduct an energy audit and a water audit every 3 years (or at such other time as may be required by the BOMA BESt Program) based on the BOMA BESt Program requirements. For each year that a BOMA BESt submission is required to be prepared by Project Co (in accordance with the BOMA BESt Program requirements), a copy of such submission shall be appended to the Energy Analysis Report.

4. CORRECTED DISCRETE ENERGY CONSUMPTION AND PROCESS FOR AMENDING THE AGGREGATE ENERGY TARGET AND THE DISCRETE ENERGY TARGETS

4.1 In all cases, corrections to energy consumption targets must be consistent with the principles outlined in the IPMVP.

4.2 Following the acceptance of the Energy Analysis Report by the City Representative in accordance with Part 1, Section 2.6 of this Schedule 8, the data set out in the Energy Analysis Report will be used to determine the Painshare Adjustments or Gainshare Adjustments.

4.3 For each Contract Year, the Gainshare Adjustment and Painshare Adjustment shall be calculated in accordance with Section 5.

4.4 At any time commencing after the first anniversary of the Completion Date, Project Co and the City shall, acting reasonably, agree to make any adjustments to the Aggregate Energy Target and the Discrete Energy Target(s) only in the event of:

(a) substantial climate change for the relevant time period as reported by Environment Canada compared to the 1980 to 2010 30 year average meteorological data for Ottawa, Ontario as reported by Environment Canada. Climate change can only be evidenced by a climatic authority such as Environment Canada and must be presented to the City with documented evidence of increased consumption trends in similar facilities in South-Eastern Ontario;

(b) changes implemented in accordance with the Project Agreement that would cause load changes or other changes in Energy Utilities usage;

(c) changes in the utilization of the MSF from that generally described in the Project Agreement.

4.5 Pursuant to Part 1, Section 4.4, Project Co may elect to propose a correction to the Aggregate Energy Target and the Discrete Energy Targets in direct proportion to any substantial change in occupation hours of the MSF.

4.6 The Party requesting an amendment to the Aggregate Energy Target and the Discrete Energy Target(s) shall appoint, subject to the other Party's approval (acting reasonably) and pay for a complete energy audit to be conducted by a third party auditor. The energy audit shall include a detailed computer simulation of Energy Utilities use by function and a comprehensive evaluation of Energy Utilities use patterns. The energy auditor shall prepare a report making a recommendation regarding amendments to the Aggregate Energy Target and Discrete Energy Target(s). Both the City and Project Co must agree to the amended Aggregate Energy Target and Discrete Energy Target(s) within 20 Business Days following receipt of such report. If there is no agreement within a further 10 Business Day period, then either Party may refer the matter to Dispute Resolution Procedure.

4.7 Any amendment to the Aggregate Energy Target and the Discrete Energy Target(s) shall only affect the Monthly Service Payment (as a result of any Painshare Adjustments or Gainshare Adjustments) from the date on which the amendment is effective and shall not, for greater certainty, have a retrospective effect on any other previous Monthly Service Payments except where the Dispute Resolution procedure adjudicates in favour of Project Co, whereby the payments shall be prorated to 30 days after the Energy Auditors report.

5. CALCULATION OF GAINSHARE ADJUSTMENT OR PAINSHARE ADJUSTMENT

5.1 Comparing Annual Energy Target

(a) After the acceptance of the Energy Analysis Report as described in Part 1, Section 3 for each Energy Year, the Corrected Discrete Energy Consumption for each Energy Service shall be compared to the Discrete Energy Target for each Energy Service, and:

(i) if the Corrected Discrete Energy Consumption in respect of any discrete Energy Service is greater than 105% of the Discrete Energy Target in respect of such Energy Service then Project Co shall calculate the Painshare Adjustment set out in Part 1, Section 5.2 and deduct it from the Monthly Service Payments accordingly in accordance with Schedule 20 – Payment Mechanism;

The table below shows the banding mechanism used for calculating the Painshare Adjustment to Project Co and the City for each Energy Service.

Energy Service	Year "X"	Painshare then equals:
If the Variance from DET for the purposes of calculating Painshare in the previous year was:	0 to 5%	0
If the Variance from DET for the purposes of calculating Painshare in the previous year was:	> 5%	100%

(ii) if the Corrected Discrete Energy Consumption in respect of any Energy Service is less than 95% of the Discrete Energy Target in respect of such Energy Service, then Project Co shall calculate the Gainshare Adjustment set out in Part 1, Section 5.2.

The table below shows the banding mechanism used for calculating the Gainshare Adjustment to Project Co and the City for each Energy Service.

Energy Service	Year "X"	Gainshare then equals:
If the Variance from DET for the purposes of calculating Gainshare in the previous year was:	0 to 5%	0
If the Variance from DET for the purposes of calculating Gainshare in the previous year was:	> 5% to 20%	50%

If the Variance from DET for the purposes of calculating Gainshare in the previous year was:	> 20%	100%

(b) If Project Co is subject to a Painshare Adjustment with respect to an Energy Year, then Project Co shall submit a detailed remediation plan within fourteen (14) days of the calculation of the Painshare Adjustment to explain how it will reduce the relevant Discrete Energy Service Actual Consumption such that it will not exceed the 105% threshold established in Part 1, Section 5.1(a)(i), above, for the subsequent Energy Year. If Project Co is not successful in its remediation plan such that the Painshare Adjustment in Part 1, Section 5.1(a)(i) is applied with respect to such Discrete Energy Service Actual Consumption for such Energy Year, then the Painshare Adjustment set out in Part 1, Section 5.2 will be calculated and apply again the following year.

5.2 The formulae to calculate the Gainshare Adjustment and the Painshare Adjustment set out in this Section 5.2 are based on the table in Part 1, Section 5.1 of this Schedule 8. For the avoidance of doubt, if Corrected Discrete Energy Consumption in respect of a discrete Energy Utility falls within a set band above or below the relevant Discrete Energy Target (i.e.: no more than 5% above or below the benchmark) no Gainshare Adjustment or Painshare Adjustment will be made for that Energy Utility in that year.

(a) For the purposes of Part 1, Section 5.2(b):

A = the Corrected Discrete Energy Consumption during the relevant year for a particular Energy Service in units e.g. megajoules; m³, etc.

B = the Discrete Energy Target for the relevant year for a discrete Energy Service in units e.g. megajoules; m³, etc.

(b) In respect of every year following the Revenue Service Availability Date:

IF: $A < \frac{95B}{100}$ then Project Co shall be entitled to claim and be paid a Gainshare Adjustment ('GS') for that year, where

if $\frac{80B}{100} < A < \frac{95B}{100}$ then $GS = 0{\cdot}5\left(\frac{95\,B}{100} - A\right)$ * Average Unit Rate Price

but if $A < \frac{80B}{100}$ then $GS = \left[\left(\frac{80B}{100} - A\right) + \frac{B}{13.3}\right]$ * Average Unit Rate Price

(In the above formula, a factor of 13.3333 is used to divide B. This is obtained by multiplying the range of the 2nd band by the percentage of Project Co pain/gain. The range of the 2nd band is 20%-5%= 15% and the Project Co gain percentage is 50%. The product is 7.5% which results in the factor of 13.3333.)

BUT IF: $A > \frac{105B}{100}$ then the City shall be entitled to deduct a Painshare Adjustment ('PS') where

if $A > \frac{105B}{100}$ then $PS = \left(A - \frac{105\,B}{100} \right)$ * Average Unit Rate Price

6. SUPPLY OF ENERGY

6.1 The City shall from time to time as required enter into contracts with Energy Utilities suppliers for the supply of Energy Utilities to the MSF and shall be responsible for all payments due pursuant to such supply contracts.

SCHEDULE 8
ENERGY MATTERS

PART 2
ENERGY MATTERS – TRACTION POWER

1. DEFINITIONS

In this Part 2 of Schedule 8, the following definitions shall have the following meanings:

1.1 "**Aggregate Actual Traction Power Consumption**" or "**AATPC**" means the actual consumption of all Electric Energy for Traction Power (including Traction Power used at the MSF) as invoiced by the relevant utility company or generator for each Contract Year.

1.2 "**Aggregate Energy Target Traction Power**" or "**AETTP**" means the total energy consumption, set forth in the Energy Target Letter submitted by Project Co at Commercial Close and which has been accepted by the City. The AETTP shall include and account for all requirements of RFP Schedule 10 – Preliminary Service Plan, and Schedule 15 – Output Specifications of the Project Agreement and any systems that are installed by Project Co for Traction Power (including Traction Power used at the MSF as part of the Works and that will be maintained by Project Co as part of the Project Co Services.

1.3 "**Aggregate Energy Model Traction Power**" means the energy model used for determining the AETTP.

1.4 "**Annual Review Meeting Traction Power**" means meetings between City Representatives and Project Co Representatives to occur within 90 days of each anniversary of the Revenue Service Availability Date (or such other date as may be agreed between the City and Project Co) to discuss Energy Services.

1.5 "**Average Annual Cooling Degree Days**" means the most recent average annual cooling degree days for Ottawa, Ontario calculated over a 30 year period, based on data published by Environment Canada.

1.6 "**Average Annual Heating Degree Days**" means the most recent average annual heating degree days for Ottawa, Ontario calculated over a 30 year period, based on data published by Environment Canada.

1.7 "**Average Unit Rate Price Traction Power**" means the average price for each standard unit of each discrete Energy Utility used for Traction Power in a Contract Year as reported by the applicable utility companies responsible for the supply of such Energy Service.

1.8 "**Corrected Aggregate Energy Consumption Traction Power**" means, for a Contract Year, the sum of CAECHTP for each discrete Energy Service related to heating of the vehicle or equipment and CAECCTP for each discrete Energy Service related to cooling

of the vehicle or equipment, plus adjustments reflecting variations in passenger loading and removal of all traction energy used for Stage 2 Additional Vehicle testing and commissioning and driver training, plus all non-heating and non-cooling Energy Utilities consumption for Traction Power.

1.9 "**Corrected Aggregate Energy Consumption Cooling Traction Power**" or "**CAECCTP**" means the sum of the Corrected Discrete Energy Consumption for each of the discrete Energy Utilities for cooling energy, calculated in accordance with Part 2, Section 3.3(h)(ii). In order to apply CAECCTP, Project Co must have separate metering for this cooling energy or have a specific methodology identified in the Energy Target Letter that identifies the procedures for isolating the cooling energy from the balance of the total energy used for Traction Power.

1.10 "**Corrected Aggregate Energy Consumption Heating Traction Power**" or "**CAECHTP**" means the sum of the Corrected Discrete Energy Consumption for each of the discrete Energy Utilities for heating energy, calculated in accordance with Part 2, Section 3.3(h)(i). In order to apply CAECHTP, Project Co must have separate metering for this heating energy or have a specific methodology identified in the Energy Target Letter that identifies the procedures for isolating the heating energy from the balance of the total energy used for Traction Power.

1.11 "**Corrected Aggregate Energy Consumption Passenger Loading**" or "**CAECPL**" means the sum of the Corrected Discrete Energy Consumption for each of the discrete Energy Utilities for passenger loading, calculated in accordance with Part 2, Section 3.3(h)(iii). In order to apply CAECPD, Project Co must have a specific methodology identified in the Energy Target Letter that identifies the procedures for isolating the energy relating to passenger density from the balance of the total energy used for Traction Power.

1.12 "**Corrected Discrete Energy Consumption Traction Power**" or "**Corrected Discrete Energy Consumption**" means the Discrete Energy Service Actual Consumption for each discrete Energy Service (calculated for each discrete Energy Service) corrected for each Contract Year in accordance with this Schedule 8 to reflect the climatic conditions and passenger loading for that Contract Year.

1.13 "**Discrete Energy Service Actual Consumption**" means the actual consumption of an individual electric Energy Service for Traction Power (including Traction Power used at the MSF) as invoiced by the relevant utility company for each Contract Year.

1.14 "**Energy Analysis Report Traction Power**" has the meaning given to it in Part 2, Section 3 of this Schedule 8.

1.15 "**Energy Service Traction Power**" or "**Energy Service**" means any metered provision of Energy Utilities used for the Traction Power System as metered from the primary side of the Traction Power supply transformer used for providing energy to the Light Rail Vehicles for locomotion and any power drawn from the secondary side of the Traction Power transformer.

1.16 "**Energy Target Letter**" means the letter submitted by Project Co at Commercial Close setting forth the AETTP.

1.17 "**Energy Utilities**" means energy/power including electricity and any other energy source used in Traction Power, including Sustainable Energy.

1.18 "**Gainshare Adjustment**" means the amount payable by the City to Project Co (which amount will be included in the calculation of the Monthly Service Payment for the Contract Month following the date in which such adjustment has been determined in accordance with this Schedule 8) based on the AATPC that falls outside the set bands set out in Part 2, Section 5 of this Schedule 8.

1.19 "**High Cost Measures**" means, in respect of a Contract Year, energy saving measures that incur capital expenditure with a Simple Payback of greater than 36 months.

1.20 "**Low Cost Measures**" means, in respect of a Contract Year, energy saving measures that incur capital expenditure with a Simple Payback of no greater than 36 months and are considered to be revenue items as opposed to capital investment measures.

1.21 "**No Cost Measures**" means energy savings measures, including those related to good house-keeping, involving no material additional expenditure and/or no capital expenditure to carry out.

1.22 "**Painshare Adjustment**" means the deduction which may be claimed by the City from Project Co (which amount will be deducted from the calculation of the Monthly Service Payment for the Contract Month following the date in which such adjustment has been determined in accordance with this Schedule 8) based on Energy Utilities consumption for the AATPC which falls outside the bands set out in Part 2, Section 5 of this Schedule 8.

1.23 "**Simple Payback**" means the number of years after which an investment will have paid for itself. Simple Payback is calculated by dividing the initial cost of the retrofit by the energy cost savings per year. Those projects with the shortest paybacks are assumed to be the most cost effective. Simple Payback = initial cost of energy retrofit / annual energy savings.

1.24 "**Traction Power**" means power used as metered at the primary side of the Traction Power transformer used for providing energy to the Light Rail Vehicles for locomotion and any power drawn from the secondary side of the Traction Power.

2. PROCEDURES FOR DETERMINING ENERGY COST SHARING

2.1 All Energy Utilities consumed or used for Traction Power shall be subject to the calculation of the Gainshare Adjustment or the Painshare Adjustment as provided in Part 2, Section 5 of this Schedule 8.

2.2 The Aggregate Energy Target Traction Power shall form the normalized 30 year benchmark for calculating the Energy Services cost sharing in respect to the AATPC.

The Corrected Aggregate Energy Consumption shall be used to calculate Painshare Adjustments and Gainshare Adjustments. The Aggregate Energy Target Traction Power shall not be altered or adjusted except by the process described in Part 2, Section 4 of this Schedule 8.

2.3 The measurement and verification of energy use for the Traction Power will be through metered use measured at the primary side of the Traction Power supply transformer. At Final Completion, Project Co shall provide the City with a Measurement and Verification Plan, including, without limitation, a metering schedule of all proposed energy end-uses. All subsequent Energy Analysis Reports are to be based on this plan.

2.4 Project Co shall provide the City with a draft Energy Analysis Report Traction Power within 60 days following the end of each Contract Year, which report shall include copies of all working papers to fully support the draft Energy Analysis Report Traction Power. The draft Energy Analysis Report Traction Power shall be consistent with the format and content requirements set out in Part 2, Section 3 of this Schedule 8.

2.5 As soon as practicable and in any event within 80 days following the end of each Contract Year, Project Co and the City shall convene an Annual Review Meeting to be attended by the Project Co Representative and the City Representative. At the Annual Review Meeting Project Co shall present the draft Energy Analysis Report Traction Power to the City, and the City and Project Co shall discuss the Aggregate Actual Consumption Traction Power for the preceding Contract Year.

2.6 Project Co shall assist the City Representative and afford the City Representative such information and access to the Traction Power records, utility meters, and by other means as may reasonably be required for the City Representative to confirm the draft Energy Analysis Report Traction Power provided by Project Co to determine the Aggregate Actual Consumption Traction Power for the Contract Year. The City shall promptly notify Project Co of the details of any disagreement of all or any aspect of the Energy Analysis Report Traction Power, and the Parties shall then seek to agree to any matters in dispute, but where matters cannot be resolved within such 20 Business Day period (or such other period as may be otherwise agreed by the City Representative, acting reasonably) it shall be dealt with in accordance with the Dispute Resolution Procedure.

(a) Within 20 Business Days following each Annual Review Meeting, or within such period as may be otherwise agreed between the City Representative and the Project Co Representative, acting reasonably:

(i) The City shall confirm its acceptance of all or any aspect of the Energy Analysis Report Traction Power; and

(ii) Subject to Part 2, Section 4 of this Schedule 8, Project Co and the City shall agree to any adjustments to the Aggregate Energy Target Traction Power.

(b) Subject to Part 2, Section 2.6(c), Project Co or the City, as the case may be, shall be entitled annually to a Gainshare Adjustment or a Painshare Adjustment, as the case may be, calculated in accordance with Part 2, Section 5 of this Schedule 8.

(c) Claims made by either Project Co or the City for a Gainshare Adjustment or a Painshare Adjustment shall be made at an Annual Review Meeting. If Project Co makes a claim for Gainshare Adjustment, Project Co shall within 10 Business Days after acceptance of the Energy Analysis Report Traction Power by the City Representative or within such other period as may be agreed by the City Representative and Project Co, acting reasonably, submit an account to the City setting out its calculation and justifying the quantification of the Gainshare Adjustment. If the City makes a claim for a Painshare Adjustment, the City shall within 10 Business Days after acceptance of the Energy Analysis Report by the City Representative or within such other period as may be agreed by the City Representative and Project Co, acting reasonably, submit an account to Project Co setting out its calculations and justifying the quantification of the Painshare Adjustment.

(d) If either Project Co or the City wishes to dispute any account presented pursuant to Part 2, Section 2.6 of this Schedule 8, it must do so by notice to the other Party within 10 Business Days of receipt of such account. The City Representative and the Project Co Representative shall use reasonable efforts to resolve the dispute for an additional 10 Business Days. If there is no agreement within a further 10 Business Days then either Party may refer the matter to the Dispute Resolution Procedure. If neither Party objects in accordance with this Section 2.6 or, following final determination of the disputed account in accordance with this Section 2.6, Project Co shall include the relevant Gainshare Adjustment or Painshare Adjustment as a separate item within the next invoice prepared by Project Co in accordance with Section 32.6(a) of the Project Agreement. No adjustments shall be made to the Monthly Service Payment for any claimed Gainshare Adjustment or Painshare Adjustment except in accordance with the procedure set out in Part 2, Section 5 of this Schedule 8.

2.7 At Commercial Close, Project Co shall deliver to the City an Energy Target Letter Traction Power in form and substance satisfactory to the City, which such Energy Target Letter Traction Power shall reflect the design of the Traction Power system. In addition, Project Co shall deliver to the City for review in accordance with Schedule 10 – Review Procedure, an updated final Energy Target Letter Traction Power together with a supporting Aggregate Energy Model Traction Power 3 months prior to the Revenue Service Availability. Any changes to the Energy Target Letter Traction Power after Commercial Close shall be approved by the City and shall constitute a Variation.

3. CONTENT AND FORMAT OF THE ENERGY ANALYSIS REPORT TRACTION POWER

3.1 The Energy Analysis Report Traction Power shall present findings of Aggregate Actual Consumption Traction Power for the relevant Contract Year and shall include the following:

(a) a summary of actual usage, degree days, passenger loadings, and breakdown by utility in megajoules and cubic meters, or other utility rate units. The summary should also highlight any exceptional changes (being changes of plus or minus 10% in consumption or pattern of use) in consumption or pattern of use since any previous survey.

(b) accurate and precise consumption data as provided by utility metering.

(c) identification of potential cost savings in respect of Energy Utilities for the Traction Power and provide an estimate of potential Energy Service consumption savings broken down by fuel type, implementation costs, Simple Payback periods and projected savings along with identifying potential risks associated with each proposed cost savings measure. Project Co shall categorize these cost savings measures in the following categories: No Cost Measures, Low Cost Measures and High Cost Measures. Project Co shall also advise the City of projected Energy Utilities for the Traction Power for the next 5 years and cost projections in respect of such projected Energy Utilities usage along with pricing trends and potential risks associated with each.

3.2 The objectives of the Energy Analysis Report Traction Power are to confirm Aggregate Actual Consumption in the relevant Contract Year and to calculate Gainshare adjustments.

3.3 Consistent with the objectives set out in Part 2, Section 3.2 of this Schedule 8, Project Co shall ensure that the Energy Analysis Report Traction Power has the following components:

(a) total Vehicle Kilometres for the relevant year;

(b) presentation of Aggregate Actual Consumption Traction Power;

(c) presentation of degree day data for the relevant Contract Year;

(d) presentation of passenger loadings for the relevant Contract Year;

(e) establishment of a basis for continued monitoring of energy consumption and adjustments to the Aggregate Energy Target Traction Power;

(f) utility data collected by Project Co shall be presented in the table set out in Appendix B to this Schedule 8;

(g) detailed analysis of all submetered end-uses;

(h) procedure for determining the Corrected Discrete Energy Consumption Traction Power for each individual Energy Service will be calculated using the following formula (with separate calculations to be conducted and provided for each discrete Energy Service):

(i) Corrected Discrete Energy Consumption Traction Power for the discrete Energy Service for heating energy ("CAECHTP") = Discrete Energy Service Actual Consumption (Mega Joules) x Average Annual Heating Degree Days / heating degree days published by Environment Canada for the Contract Year.

(ii) Corrected Discrete Energy Consumption for the discrete Energy Service for cooling energy ("CAECCTP") = Discrete Energy Services Actual Consumption (Mega Joules) x Average Annual Cooling Degree Days / cooling degree days published by Environment Canada for the Contract Year.

(iii) Corrected Discrete Energy Consumption for the discrete Energy Service for passenger loadings shall be calculated using the same energy model referenced in Part 2 Section 1.3 and as defined in the specific methodology identified in the Energy Target Letter that identifies the procedures for isolating the energy relating to passenger loading from the balance of the total energy used for Traction Power.

(i) outline any outstanding issues from any previous Energy Analysis Report;

(j) adjustments to the Aggregate Energy Target Traction Power;

(k) tables and graphs showing the consumption, unit costs, and total costs for all purchased Energy Utilities for the previous 12 months. Breakdown of Energy Utilities types and costs for each energy use described in Part 2, Section 3.2 and 3.3 of this Schedule 8 and any other major energy use for the previous 12 months;

(l) appendices – The appendices shall include graphs, calculations and miscellaneous data that are relevant to the Energy Analysis Report Traction Power; and

(m) summary tables from all previous Energy Analysis Reports Traction Power delivered by Project Co to the City.

4. CORRECTED DISCRETE ENERGY CONSUMPTION AND PROCESS FOR AMENDING THE AGGREGATE ENERGY TARGET TRACTION POWER

4.1 In all cases, corrections to energy consumption targets must be consistent with the principles outlined in the Part 2 of this Schedule 8.

4.2 Following the acceptance of the Energy Analysis Report Traction Power by the City Representative in accordance with Part 2, Section 2.6 of this Schedule 8, the data set out in the Energy Analysis Report Traction Power will be used to determine the Painshare Adjustments or Gainshare Adjustments.

4.3 For each Contract Year the Gainshare Adjustment and Painshare Adjustment shall be calculated in accordance with Part 2, Section 5.

4.4 At any time commencing after the first anniversary of the Completion Date, Project Co and the City shall, acting reasonably, agree to make any adjustments to the AETTP and/or the Corrected Aggregate Energy Consumption Traction Power only in the event of:

(a) changes implemented in accordance with the Project Agreement that would cause load changes or other changes in Energy Utilities usage;

(b) changes in the utilization of Traction Power from that generally described in the Project Agreement;

(c) substantial climate change for the relevant time period as reported by Environment Canada compared to the 1980 to 2010 30 year average meteorological data for Ottawa, Ontario as reported by Environment Canada. Climate change can only be evidenced by a climatic authority such as Environment Canada and must be presented to the City with documented evidence of increased consumption trends in similar facilities in the South-Eastern Ontario.

4.5 Pursuant to Part 2, Section 4.4, Project Co may elect to propose a correction to AETTP in direct proportion to any substantial change in use to Traction Power.

4.6 The Party requesting an amendment to the AETTP shall appoint, subject to the other Party's approval (acting reasonably) and pay for a complete energy audit to be conducted by a third party auditor. The energy audit shall include a detailed computer simulation of Energy use by function and a comprehensive evaluation of Energy Utilities use patterns. The energy auditor shall prepare a report making a recommendation regarding amendments to the AETTP. Both the City and Project Co must agree to the amended AETTP within 20 Business Days following receipt of such report. If there is no agreement within a further 10 Business Day period, then either Party may refer the matter to Dispute Resolution Procedure.

4.7 Any amendment to the AETTP shall only affect the Monthly Service Payment (as a result of any Painshare Adjustments or Gainshare Adjustments) from the date on which the amendment is effective and shall not, for greater certainty, have a retrospective effect on any other previous Monthly Service Payments. Except where the Dispute Resolution procedure adjudicates in favour of Project Co whereby the payments shall be prorated to 30 days after the Energy Auditors report.

5. CALCULATION OF GAINSHARE ADJUSTMENT OR PAINSHARE ADJUSTMENT

5.1 Comparing Annual Energy Target

(a) After the acceptance of the Energy Analysis Report Traction Power described in Part 2, Section 3 for each Energy Year, the Corrected Aggregate Energy Consumption Traction Power shall be compared to the AETTP and:

(i) if the Corrected Aggregate Energy Consumption Traction Power is greater than 110% of the AETTP then Project Co shall calculate the Painshare Adjustment set out in Part 2, Section 5.2 and deduct from the Monthly Service Payments accordingly in accordance with Schedule 20 – Payment Mechanism;

The table below shows the banding mechanism used for calculating the annual Painshare Adjustment to Project Co and the City for each Energy Service.

Energy Service	Year "X"	Painshare then equals:
If the Variance from AETTP for the purposes of calculating Painshare in the previous year was:	0 to 10%	0
If the Variance from AETTP for the purposes of calculating Painshare in the previous year was:	> 10%	100%

(ii) if the Corrected Aggregate Energy Consumption Traction Power is less than 95% of the AETTP, then Project Co shall calculate the Gainshare Adjustment set out in Part 2, Section 5.2.

The table below shows the banding mechanism used for calculating the annual Gainshare Adjustment to Project Co and the City for each Energy Service.

Energy Service	Year "X"	Gainshare then equals:
If the Variance from AETTP for the purposes of calculating Gainshare in the previous year was:	0 to 5%	0
If the Variance from AETTP for the purposes of calculating Gainshare in the previous year was:	> 5% to 20%	50%
If the Variance from AETTP for the purposes of	> 20%	100%

calculating Gainshare in the previous year was:		

(b) If Project Co is subject to a Painshare Adjustment with respect to an Energy Year, then Project Co shall submit a detailed remediation plan within fourteen (14) days of the calculation of the Painshare Adjustment to explain how it will reduce the Corrected Aggregate Energy Consumption Traction Power such that it will not exceed the 110% threshold established in Part 2, Section 5.1(a)(i), above, for the subsequent Energy Year. If Project Co is not successful in its remediation plan such that the Painshare Adjustment in Part 2, Section 5.1(a)(i) is applied with respect to such Corrected Aggregate Energy Consumption Traction Power for such Energy Year, then the Painshare Adjustment set out in Part 2, Section 5.2 will be calculated and apply again the following year.

5.2 The formulae to calculate the Gainshare Adjustment and the Painshare Adjustment set out in this Part 2, Section 5.2 are based on the table in Part 2, Section 5.1 of this Schedule 8. For the avoidance of doubt, if Corrected Aggregate Energy Consumption Traction Power falls within a set band above or below the relevant AETTP (i.e.: no more than 10% above or 5% below the benchmark) no Painshare Adjustment or Gainshare Adjustment will be made for that Energy Utility in that year.

(a) For the purposes of Part 2, Section 5.2(b):

A = the Corrected Aggregate Energy Consumption Traction Power during the relevant year for a particular Energy Service in units e.g. megajoules; m^3, etc.

B = the AETTP for the relevant year in units e.g. megajoules; m^3, etc.

(b) In respect of every year following the Revenue Service Availability Date:

IF: $A < \frac{95B}{100}$ then Project Co shall be entitled to claim and be paid a Gainshare Adjustment ('GS') for that year, where

if $\frac{80B}{100} < A < \frac{95B}{100}$ then $GS = 0.5\left(\frac{95\,B}{100} - A\right)$ * Average Unit Rate Price

but if $A < \frac{80B}{100}$ then $GS = \left[\left(\frac{80B}{100} - A\right) + \frac{B}{13.\dot{3}}\right]$ * Average Unit Rate Price

(In the above formula, a factor of 13.3333 is used to divide B. This is obtained by multiplying the range of the 2nd band by the percentage of Project Co pain/gain. The range of the 2nd band is 20%-5%= 15% and the Project Co gain percentage is 50%. The product is 7.5% which results in the factor of 13.3333.)

BUT IF: $A > \frac{110B}{100}$ then the City shall be entitled to deduct a Painshare Adjustment ('PS') where

if $A > \frac{110B}{100}$ then $PS = \left[\left(A - \frac{110\,B}{100} \right) \right]$ * Average Unit Rate Price

6. SUPPLY OF ENERGY

6.1 The City shall from time to time as required enter into contracts with Energy Utilities suppliers for the supply of Energy Utilities for Traction Power and shall be responsible for all payments due pursuant to such supply contracts.

APPENDIX A
ENERGY ANALYSIS REPORT SUBMITTAL REQUIREMENTS – ENERGY MATTERS – MSF

	Thirty Year Average for Ottawa	Contract Year	% variance between Average Annual Heating Days/Average Annual Cooling Days and Contract Year
Heating Degree Days	**Average Annual Heating Days: [●]**	**Contract Year Heating Days (as provided by Environment Canada): [●]**	
Cooling Degree Days	**Average Annual Cooling Days: [●]**	**Contract Year Cooling Days (as provided by Environment Canada): [●]**	

Total Energy Summary	**Discrete Energy Targets**		**Actual Consumption**		**Corrected Discrete Energy Consumption**		**Percent Variance between vi and ii**	**Painshare Adjustment or Gainshare Adjustment**
	Usage	**Cost for Contract Year (calculated based on Discrete Energy Targets multiplied by average unit cost of each discrete Energy Utility)**	**Usage**	**Cost for Contract Year**	**Usage**	**Corrected Cost for Contract Year (calculated based on Corrected Discrete Energy Consumption for each of the discrete Energy Utilities multiplied by average unit cost of each such discrete Energy Utilities)**		
	i	ii	iii	iv	v	vi	vii	viii
Electricity								
Natural Gas								
Oil / Other								

Total Energy Summary	Discrete Energy Targets		Actual Consumption		Corrected Discrete Energy Consumption		Percent Variance between vi and ii	Painshare Adjustment or Gainshare Adjustment
	Usage	Cost for Contract Year (calculated based on Discrete Energy Targets multiplied by average unit cost of each discrete Energy Utility)	Usage	Cost for Contract Year	Usage	Corrected Cost for Contract Year (calculated based on Corrected Discrete Energy Consumption for each of the discrete Energy Utilities multiplied by average unit cost of each such discrete Energy Utilities)		
Aggregate sums	**[To include Aggregate Energy Target]**		**[Aggregate Actual Consumption: ●]**		**[Corrected Aggregate Energy Consumption: ●]**			

APPENDIX B
ENERGY ANALYSIS REPORT SUBMITTAL REQUIREMENTS – ENERGY MATTERS – TRACTION POWER

	Thirty Year Average for Ottawa	Contract Year	% variance between Average Annual Heating Days/Average Annual Cooling Days and Contract Year
Heating Degree Days	**Average Annual Heating Days: [●]**	**Contract Year Heating Days (as provided by Environment Canada): [●]**	
Cooling Degree Days	**Average Annual Cooling Days: [●]**	**Contract Year Cooling Days (as provided by Environment Canada): [●]**	

	Planned Passenger Loading	Average Passenger Loading Contract Year	% variance between Planned Passenger Loading and Average Passenger Loading Contract Year
Passenger Loading Early Morning	**[●]**	**[●]**	
Passenger Loading Morning Peak			
Passenger Loading Midday			
Passenger Loading Afternoon Peak			
Passenger Loading Early Evening			
Passenger Loading Late Evening (M-Th)			
Passenger Loading			

	Planned Passenger Loading	Average Passenger Loading Contract Year	% variance between Planned Passenger Loading and Average Passenger Loading Contract Year
Late Evening (Fri)			
Passenger Loading Night (M-Th)			
Passenger Loading Night (Fri)			
Passenger Loading Saturday Daytime			
Passenger Loading Saturday Evening			
Passenger Loading Saturday Night			
Passenger Loading Sunday Daytime			
Passenger Loading Sunday Evening			

Total Energy Summary	Aggregate Energy Target Traction Power		Aggregate Actual Traction Power Consumption		Corrected Aggregate Energy Consumption Traction Power		Percent Variance	Painshare Adjustment or Gainshare Adjustment
	Usage	Cost for Contract Year	Usage	Cost for Contract Year	Usage	Corrected Cost for Contract Year		
	i	ii	iii	iv	v	vi	vii	viii
Electricity								
Aggregate sums	**[Aggregate Energy Target]**		**[Aggregate Actual Consumption ●]**					

SCHEDULE 9

KEY INDIVIDUALS

A. KEY INDIVIDUALS – DESIGN AND CONSTRUCTION WORKS

Project Co Party	Position/Function	Name and Contact Information
Construction Contractor	Design Manager	Roger Woodhead SNC-Lavalin Constructors (Pacific) Inc. 1075 West Georgia Street, 18th Floor Vancouver, British Columbia Canada V6E 3C9 Email: Roger.Woodhead@snclavalin.com Fax: 604-662-7688
Construction Contractor	Lead Architect	Claudina Sula Adamson Associates Architects 401 Wellington Street West, 3rd Floor Toronto, Ontario Canada M5V 1E7 Email: CSula@adamson-associates.com Fax: 416-967-7150
Construction Contractor	Quality Manager	Chris Phillips SNC-Lavalin Constructors (Pacific) Inc. 1075 West Georgia Street, 18th Floor Vancouver, British Columbia Canada V6E 3C9 Email: Chris.Phillips@snclavalin.com Fax: 604-662-7688
Construction Contractor	Construction Manager	Pedro Luis Gomez Escribano Dragados Canada 150 King Street West Toronto, Ontario Canada M5H 1J9 Email: pgomez@dragados-canada.com

Project Co Party	Position/Function	Name and Contact Information
		Fax: 647-260-5002
Construction Contractor	Traffic Manager	Ron Lee SNC-Lavalin Constructors (Pacific) Inc. 1075 West Georgia Street, 18th Floor Vancouver, British Columbia Canada V6E 3C9 Email: Ron.Lee@snclavalin.com Fax: 604-662-7688
Construction Contractor	Traffic Control Supervisor	Jeff Walker MMM Group Limited Suite 700, 1045 Howe Street Vancouver, British Columbia Canada V6Z 2A9 Email: walkerj@mmm.ca Fax: 604-683-8655
Construction Contractor	Traffic Engineer	Jim Gough MMM Group Limited Suite 700, 1045 Howe Street Vancouver, British Columbia Canada V6Z 2A9 Email: goughj@mmm.ca Fax: 604-683-8655
Construction Contractor	Public Art Manager	Justin Ridgeway 1341 Queen Street Alton, Ontario Canada L7K 0C4 Email: j.f.ridgeway@gmail.com Fax: N/A
Construction Contractor	Vehicle Procurement Officer	Rainer Ibowski SNC-Lavalin Constructors (Pacific) Inc. 1075 West Georgia Street, 18th Floor Vancouver, British Columbia Canada V6E 3C9 Email: Rainer.Ibowski@snclavalin.com

Project Co Party	Position/Function	Name and Contact Information
		Fax: 604-662-7688
Construction Contractor	Vehicle Supply Manager	Chris Heald Interfleet Technology Canada Suite 122, 1005 Skyview Drive Burlington, Ontario Canada L7P 5B1 Email: Heald.C@interfleetinc.com Fax: 905-315-9866
Construction Contractor	LRT Systems and Integration Manager	Keven Tagg SNC-Lavalin Constructors (Pacific) Inc. 1075 West Georgia Street, 18th Floor Vancouver, British Columbia Canada V6E 3C9 Email: Kevin.Taggart@snclavalinom.com Fax: 604-662-7688
Construction Contractor	Tunnel Design Manager	Brian Garrod Hatch Mott Macdonald 2800 Speakman Drive Mississauga, Ontario Canada L5K 2R7 Email: Brian.Garrod@hatchmott.com Fax: 905-855-2607
Construction Contractor	Tunnel Construction Manager	Roger Scoda Estelrich Dragados Canada 150 King Street West Toronto, Ontario Canada M5H 1J9 Email: rscoda@dragados-canada.com Fax: 647-260-5002

B. KEY INDIVIDUALS – MAINTENANCE SERVICES

Project Co Party	Position/Function	Name and Contact Information
Maintenance Contractor	Quality Manager	Chris Phillips SNC-Lavalin Constructors (Pacific) Inc. 1075 West Georgia Street, 18th Floor

Project Co Party	Position/Function	Name and Contact Information
		Vancouver, British Columbia Canada V6E 3C9 Email: Chris.Phillips@snclavalin.com Fax: 604-662-7688
Maintenance Contractor	Maintenance Director	Grant Bailey PROTRANS BC OPERATIONS LTD 9851 Van Horne Way Richmond, British Columbia Canada V6X 1W4 Email: gbailey@protransbc.com Fax: 604-247-5714
Maintenance Contractor	Vehicle Maintenance Manager	Nigel Freeman 1001 Frontenac Road, Naperville Illinois, Chicago U.S.A. 60563 Email: Nigel.freeman@transport.alstom.com Fax: 630-369-2203
Maintenance Contractor	Maintenance Manager	Santiago Martin Moyano 155 University Avenue, Suite 1800 Toronto, Ontario Canada M5H 3B7 Email: smartin@acsinfra.com Fax: 786-272-7992

C. KEY INDIVIDUALS – DESIGN AND CONSTRUCTION WORKS AND MAINTENANCE SERVICES

Project Co Party	Position/Function	Name and Contact Information
Project Co	Project Co Representative	Eusebio Corregel c/o ACS Infrastructure Canada Inc. 155 University Avenue, Suite 1800, Toronto, Ontario Canada M5H 3B7 Email: rcanada@acsinfra.com Fax: (416) 365-7886
Construction Contractor	Environmental and Sustainability Director	Ian Upjohn SNC Lavalin Inc.

Project Co Party	Position/Function	Name and Contact Information
		185 The West Mall Toronto, Ontario Canada M9C 5L5 Email: Ian.Upjohn@snclavalin.com Fax: 416-231-5356
Construction Contractor	Environmental and Sustainability Manager	Stephen Carpenter Enermodal Engineering (part of MMM Group) 119 Spadina Avenue, Suite 500 Toronto, Ontario Canada M5V 2L1 Email: SCarpenter@enermodal.com Fax: 416-260-3028
Construction Contractor	Sustainability Coordinator	Cindy MacCormack Enermodal Engineering (part of MMM Group) 119 Spadina Avenue, Suite 500 Toronto, Ontario Canada M5V 2L1 Email: CMacCormack@enermodal.com Fax: 416-260-3028
Construction Contractor	Environmental Permits and Approvals Coordinator	Kristin Hanson SNC-Lavalin Environment 20 DeBoers Drive, Suite 200 Toronto, Ontario Canada M3J 0H1 Email: Kristin.Hanson@snclavalin.com Fax: 416-635-5353
Construction Contractor	Quality Director	Julio Lurena Barrios c/o ACS Infrastructure Canada Inc. 155 University Avenue, Suite 1800 Toronto, Ontario Canada M5H 3B7 Email: rcanada@acsinfra.com Fax: 416-642-2162
Construction Contractor	Design-Build Director	Dave Weatherby SNC-Lavalin Constructors (Pacific) Inc.

Project Co Party	Position/Function	Name and Contact Information
		1075 West Georgia Street, 18th Floor Vancouver, British Columbia Canada V6E 3C9 Email: Dave.Weatherby@snclavalin.com Fax: 604-662-7688
Construction Contractor	Systems Integration Manager	Keven Tagg SNC-Lavalin Constructors (Pacific) Inc. 1075 West Georgia Street, 18th Floor, Vancouver, British Columbia, Canada V6E 3C9 Email: Kevin.Taggart@snclavalinom.com Fax: 604-662-7688
Construction Contractor	Project Co Commissioning Coordinator	John Selke SNC-Lavalin Constructors (Pacific) Inc. 1075 West Georgia Street, 18th Floor Vancouver, British Columbia Canada V6E 3C9 Email: jselke@telus.net Fax: 604-662-7688

D. KEY INDIVIDUALS – HIGHWAY WORK

Project Co Party	Position/Function	Name and Contact Information
Construction Contractor	Traffic Manager	Ron Lee SNC-Lavalin Constructors (Pacific) Inc. 1075 West Georgia Street, 18th Floor Vancouver, British Columbia Canada V6E 3C9 Email: Ron.Lee@snclavalin.com Fax: 604-662-7688

Project Co Party	Position/Function	Name and Contact Information
Construction Contractor	Traffic Control Supervisor	Jeff Walker MMM Group Limited Suite 700, 1045 Howe Street Vancouver, British Columbia Canada V6Z 2A9 Email: walkerj@mmm.ca Fax: 604-683-8655
Construction Contractor	Traffic Engineer	Jim Gough MMM Group Limited Suite 700, 1045 Howe Street Vancouver, British Columbia Canada V6Z 2A9 Email: goughj@mmm.ca fax: 604-683-8655
Construction Contractor	Environmental Coordinator	Kristin Hanson SNC-Lavalin Environment 20 DeBoers Drive, Suite 200 Toronto, Ontario Canada M3J 0H1 Email: Kristin.Hanson@snclavalin.com Fax: 416-635-5353

SCHEDULE 10

REVIEW PROCEDURE

PART A
DESIGN AND CONSTRUCTION REQUIREMENTS

1. WORKS SUBMITTALS

1.1 The provisions of Part A of this Schedule 10 shall apply to the Design Development Submittals, the Construction Document Submittals, the Design Data and any and all items, documents and anything else required or specified by this Project Agreement, including all Works Submittals listed in Appendix A and Appendix B to this Schedule 10, in respect of the Design and Construction Works to be submitted to, reviewed or otherwise processed by the City in accordance with the Review Procedure prior to or after Substantial Completion in respect of the completion of Minor Deficiencies, including any and all subsequent revisions, amendments and changes thereto (collectively and individually, "**Works Submittal**" or "**Works Submittals**" as applicable in Part A of this Schedule 10).

2. SCHEDULE FOR WORKS SUBMITTALS

2.1 The Works Schedule shall provide for a progressive and orderly flow of Works Submittals from Project Co to the City Representative to allow sufficient time for review of each Works Submittal by the City Representative taking into account both the resources necessary to be available to the City Representative to conduct such review and whether delay in the review of the subject matter of the Works Submittal shall have a material impact on Project Co's ability to progress future anticipated Works Submittals and the Design and Construction Works in accordance with the Works Schedule.

2.2 The Works Schedule and any amendment to the Works Schedule shall allow a period of 10 Business Days (or such longer period as the Parties may agree) from the date of receipt for review of and response to each Works Submittal, provided that if Project Co has made major changes to the grouping and volume of Works Submittals, such period of time shall be adjusted by Project Co, acting reasonably, taking into account the factors set forth in Section 2.1 of this Schedule 10.

2.3 Project Co shall, in scheduling Works Submittals and in the performance of the Project Scope, allow adequate time prior to performing the Project Scope that are the subject of the Works Submittals, for review of the Works Submittals and for Project Co to make changes to Works Submittals that may be required if comments are received on the Works Submittals, such review and required changes to be in accordance with Part A of this Schedule 10.

2.4 If the Works Schedule indicates that a large number of Works Submittals will be made at one time, the City Representative may, at the City Representative's discretion, request a longer period for review or a staggering of the Works Submittals, and Project Co shall review and revise the Works Schedule accordingly, taking into account both the

resources necessary to be available to the City Representative to conduct such review and whether delay in the review of the subject matter of the Works Submittal shall have a material impact on Project Co's ability to progress future anticipated Works Submittals and the Design and Construction Works in accordance with the Works Schedule.

2.5 Project Co shall submit all Works Submittals to the City in accordance with the current Works Schedule.

3. GENERAL REQUIREMENTS FOR WORKS SUBMITTALS

3.1 Unless otherwise specified by the City Representative, Project Co shall issue 3 printed copies of all Works Submittals to the City, together with an electronic copy in a format agreed by the Parties acting reasonably and one printed copy of each Works Submittal to the Independent Certifier, together with an electronic copy in a format agreed by the Parties acting reasonably.

3.2 Project Co shall compile and maintain a register of the date and contents of the submission of all Works Submittals and the date of receipt and content of all returned Works Submittals and comments thereon, which shall be provided to the City upon request.

3.3 All Works Submittals shall be in English.

3.4 All Works Submittals required by this Project Agreement or by Applicable Law to be signed or sealed by persons with professional designations (including, where applicable, by registered professional engineers or architects) shall, where applicable, be so signed and sealed.

3.5 All Works Submittals shall include copies of all documents to be reviewed and shall clearly identify the purpose of the Works Submittal and Project Co's proposed course of action relating to the Works Submittal and the Project Scope that are the subject of the Works Submittal.

3.6 All Works Submittals shall, where applicable, refer to the relevant provisions of the Output Specifications, any other applicable Schedule to the Project Agreement and to any Design Data that has previously been subject to review.

3.7 All Works Submittals shall be clearly identified as a Works Submittal and shall be delivered with appropriate covering documentation, which shall include a list of all attached Works Submittals and for each Works Submittal:

(a) the document number(s) or drawing number(s);

(b) revision numbers (if applicable);

(c) document or drawing title(s);

(d) name of entity that prepared the Works Submittal;

(e) the Works Submittal history showing date and delivery information and/or log number of all previous submissions of that Works Submittal including reviewer and checker initials; and

(f) identification of any previous Works Submittal superseded by the current Works Submittal.

4. COMMENTS

4.1 The City Representative shall review and respond to each Works Submittal in accordance with the time periods specified in Section 2.2 of this Schedule 10. The City Representative shall return Works Submittals to Project Co with a copy to the Independent Certifier and assign one of the following 3 comments:

(a) "REVIEWED";

(b) "REVIEWED AS NOTED"; or

(c) "REJECTED".

4.2 The comment "REVIEWED" will be assigned to those Works Submittals that, in the opinion of the City Representative, conform to the requirements of this Project Agreement. Project Co shall comply with and implement such Works Submittals.

4.3 The comment "REVIEWED AS NOTED" will be assigned to those Works Submittals that, in the opinion of the City Representative, generally conform to the requirements of this Project Agreement, but in which immaterial deficiencies have been found by the City Representative's review. Project Co shall correct these Works Submittals and provide a copy of the corrected Works Submittals to the City Representative. Project Co shall comply with and implement such Works Submittals after correction, in accordance with the comments. If at any time it is discovered that Project Co has not corrected the deficiencies on Works Submittals stamped "REVIEWED AS NOTED", then Project Co will be required to modify the Works Submittals and Project Scope as required to ensure that the Design and Construction Works comply with the Output Specifications, any other applicable Schedule to the Project Agreement, and the Project Co Proposal Extracts and Project Co may be required, at the City Representative's discretion, to resubmit relevant Works Submittals. In such circumstances the City Representative shall act promptly in considering whether such deficiencies have been corrected. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.

4.4 The comment "REJECTED" will be assigned to those Works Submittals that, in the opinion of the City Representative, contain significant deficiencies or do not generally conform to the requirements of this Project Agreement, including this Schedule 10. Project Co shall correct and re-submit these Works Submittals within 10 Business Days after the Works Submittal has been returned to Project Co, or such longer period as Project Co may reasonably require, and (unless the Works Submittal is re-submitted within 5 Business Days) shall give the City Representative not less than 5 Business Days'

notice of when the Works Submittals shall be resubmitted. The City Representative will then review such re-submitted Works Submittals and assign a comment to the corrected Works Submittal. The Works Submittals shall be corrected, revised and resubmitted as often as may be required to obtain a comment that permits Project Co to proceed. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.

4.5 Where the City Representative issues the comment "REVIEWED AS NOTED" or "REJECTED", the City Representative shall provide reasons for the comment, referencing the particulars of the Section(s) of this Project Agreement that the Works Submittal fails to satisfy, and, if requested by the Project Co Representative, the City Representative shall meet with the Project Co Representative to discuss the reasons for the comment.

4.6 If, at any time after assigning any comment to a Works Submittal, the City Representative or Project Co discovers any significant deficiencies or any failure to conform to the requirements of this Project Agreement, the City Representative may revise the comment assigned to any Works Submittal. If the Parties agree or it is determined in accordance with Section 5 of this Schedule 10 that the revised comment is correct, Project Co shall make all such corrections to the Works Submittals and the Project Scope. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.

4.7 For the purpose of facilitating and expediting the review and correction of Works Submittals, the City Representative and the Project Co Representative shall meet as may be mutually agreed to discuss and review any outstanding Works Submittals and any comments thereon.

4.8 Where a Works Submittal is voluminous, the City Representative at his or her discretion may elect to stamp only the cover page or first sheet of the Works Submittal with the appropriate comment, if any, and return to Project Co the cover page or first page together with individual pages or sheets on which comments are made, together with an explanation of the status of all pages not returned to Project Co. Any pages returned without such an explanation as to their status shall be deemed to be "REVIEWED" by the City.

4.9 In lieu of returning a Works Submittal, the City Representative may by letter notify Project Co of the comment assigned to the Works Submittal and if such comment is "REVIEWED AS NOTED" or "REJECTED" the letter shall contain comments in sufficient detail for Project Co to identify the correction sought.

5. DISPUTES

5.1 If Project Co disputes any act of the City or the City Representative in respect of a Works Submittal under this Part A of Schedule 10, Project Co shall promptly notify the City Representative and the Independent Certifier of the details of such Dispute and shall submit the reasons why Project Co believes a different comment should be assigned,

together with appropriate supporting documentation. The City Representative shall review the Works Submittal, the reasons and supporting documentation and within 5 Business Days after receipt thereof shall either confirm the original comment or notify Project Co of a revised comment. If the City Representative confirms the original comment, Project Co may request the Independent Certifier to resolve the Dispute and render a decision within 5 Business Days of such request.

5.2 If either Party is not satisfied, acting reasonably, with the resolution of the Independent Certifier, subject to Section 10.2 of this Schedule 10, either Party may refer the matter for determination in accordance with Schedule 27 – Dispute Resolution Procedure.

5.3 Notwithstanding the provisions of Sections 5.1 and 5.2, the City may direct Project Co to revise the Works Submittals in accordance with the comments of the City and proceed to perform and complete the Design and Construction Works on the basis of such revised Works Submittals. For clarity, such direction shall be considered a Dispute and Project Co may proceed in accordance with Section 58 of the Project Agreement and Schedule 27 – Dispute Resolution Procedure of the Project Agreement.

6. EFFECT OF REVIEW

6.1 Any review and comment by the City or the City Representative of any Works Submittals is for general conformity to the obligations and requirements of this Project Agreement, and any such review and comment shall not relieve Project Co of the risk and responsibility for the Project Scope and for meeting all of its obligations under and requirements of this Project Agreement, and shall not create any new or additional obligations or liabilities for the City. Without limiting the generality of the foregoing any and all errors or omissions in Works Submittals or of any review and comment shall not exclude or limit Project Co's obligations or liabilities in respect of the Design and Construction Works under this Project Agreement or exclude or limit the City's rights in respect of the Design and Construction Works under this Project Agreement.

7. WORKS SUBMITTAL EXPLANATION

7.1 The City is adopting a Project Management and Systems engineering approach for the OLRT which follows the requirements of ISO/IEC 15288 "Systems Engineering Life Cycle Processes". ISO/IEC 15288 describes a set of standard project processes which will provide a systems engineering approach and will offer all project stakeholders a common process framework that improves the communication and cooperation during the project life cycle. This systems engineering approach will be applicable for all levels in the systems hierarchy and for all disciplines.

7.2 At any time, the City Representative may, acting reasonably, require Project Co or any Project Co Parties, including Project Co's consultants and any other relevant personnel, at no additional cost to the City, to explain to the City Representative and the City's advisors the intent of Project Co's Works Submittals, including in relation to any design and any associated documentation and as to its satisfaction of the Output Specifications or any other Schedule to the Project Agreement, as applicable.

8. REVISIONS

8.1 Project Co shall ensure that Works Submittals keep the same, unique reference number throughout the review process, and that subsequent revisions of the same Works Submittal are identified by a sequential revision number. Correspondence related to such Works Submittal shall reference the reference number and revision number.

8.2 Re-submittals shall clearly show all revisions from the previous Works Submittal. Bound documents, including reports and manuals, shall contain a preface that clearly states how revisions are marked and the previous revision number against which the revisions have been marked. A consistent format for mark-ups of documents shall be used (e.g. deletions struck out and additions underscored). Revised portions of drawings shall be clearly marked (with appropriate means to visually distinguish between the parts of the drawing that are revised and the parts that are not revised) and the revision number and description of the revision shall be included on the drawing.

8.3 All revisions on print media shall be initialled by hand by the individual designer, design checker and, where applicable, by the drafter and the drafting checker and shall identify the persons who initialled the Works Submittal. Electronic versions of the Works Submittal shall identify the persons who initialled the revisions to the printed version of the Works Submittal. All such revisions must be able to be integrated into the As Built Drawings.

8.4 Project Co shall keep all Design Data current. If any Design Data is revised as part of a Works Submittal, all other Design Data relying on or based on that Design Data shall also be revised accordingly. All such revised Design Data shall also be submitted with the Works Submittal to which it relates.

9. AUDIT BY THE CITY REPRESENTATIVE

9.1 Without limiting any other right under this Project Agreement, the City Representative shall have the right to audit all Works Submittals, including comparing all Works Submittals to previous Works Submittals.

9.2 If during an audit or at any other time it is discovered by the City or Project Co (or resolved pursuant to Section 9.3 of this Schedule 10) that any Works Submittals were not correctly implemented, Project Co shall at its sole cost immediately take all necessary steps to correct and modify the applicable Works Submittals and the Project Scope to which they relate and shall advise the City Representative of all such corrections and modifications.

9.3 Any Dispute concerning the implementation of a Works Submittal, subject to Section 5.1 of this Schedule 10, shall be referred in the first instance to the Independent Certifier for resolution.

10. VARIATIONS

10.1 No alteration or modification to the design, quality and quantity of the Project Scope arising from the development of detailed design or from the co-ordination of the design in connection with any Works Submittal shall be construed or regarded as a Variation.

10.2 If, having received comments from the City Representative on any Works Submittal, Project Co considers that compliance with those comments would amount to a Variation, Project Co shall, within 10 Business Days of receipt of and before complying with the comments, provide written notice to the City of the same and, if it is agreed by the Parties that a Variation would arise if the comments were complied with, the City may, at its election, (a) issue a Variation Enquiry and it shall be dealt with in accordance with Schedule 22 – Variation Procedure or (b) amend its comment on the Works Submittal. If the Parties do not agree that a Variation would arise if the comments were complied with, either party may proceed to resolve the matter in accordance with Section 5 of this Schedule 10 including for clarity, the exercise by the City of its rights under Section 5.3 of this Schedule 10. Subject to the foregoing sentence, any failure by Project Co to notify the City in accordance with this Section 10.2 that Project Co considers compliance with any comments of the City Representative would amount to a Variation shall constitute an irrevocable acceptance by Project Co that any compliance with the City Representative's comments shall be without cost to the City and without any extension of time.

SCHEDULE 10
REVIEW PROCEDURE

PART B
MAINTENANCE TERM

1. MAINTENANCE SUBMITTALS

1.1 The provisions of Part B of this Schedule 10 shall apply to any and all items, documents and anything else required or specified by this Project Agreement, other than the Design Development Submittals, the Construction Document Submittals and the Design Data, to be submitted to, reviewed or otherwise processed by the City in accordance with the Review Procedure in respect of the Project, after the Revenue Service Availability, except in respect of the completion of Minor Deficiencies, including any and all subsequent revisions, amendments and changes thereto (collectively and individually, "**Maintenance Submittal**" or "**Maintenance Submittals**" as applicable in Part B of this Schedule 10).

1.2 Project Co shall allow a period of 10 Business Days (or such longer period as the Parties may agree) from the date of receipt for review of and response to each Maintenance Submittal.

1.3 Project Co shall, in scheduling Maintenance Submittals and in the performance of the Project Scope, allow adequate time prior to performing the Project Scope that are the subject of the Maintenance Submittals, for review of the Maintenance Submittals and for Project Co to make changes to Maintenance Submittals that may be required if comments are received on the Maintenance Submittals, such review and required changes to be in accordance with Part B of this Schedule 10.

2. GENERAL REQUIREMENTS FOR MAINTENANCE SUBMITTALS

2.1 Unless otherwise specified by the City Representative, Project Co shall issue 3 printed copies of all Maintenance Submittals to the City, together with an electronic copy in a format agreed by the Parties acting reasonably.

2.2 Project Co shall compile and maintain a register of the date and contents of the submission of all Maintenance Submittals and the date of receipt and content of all returned Maintenance Submittals and comments thereon, which shall be provided to the City upon request.

2.3 All Maintenance Submittals shall be in English.

2.4 All Maintenance Submittals required by this Project Agreement or by Applicable Law to be signed or sealed by persons with professional designations (including, where applicable, by registered professional engineers or architects) shall, where applicable, be so signed and sealed.

2.5 All Maintenance Submittals shall include copies of all documents to be reviewed and shall clearly identify the purpose of the Maintenance Submittal and Project Co's proposed course of action relating to the Maintenance Submittal and the Project Scope that are the subject of the Maintenance Submittal.

2.6 All Maintenance Submittals shall, where applicable, refer to the relevant provisions of the Expanded Output Specifications and/or any other applicable Schedule to the Project Agreement.

2.7 All Maintenance Submittals shall be clearly identified as a Maintenance Submittal and shall be delivered with appropriate covering documentation, which shall include a list of all attached Maintenance Submittals and for each Maintenance Submittal:

(a) the document number(s) or drawing number(s);

(b) revision numbers (if applicable);

(c) document or drawing title(s);

(d) name of entity that prepared the Maintenance Submittal;

(e) the Maintenance Submittal history showing date and delivery information and/or log number of all previous submissions of that Maintenance Submittal; and

(f) identification of any previous Maintenance Submittal superseded by the current Maintenance Submittal.

3. COMMENTS

3.1 The City Representative shall review and respond to each Maintenance Submittal in accordance with the time periods specified in Section 11.2 of this Schedule 10. The City Representative shall return Maintenance Submittals to Project Co and assign one of the following 3 comments:

(a) "REVIEWED";

(b) "REVIEWED AS NOTED"; or

(c) "REJECTED".

3.2 The comment "REVIEWED" will be assigned to those Maintenance Submittals that, in the opinion of the City Representative, conform to the requirements of this Project Agreement. Project Co shall comply with and implement such Maintenance Submittals.

3.3 The comment "REVIEWED AS NOTED" will be assigned to those Maintenance Submittals that, in the opinion of the City Representative, generally conform to the requirements of this Project Agreement, but in which immaterial deficiencies have been found by the City Representative's review. Project Co shall correct these Maintenance

Submittals and provide a copy of the corrected Maintenance Submittals to the City Representative. Project Co shall comply with and implement such Maintenance Submittals after correction, in accordance with the comments. If at any time it is discovered that Project Co has not corrected the deficiencies on Maintenance Submittals stamped "REVIEWED AS NOTED", then Project Co will be required to modify the Maintenance Submittals and Project Scope as required to ensure that the Project Scope comply with the Expanded Output Specifications and Project Co may be required, at the City Representative's discretion, to resubmit relevant Maintenance Submittals. In such circumstances the City Representative shall act promptly in considering whether such deficiencies have been corrected. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.

3.4 The comment "REJECTED" will be assigned to those Maintenance Submittals that, in the opinion of the City Representative, contain significant deficiencies or do not generally conform with the requirements of this Project Agreement, including this Schedule 10. Project Co shall correct and re-submit these Maintenance Submittals within 10 Business Days after the submittal has been returned to Project Co, or such longer period as Project Co may reasonably require, and (unless the Maintenance Submittal is re-submitted within 5 Business Days) shall give the City Representative not less than 5 Business Days' notice of when the Maintenance Submittals shall be resubmitted. The City Representative will then review such re-submitted Maintenance Submittals and assign a comment to the corrected Maintenance Submittal. The Maintenance Submittals shall be corrected, revised and resubmitted as often as may be required to obtain a comment that permits Project Co to proceed. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.

3.5 Where the City Representative issues the comment "REVIEWED AS NOTED" or "REJECTED", the City Representative shall provide reasons for the comment, referencing the particulars of the Section(s) of this Project Agreement that the Maintenance Submittal fails to satisfy, and, if requested by the Project Co Representative, the City Representative shall meet with the Project Co Representative to discuss the reasons for the comment.

3.6 If, at any time after assigning any comment to a Maintenance Submittal, the City Representative or Project Co discovers any significant deficiencies or any failure to conform to the requirements of this Project Agreement, the City Representative may revise the comment assigned to any Maintenance Submittal. If the Parties agree or it is determined in accordance with Section 14 of this Schedule 10 that the revised comment is correct, Project Co shall make all such corrections to the Maintenance Submittals and the Project Scope. No extension of time will be given or additional compensation paid in respect of any such modification or re-submittal.

3.7 For the purpose of facilitating and expediting the review and correction of Maintenance Submittals, the City Representative and the Project Co Representative shall meet as may be mutually agreed to discuss and review any outstanding Maintenance Submittals and any comments thereon.

3.8 Where a Maintenance Submittal is voluminous, the City Representative at his or her discretion may elect to stamp only the cover page or first sheet of the Maintenance Submittal with the appropriate comment, if any, and return to Project Co the cover page or first page together with individual pages or sheets on which comments are made, together with an explanation of the status of all pages not returned to Project Co. Any pages returned without such an explanation as to their status shall be deemed to be "REVIEWED" by the City.

3.9 In lieu of returning a Maintenance Submittal, the City Representative may by letter notify Project Co of the comment assigned to the Maintenance Submittal and if such comment is "REVIEWED AS NOTED" or "REJECTED" the letter shall contain comments in sufficient detail for Project Co to identify the correction sought.

4. DISPUTES

4.1 If Project Co disputes any act of the City or the City Representative in respect of a Maintenance Submittal under this Part B, Project Co shall promptly notify the City Representative of the details of such Dispute and shall submit the reasons why Project Co believes a different comment should be assigned, together with appropriate supporting documentation. The City Representative shall review the Maintenance Submittal, the reasons and supporting documentation and within 5 Business Days after receipt thereof shall either confirm the original comment or notify Project Co of a revised comment.

4.2 If after such review by the City Representative Project Co disputes the comment on a Maintenance Submittal, subject to Section 19.1 of this Schedule 10 Project Co may refer the matter for determination in accordance with Schedule 27 – Dispute Resolution Procedure.

5. EFFECT OF REVIEW

5.1 Any review and comment by the City or the City Representative of any Maintenance Submittals is for general conformity to the obligations and requirements of this Project Agreement, and any such review and comment shall not relieve Project Co of the risk and responsibility for the Project Scope and for meeting all of its obligations under and requirements of this Project Agreement, and shall not create any new or additional obligations or liabilities for the City. Without limiting the generality of the foregoing any and all errors or omissions in Maintenance Submittals or of any review and comment shall not exclude or limit Project Co's obligations or liabilities under this Project Agreement in respect of matters related to the Maintenance Submittal or exclude or limit the City's rights under this Project Agreement in respect of matters related to the Maintenance Submittal.

6. MAINTENANCE SUBMITTAL EXPLANATION

6.1 At any time, the City Representative may, acting reasonably, require Project Co or any Project Co Parties, including Project Co's consultants and any other relevant personnel, at no additional cost to the City, to explain to the City Representative and the City's

advisors the intent of Project Co's Maintenance Submittals, including as to its satisfaction of the Expanded Output Specifications.

7. REVISIONS

7.1 Project Co shall ensure that Maintenance Submittals keep the same, unique reference number throughout the review process, and that subsequent revisions of the same Maintenance Submittal are identified by a sequential revision number. Correspondence related to such Maintenance Submittal shall reference the reference number and revision number.

7.2 Re-submittals shall clearly show all revisions from the previous Maintenance Submittal. Bound documents, including reports and manuals, shall contain a preface that clearly states how revisions are marked and the previous revision number against which the revisions have been marked. A consistent format for mark-ups of documents shall be used (e.g. deletions struck out and additions underscored). Revised portions of drawings shall be clearly marked (with appropriate means to visually distinguish between the parts of the drawing that are revised and the parts that are not revised) and the revision number and description of the revision shall be included on the drawing.

7.3 All revisions on print media shall be initialled by hand by the individual designer, design checker and, where applicable, by the drafter and the drafting checker and shall identify the persons who initialled the Maintenance Submittal. Electronic versions of the Maintenance Submittal shall identify the persons who initialled the revisions to the printed version of the Maintenance Submittal.

8. AUDIT BY THE CITY REPRESENTATIVE

8.1 Without limiting any other right under this Project Agreement, the City Representative shall have the right to audit all Maintenance Submittals, including comparing all Maintenance Submittals to previous Maintenance Submittals.

8.2 If during an audit or at any other time it is discovered by the City or Project Co that any Maintenance Submittals were not correctly implemented, Project Co shall at its sole cost immediately take all necessary steps to correct and modify the applicable Maintenance Submittals and the Project Scope to which they relate and shall advise the City Representative of all such corrections and modifications.

9. VARIATIONS

9.1 If, having received comments from the City Representative on any Maintenance Submittal, Project Co considers that compliance with those comments would amount to a Variation, Project Co shall, within 10 Business Days of receipt of and before complying with the comments, provide written notice to the City of the same and, if it is agreed by the Parties, or is determined pursuant to Schedule 27 – Dispute Resolution Procedure, that a Variation would arise if the comments were complied with, the City may at its election, either issue a Variation Enquiry and it shall be dealt with in accordance with Schedule 22 – Variation Procedure or amend its comment on the Maintenance Submittal.

Any failure by Project Co to notify the City in accordance with this Section 19.1 that Project Co considers compliance with any comments of the City Representative would amount to a Variation shall constitute an irrevocable acceptance by Project Co that any compliance with the City Representative's comments shall be without cost to the City and without any extension of time.

SCHEDULE 10
REVIEW PROCEDURE

APPENDIX A
MINIMUM DESIGN AND CONSTRUCTION SUBMITTAL REQUIREMENTS

1. TECHNICAL APPRAISAL FORMS

1.1 Submission Requirements

(a) Each Final Design Development Submittal and Construction Document Submittal package submitted by Project Co shall be accompanied by a completed Technical Appraisal Form (TAF).

(b) In any case where submitted Design Data involves any mechanical or electrical and/or Vehicles and Systems functions, or similar specialization, Project Co shall submit to the City Representative in accordance with the Review Procedure a TAF in respect of such data and functions.

(c) In any case where the Works involves the complete or partial demolition of an existing Structure, Project Co shall submit to the City Representative in accordance with the Review Procedure a TAF in respect of such complete or partial demolition.

1.2 TAF Form and Content

Each TAF submitted by Project Co pursuant to Section 1.1(a) - Submission Requirements of this Appendix A shall be in the format shown in Attachment 1 - Sample Contents for a Structural TAF to this Schedule 10 and shall:

(a) for Final Design Development Submittals, include the relevant design criteria, environmental and ground considerations, and interface requirements, together with a listing of the design documentation included in the design package;

(b) be signed by:

(i) the Project Co Representative; and

(ii) the designer(s) and constructor(s), or their respective principal(s), as necessary.

1.3 TAF Variation

Any variation to a TAF which has been subject to the Review Procedure during design, assessment or any Construction Activity shall be submitted in accordance with the Review Procedure as an addendum to the TAF.

2. DESIGN SUBMISSIONS, REVIEW AND REPORTS

2.1 General

All Design Submissions shall include, without limitation, the name, licences, qualifications and/or certifications of Third Parties used by Project Co.

2.2 Format of Design Submission

(a) Project Co shall provide two hard copies and one electronic copy of each Design Development Submittal.

(b) Drawings shall be in a format in accordance with the requirements of the City of Ottawa standards. Project Co shall confirm drawing conventions and standards, including but not limited to those standards used for any computer aided drawing and design (CADD) software, title block and stationing convention, with the City Representative prior to commencing design drawing production.

(c) Drawings for the New Municipal Infrastructure to be constructed by Project Co shall be in accordance with the applicable City's standards.

2.3 Pre final and Final Design Development and Construction Document Submittal Review

Final Submittals from all design disciplines shall be submitted to the City Representative in accordance with Schedule 10 – Review Procedure and shall consist of the relevant TAF(s) together with all final design drawings, supporting Design Data and calculations required in accordance with this Appendix A.

2.4 Objection to Design Data

If the City Representative objects to any Design Data in accordance with the Review Procedure, the City Representative shall so notify Project Co and Project Co shall, unless Project Co disputes the objection by the City Representative to such Design Data in accordance with the Dispute Resolution Procedure, either:

(a) cause to be made such alterations and additions as may be necessary such that the Design Data accords with the Project requirements and all other requirements of this Project Agreement, all in accordance with the Review Procedure; or

(b) subject to the other provisions of this Project Agreement, submit an Innovation Proposal.

2.5 Temporary Works

As a minimum, design submissions for Temporary Works shall include those items intended for public use and/or potentially affecting public safety. Final designs for these

Temporary Works shall be submitted to the City Representative in accordance with the Review Procedure.

Design Data relating to any Temporary Works shall be checked as follows:

(a) any such Design Data prepared by or on behalf of the Construction Contractor requires an independent check by the designer; and

(b) any such Design Data prepared by the designer requires an independent check by a Checking Team which may be from the designer but shall be independent of the Design Team.

In performing the check referred to in paragraphs (a) and (b) above, the designer shall satisfy itself that:

(a) the Design Data meets the Project requirements and otherwise complies with the requirements of the Project Agreement;

(b) the Temporary Works (as a whole and the constituent parts) are satisfactory for the safe and proper discharge of Project Co's relevant obligations; and

(c) the Design Data reflects the requirements of the relevant governmental authorities for all affected roads or areas used by or accessible to the public other than the New System Infrastructure.

Where any Temporary Works may endanger public safety on other road or area used by or accessible to the public other than the New LRT Infrastructure, Project Co shall consult the relevant governmental authority and the Design Data shall reflect the requirements of such authority.

3. FINAL DESIGN DEVELOPMENT SUBMITTALS

3.1 General

Final Design Development Submittals shall be prepared and shall have indexes and sectional dividers. The design folders shall contain pertinent correspondence, shall be arranged by subject matter in chronological order, and shall include design calculations and backup information. Design submissions shall include, without limitation, copies of all approvals, design reports, correspondence and calculations.

3.2 Public Art Integrated Projects

Design Review documents and drawings submissions to be done at the first Pre-final, second Pre-final and Final Design Development submittals.

The Final Design Development Submittals shall, without limitation:

(a) First Pre-final Submittal:

(i) Base construction costs (without application of art) of all built components affected by the art programme at all stations, including: Roof, Windscreens, Landscape, Escalator Chamber, and Tunnel & Platform Walls on both an overall and on a component or square meter or cubic meter cost basis;

(ii) Identification of artist(s);

(iii) Overview of art concept, including sketches, two-dimensional and three-dimensional (if available) representations, materials to be used;

(iv) Proposed locations for art;

(v) Description of implications for other construction disciplines; and

(vi) Anticipated details of integration of artwork into architecture.

(b) Second Pre-final Submittal:

(i) Developed art concept, including sketches, two-dimensional and three-dimensional representations of artwork integrated into architecture at all locations, materials and methods of art production and integration to be used, including:

(A) Integration of artwork with all other construction disciplines;

(B) Full scale, details of integration of artwork into architecture;

(C) Itemized artwork costing net of base construction costs; and

(D) Specific locations for bench and signbox art programmes at all stations.

(c) Final Design Development Submittal:

(i) Final art concept, including sketches, two-dimensional and three-dimensional representations of artwork integrated into architecture at all locations, materials and methods of art production and integration to be used, including:

(A) Complete integration of artwork with all other construction disciplines;

(B) Final, full scale, details of integration of artwork into architecture;

(C) Material sample of art applied to all architectural finishes affected by art project; and

(D) Final artwork costing net of base construction costs.

3.3 **Public Art Non-Integrated Projects**

Design Review documents and drawings submissions to be done at the first Pre-final, second Pre-final and Final Design Development submittals. The Final Design Development Submittals shall, without limitation:

(a) First Pre-final Submittal:

(i) Base supply and installation costs of all built components affected by the art program including: Ceremonial Gate and Lantern at Lebreton Station;

(ii) Anticipated details of installation of artwork;

(iii) Cost Allowance for installation of all artworks;

(iv) Description of implications for other construction disciplines; and

(v) Base construction costs (without application of art) of all built components affected by the art programme at all stations, including: Ceremonial Gate and Lantern, on both an overall and on a component or square meter or cubic meter cost basis.

3.4 **Utilities**

The Final Design Development Submittals shall, without limitation:

(a) contain all signed and sealed utility plan and profile drawings;

(b) include all comments from all utility agencies;

(c) address any comments of the City Representative from the Design Review Meetings, internal design reviews, quality control, and design reports;

(d) show offsets for any utility within 2m of the proposed work;

(e) plant location must be tied to property line, curb or a permanent structure;

(f) show duct configuration;

(g) show all plant / appurtenances; and

(h) include a key plan of the proposed work.

Electronic Utility drawing submittals shall:

(a) Have a total file size less than 3 MB;

(b) All drawings must be in pdf format;

(c) A narrative describing the work to be undertaken, a street location, the project manager, any known utility relocations, and any other information relevant to this aspect of the Project;

(d) One full sized hard copy of plans; and

(e) four half sized copy of plans.

Manual Utility drawing submittals shall:

(a) Include 25 CD's;

(i) All CD's shall contain plans in PDF format;

(ii) All CD's must be individually labelled with the name of the Project (i.e. major streets, Project No., Utility /Consultant, date)

(iii) All CD's must be in a case/ protective packaging; and

(iv) All CD's must include a memo describing the works, a key plan and a table of contents/ index.

(b) One full sized hard copy set of plans;

(c) Four half sized hard copy set of plans;

(d) A key plan;

(e) A narrative describing the work to be undertaken, a street location, the project manager, any known utility relocations and any other relevant information; and

(f) A copy of the table of contents.

3.5 **Drainage and Storm Water**

The Final Design Development Submittals shall, without limitation:

(a) contain all signed and sealed drainage drawings;

(b) include a stormwater management plan and drainage design report;

(c) address any comments of the City Representative from the Design Review Meetings, internal design reviews, quality control, and design reports;

(d) include revisions, stakeholder issues, environmental issues and mitigation plans;

(e) include the Ministry of Environment Environmental Compliance Approval for sewage works; and

(f) include bypass pumping plans.

3.6 **Geotechnical Design**

For the first Pre-final, second Pre-final and Final Design Development Submittals Project Co shall prepare a comprehensive geotechnical design report for the Project that covers existing geotechnical information and known site conditions, any new investigations performed for the Project, geotechnical engineering analysis, geotechnical design assumptions and design parameters (and the basis for these) and geotechnical design recommendations.

(a) At the first Pre-final Design Submittal provide a geotechnical design report, for all Structures, including stations, bridges, tunnels, retaining walls, and overhead catenary Support Structures. The report shall include a narrative, design calculations, and a reduced size (11”x17”) set of drawings showing the general arrangements of all structures. The report shall provide the following:

(i) a summary of any additional work and subsurface investigations that have been completed since the interim submittals, including drafted drill summary logs indicating all relevant drilling, sampling and testing information in accordance with accepted practice;

(ii) an interpreted geologic profile along the entire alignment;

(iii) recommendations for foundation systems for structures, including loads and and/or allowable loading stresses and estimates of total and differential settlements at 2, 5, 10, 20, 40 and 100 years following construction;

(iv) geotechnical design recommendations for retaining structures;

(v) geotechnical design recommendations for guideways and pavements;

(vi) design of high fill embankments, including fill stages and consolidation period between each fill stage;

(vii) design details for time-rate-of-settlement control measures such as prefabricated vertical drains, lightweight fills, and/or preload/surcharge;

(viii) estimates of total and differential settlement of embankments, guideways and roadways at 2, 5, 10, 20, 40 and 100 years following construction;

(ix) plans and procedures for dewatering/unwatering or groundwater drawdown/depressurization where it is necessary for completing and maintaining excavations;

(x) plans and procedures for mitigating the effects of time dependent deformation (swelling) in shale bedrock, where applicable;

(xi) a preliminary monitoring and instrumentation plan;

(xii) requirements for ground improvement measures necessary to meet the static and seismic performance requirements for foundations, cut and fill slopes, embankments and retaining structures;

(xiii) an assessment of the stability of approach embankments, guideway embankments, retaining structures, cut slopes and fill slopes under static and seismic loading conditions and the ability of these to meet the seismic performance requirements;

(xiv) descriptions of aesthetic treatment and maintenance considerations for all retaining walls, slopes, and embankments;

(b) In addition to those items required for the first Pre-final Design Submittal, the second Pre-final Design Submittal shall include:

(i) resolution of all issues identified during reviews of the first Pre-final Design Submittals and where required, revision of the submittals;

(ii) Hydrogeological Assessment as required.

(iii) Construction Impact Assessment Report (CIAR):

(A) Stage 1 – Report presenting deformation analysis methods, supporting calculations, and results. Highlight all key assumptions. Provide plan sheets showing contours of ground movement, including vibration attenuation and groundwater drawdown. List all Structures within the Zone of Influence, anticipated Structure movements and deformations, and anticipated types of damage. Identify which Structures will require mitigation measures in advance of construction to reduce the risk of potential impacts. Identify which Structures will be monitored during construction and mitigated if measured movements or deformations during construction indicate that impacts will be more severe than anticipated. The report may be produced for logical geographic and/or Project divisions rather than producing a single comprehensive report for the entire Project. Submit draft and final versions of the report(s).

(iv) A Geotechnical Instrumentation and Monitoring Plan which shall include, without limitation:

(A) Method Statement and construction drawings showing the location of the Construction Monitoring Zone, instrumentation installation locations and survey coordinates as applicable, structure being monitored, trigger and action values, and instrument reading frequency. Include geotechnical instrumentation types and

installation details, schematics of physical locations of the components required for reading, transmitting, and storing automatically-read geotechnical instrumentation.

(B) Geotechnical instrumentation and systems hardware, including without limitation:

(1) Product data sheets, installation procedures, and manufacturers stated instrumentation accuracies.

(2) Operator manuals, including web-based geotechnical instrumentation reporting systems.

(3) Instructions for baselining instruments.

(C) Implementation Plan on exceeding trigger and action levels;

(D) Well and borehole decommissioning plan;

(E) Geotechnical instrumentation and monitoring:

(1) Geotechnical instrumentation installation records including drill logs identifying subsurface conditions, and performance of acceptance tests to ensure that the electronically read instruments are functioning as intended. This is to be submitted within five (5) working days of completing installation.

(2) Factory calibrated test certificates for instrumentation.

(F) As-built plans of geotechnical instrumentation installation locations which shall be updated as set out in Schedule 33 to this Project Agreement.

(G) Schedule of assets and associated information showing status of impact assessments acceptances of the monitoring and mitigation plans.

(c) In addition to those items required for the first and second Pre-final Design Submittals, the Final Design Development Submittal shall include:

(i) Resolutions of all issues identified during reviews of the first and second Pre-final Design Development Submittals, and where required, revision of the submittals;

(ii) Construction Impact Assessment Report (CIAR):

(A) Stage 2 – Report detailing the impact mitigation and geotechnical instrumentation requirements on a structure-specific basis. Specify groundwater drawdown limits. Include supporting calculations and design drawings. Provide documentation showing that the proposed mitigation is acceptable to the affected third party. Submit draft and final versions of the report(s).

(B) Addenda to the CIAR as needed to reflect revisions to the protection of Structures design based on the collection of new data relevant to the anticipated ground movements and Structure responses.

(iii) Damage Remediation Plan for Existing Adjacent Structures caused by Project Co's Actions, which shall include without limitation:

(A) A detailed plan for remedying damage to Existing Adjacent Structures caused by Project Co's actions; and

(B) A plan for interacting with Existing Adjacent Structures owners.

(iv) all final design drawings;

(v) a final geotechnical design report.

3.7 **Structural Design**

The first Pre-final, second Pre-final and Final Design Development Submittals shall, without limitation:

(a) contain a description of aesthetic treatments for bridges and walls;

(b) contain a description of all identified constraints and restrictions;

(c) include proof of notification to all third party agencies;

(d) include a Bridge Condition Report following OSIM guidelines with recommendations for all existing structures;

(e) include a final design report for structures;

(f) contain a description of maintenance considerations for all structures throughout the Maintenance Term;

(g) include Construction Specifications;

(h) include standards and non-standard drawings;

(i) include Quality Control documentation for record; and

(j) contain all signed and sealed final design drawings and corresponding calculations.

3.8 **Guideway**

The first Pre-final, second Pre-final and Final Design Development Submittals shall include at a minimum the following:

(a) Confirmation that all applicable standards used, including names, date and reference have been satisfied

(b) confirmation that PA and Output Specifications requirements have been incorporated;

(c) narrative, drawings and calculations supporting the basis for design;

(d) details of Special Trackwork;

(e) all signed and sealed Guideway drawings; and

(f) reduced size (11" x 17") drawings showing the Guideway alignment in plan and profile.

3.9 **Tunnel**

The first Pre-final, second Pre-final and Final Design Development Submittal shall demonstrate on a progressive basis that all equipment, materials, means and methods, and sequences have been selected and designed in accordance with the Project design criteria and that completed Tunnel Works shall satisfy all design and construction performance criteria.

(a) The first Pre-final Submittal shall comprise a General Tunnel Design and Construction Report containing narrative, drawings and calculations supporting the basis for design for temporary and permanent works. Separate reports may be submitted for Tunnel reaches based on locations and construction methods. Amplify details for transitions from one design type to another. Integrate design of initial support or temporary excavation support with that of permanent linings. The report shall include, at a minimum, the following;

(i) Tunnel Excavation Plan, which shall contain at a minimum:

(A) Methods, systems, staging, and plant arrangement and sizing; preparation and layouts for launch and retrieval, including equipment hold points; excavation and sequencing of initial support or excavation support including detailed cycle times. Include commensurate detail for other major associated activities;

(B) Muck handling plan, including narrative and working drawings for in-tunnel and portal, and haul routes; and

(C) Preliminary temporary and initial support design including working drawings and sequencing.

(ii) Permanent Lining:

(A) Precast concrete segmental lining details, including, calculations demonstrating compliance with specified requirements for segments and segment ring systems;

(B) Working drawings and calculations for cast-in-place and shotcrete permanent linings; and

(C) Preliminary details for waterproofing design including working drawings and typical layouts for each structure type.

(iii) Cut and Cover Structures:

(A) Excavation support and temporary road deck plans and calculations;

(B) Temporary utility support plans and calculations for utilities no to be relocated;

(C) Temporary utility protection;

(D) Utility relocations.

(b) The second Pre-final Design Development Submittal shall include a revised General Tunnel Design and Construction Report. The report will in addition to the items addressed in the first Pre-final Design Development Submittal include:

(i) Meeting and coordination plan, including:

(A) Tabulation of required meetings during design and construction and coordination efforts;

(B) Plan for interaction with CN/VIA Rail

(ii) Initial and Temporary Support Plan:

(A) Design calculations and analysis for initial and temporary support;

(B) Working drawings and sequencing.

(iii) Permanent Lining Plan:

(A) Design calculation and analysis for all permanent linings;

(B) Narrative report supplemented with Working Drawings showing methodology for sequencing, scheduling, staging, and performing construction activities for permanent linings. Include details of equipment and supporting plant, cycle times, geometries and dimensions;

(C) Pre-Cast Concrete Segmental Lining:

(1) Product data for gaskets, bolts and/or dowels, lifting sockets, packer if used, and reinforcement;

(2) Joint details showing interaction and geometry of packing as related to gasket performance.

(iv) Waterproofing Plan:

(A) Means and methods for installation;

(B) Product data for key components of the waterproofing system, including material test reports and certifications;

(C) Recommended repair procedures by manufacturer;

(D) Working drawings for Waterproofing, including plans, sections and details; which shall contain, without limitations:

(1) Sequence of waterproofing installation relative to construction sequence;

(2) Typical layouts for each type of Structure;

(3) Waterproofing terminations for each structure and between different waterproofing systems;

(4) Waterproofing at penetrations including electrical ducts, mechanical pipes and sleeves;

(5) Waterproofing at corners;

(6) Waterproofing connection to drainage systems; and

(7) Attachment assembly including rebar support details;

(v) Orientation and training plan for excavation and support equipment, and other major plants.

(vi) Tunnel Quality Plan, including:

(A) Quality control plans for key Construction Activities;

(B) Quality control measures and requirements for tunnel performance and other data acquisition and monitoring, remedial plans for quality defects and assuring that deficiencies do not reoccur;

(C) Specific details of data acquisition and monitoring plans including locations, frequencies and Trigger and Action Levels; and remedial plans consistent with means and methods for quality defects and assuring that deficiencies do not reoccur;

(D) Material, testing, manufacturer certifications, and construction specifications.

(vii) Certifications for materials and equipment demonstrating compliance with specified requirements.

(viii) Shop drawings for items fabricated specifically for Construction of the Works, including a schedule of Tunnel Shop Drawings to be submitted.

(ix) Mix Designs including those for concrete, shotcrete and grout. Submittal to include trial and pre-production testing results for each proposed Mix design.

(x) Test Reports, Inspection Reports, and Sampling Plans:

(A) Requirements for test and inspection reports and sampling plans required to verify design basis;

(B) Requirements for sampling plans for generated spoils and other materials; and factory tests, site tests, grouting and other required documented analyses;

(C) Requirements for inspection reports, such as weld testing.

(xi) Contingency plans for lost ground, misalignment, inundation events, power loss, loss of communications, fire or injury and any other relevant event.

(A) Report addressing the approach for accommodating the proposed 3000mm CSO at Kent Street. The report shall include a narrative, working drawings, and calculations that addresses the following:

(1) The anticipated impacts of OLRT Tunnel construction on the future CSO tunnel construction.

(2) Analysis demonstrating that the performance and maintenance of the proposed CSO tunnel will not be impacted by the OLRT Tunnel.

(3) Details required for mitigation work or modifications to the OLRT Tunnel design to accommodate the proposed CSO tunnel.

(4) Anticipated loads imposed by the OLRT Tunnel on the proposed CSO tunnel.

(B) If Project Co elects to design the Tunnel Structure below the Vertical Alignment Envelope limit of 50.0 meters at this location, a technical and cost analysis report will be required. The report shall include a narrative and working drawings and design calculations.

(1) The report shall demonstrate that the lower design elevation is technically feasible. The analysis shall be based on numerical analysis methods.

(2) The report shall provide the anticipated impacts of OLRT Tunnel construction on the future CSO tunnel construction.

(3) The report shall demonstrate that the performance and maintenance of the proposed CSO tunnel will not be impacted by the OLRT Tunnel.

(4) The report shall include details required for mitigation work or modifications to the OLRT Tunnel design to accommodate the proposed CSO tunnel.

(5) The report shall provide anticipated loads imposed by the OLRT Tunnel on the proposed CSO tunnel.

(6) The report shall address all cost and/or economic considerations.

(xii) Tunnel ventilation design:

(A) Overall approach to design and construction of the emergency ventilation systems;

(B) System operation and control, in normal and emergency operation modes;

(C) Site drawings indicating the location of the smoke ventilation shafts and their relationship to Station entrances, Station air intakes and openings of adjacent buildings, and other objects;

(D) Results of smoke dispersion/recirculation analysis;

(E) Details of the system, including but not limited to: SCADA system, the axial flow and jet fans, and ventilation dampers;

(F) Fire Life Safety protocol.

(xiii) Tunnel Commissioning Report.

(c) The Final Design Submittal shall include a revised General Tunnel Design and Construction Report. The report will in addition to the items addressed in the Second Pre-Final Submittal include:

(i) Tunnel Boring Plan:

(A) Tunnel Boring Machine (TBM):

(1) Detailed description for TBM and trailing gear, including drawings and plans for equipment layout, calculations, and back-up information;

(2) Detailed narrative supported with sketches demonstrating the ability of the TBM and trailing gear to perform in the anticipated ground conditions;

(3) Provide details of gas detection and guidance systems;

(4) Test reports for factory tests and on-site tests demonstrating compliance with performance requirements;

(5) Site layout and staging plans during mobilization and excavation.

(B) Plan for start-up/launching of the TBM.

(C) Tail void grouting:

(1) Working Drawings and method statements.

(2) Certifications of compliance for materials and calibration of gauges and meters.

(3) Quality control plans for assuring grout quality and placement performance.

(D) Precast concrete segmental lining:

(1) Working Drawings and method statements for key components and segment production, including back-up calculations when applicable;

(2) Shop Drawings including geometry of details of segments, segment sizes, orientation, tapers, reinforcement, gasket groove geometry, joint details, packing, inserts, joint connections, and segment identification;

(3) Shop Drawings for segment molds, fully dimensioned, including fabrication tolerances;

(4) Certifications of compliance for materials, and that segments meet design criteria;

(5) Quality control plans for segment casting, including maintaining tolerances, testing and sampling for strengths for stripping and demolding, controlling shrinkage and temperature cracks, evenly distributing fibers or other reinforcement, methods for curing, record keeping, repair procedures and records, ensuring that segment production does not impact tunnel excavation rates, segment protection during handling and transport, and ring mockups for verifying dimensional tolerances;

(6) Plans for storage of tunnel liners prior to placement including, heating of tunnel liners, as determined necessary by Project Co.

(ii) Mined Structures Plan:

(A) Means and methods supplemented by Working Drawings for:

(1) Excavation of soil and rock;

(2) Installation of initial support including supplemental measures, and measures for profile control and groundwater control; and

(3) Underpinning of or installation of protection systems for Existing Adjacent Structures;

(B) Work plan for cross passage excavation, including temporary bracing of segmental lining during break-out;

(C) Product data, mix designs, and quality control test reports for materials used.

(iii) Cut and Cover Structures Plan:

(A) Working Drawings and staging plans, including calculations as required for:

(1) Temporary track modification and temporary bridges for rail operations;

(2) Sequencing of work while maintaining required building access, traffic with temporary traffic moves and detours, and live rail operations. Provide schedules of traffic and rail work periods as appropriate and identify work operations which must be accomplished within including mobilization and demobilization efforts and allowances for material cure or set times and protection of the work outside work periods. Coordinate with other required submittals, such as traffic management and circulation plans;

(3) Lift drawings for concrete pours showing details for each pour including control joints, construction joints, keyways, waterstops, waterproofing, required embedments, and falsework;

(4) Details of backfill above cut-and-cover structures, including provisions for utilities and other subsurface infrastructure, and details of track support.

(B) Means and methods for:

(1) Excavation of soil and rock, construction of excavation support systems and road deck structure;

(2) Installing temporary support for live rail service;

(3) Installation of temporary utility supports;

(4) Control of ground water. Include working drawings and calculations demonstrating compliance with specified requirements;

(5) Concrete construction, including type and arrangement of formwork;

(6) Structure underpinning and special support plans and calculations coordinated with requirements of Protection of Existing Adjacent Structures.

3.10 **Vehicles and Systems**

The first Pre-final, second Pre-final and Final Design Development submittals shall demonstrate, on a progressive basis, that all vehicles, equipment and systems have been selected, designed, procured, manufactured, installed, inspected and tested to function in accordance with the requirements of the OLRT project. Each submittal shall include, but not be limited to consideration of the following:

(a) Integration of all Systems elements including inter relationship between:

(i) Communications;

(ii) Train Control;

(iii) Vehicles (revenue and non revenue);

(iv) Traction power and distribution;

(v) Electrical;

(vi) Mechanical;

(vii) Corrosion Control/Stray Current/EMI/Noise and Vibration;

(viii) Ventilation;

(ix) SCADA Systems (including BAS/BMS Systems);

(x) Fare Collection;

(xi) BCC/YCC/TSCC;

(xii) Civil/Guideway/Tunnel Infrastructure;

(xiii) Any other relevant systems.

The design submittals shall demonstrate that the design and implementation of all systems, subsystems and facilities are compatible between disciplines including, but not limited to, the following:

(a) Implementation of a work breakdown structure encompassing all Vehicles and systems components and sub components.

(b) System interface matrices among and across all disciplines.

(c) Interface control catalogues and other interface control documents that are necessary to demonstrate a comprehensive approach has been utilized for system integration, detailing electrical and software performance.

(d) System safety analysis and system safety program plan.

The first Pre-final, second Pre-final and Final Design Development submittals shall demonstrate, on a progressive basis, that all vehicles, equipment and systems have been selected, designed, procured, manufactured, installed, inspected and tested to function in accordance with the requirements of the Project. Each submittal shall include, but not be limited to consideration of the following:

(a) All applicable standards used, including names, date and reference.

(b) Concessions and approvals.

(c) Identified safety risks and close-out of risks.

(d) Identified threats and vulnerabilities.

(e) Supporting construction drawings and diagrams, including high level general arrangements and block diagrams of interconnections.

(f) Configuration strategy for all systems and subsystems used.

(g) Interface control matrix identifying interfaces between systems, equipment and components, responsibility for managing the interface and interface control document.

(h) Confirmation that PA and Output Specifications requirements have been incorporated.

(i) Simulation and supporting calculations to support any design assumptions.

(j) Identification of systems and subsystems.

(k) Description of intended functionality.

(l) Identification of human factors required.

(m) Statutory obligations, legal and jurisdictional requirements.

(n) Compliance to environmental constraints.

(o) Intended test strategy and pass fail criteria for acceptance.

(p) Operating and maintenance requirements to support the systems over the Maintenance Term.

(q) Provision of data to support public information and marketing.

(r) The Canadian Content Certificate updated with effect as of the date of submission, together with any necessary or desirable back-up information

reasonably necessary to support the contents thereof, which shall demonstrate to the satisfaction of the City that the Vehicles are expected to meet the Canadian Content Requirements as of the date of the delivery of Vehicles to the City, including:

(i) evidence of equipment type and place of manufacture

(ii) detailed parts list and manufacturer of the parts

(iii) contact details for each manufacturer proposed

(iv) sub-supplier certificates of conformity

(v) baselined breakdown of Canadian Content Requirements calculated in accordance with the Canadian Content Policy

(vi) details of any deviations from the prior Canadian Content Certificate and the resulting adjustment to Canadian content

The Final Design Development Submittals shall contain without limitation, the following:

(a) Traction power submittals shall include, without limitation:

(i) First Pre-final Submission:

(A) a Load Flow Study;

(B) TPSS Site Locations and Site Plans;

(C) electrification single line diagram;

(D) TPSS Equipment interior Arrangement Drawing;

(E) results of preliminary TPSS site resistivity surveys;

(F) protective relaying and transfer trip concept of operation;

(G) auxiliary and emergency trip systems concept of operations and riser diagrams;

(H) preliminary TPSS SCADA points list; and

(I) TPSS Civil Structural drawings.

(ii) Second Pre-final Submission:

(A) without limitation, all items included in the First Pre-final Submission;

(B) AC & DC circuit breaker control schematic diagrams;

(C) fire and smoke detection, security and intrusion detection concept of operations and riser diagrams;

(D) DC house power (battery charger, battery bank, load study);

(E) AC house power (auxiliary transformer, panelboard, load study);

(F) ground grid design calculations and designs for each traction power substation;

(G) TPSS site plans;

(H) TPSS elevations and details (indicating architectural treatment);

(I) communications interface drawings and details;

(J) AC/DC and rectifier plans, elevations and details;

(K) guideway plans, elevations and details;

(L) cable and conduit schedules;

(M) protective relaying schematics;

(N) traction feeder schedule;

(O) TPSS civil and structural drawings;

(P) yard and shop DC distribution plan and details;

(Q) HVAC calculations; and

(R) prefabricated substation structural calculations.

(iii) Final Design Development Submittal:

(A) without limitation, all items included in the first Pre-final Submission and second Pre-final Submission;

(B) final Load Flow Study;

(C) final TPSS site locations and site plans;

(D) final electrification single line drawings;

(E) final TPSS equipment arrangement drawings;

(F) final TPSS civil and structural drawings;

(G) final panelboard schedules (AC and DC);

(H) final relaying and coordination study;

(I) final system start-up and commissioning plan; and

(J) Description of system including normal and abnormal operational modes.

(b) Train Control Submittals shall include, without limitation:

(i) System Safety Program Plan;

(ii) CBTC Network Design including network redundancy design and latency;

(iii) Location of Access Points;

(iv) Environmental Qualifications of Access Points;

(v) Transponder locations;

(vi) Loading of Zone Controllers and expected cycle times;

(vii) Redundancy and failover schemes for all equipment;

(viii) Power redundancy at every level;

(ix) Yard Proposal;

(x) Broken Rail Protection method;

(xi) Interlocking Route and Aspect Charts;

(xii) Switch heater design and layout;

(xiii) Safety analysis of gas storage and/or distribution if gas switch heaters are proposed;

(xiv) TSCC HMI layout;

(xv) Local Control Panel Layout and hardware;

(xvi) Cable and fibre routing;

(xvii) CIH layout, power and HVAC;

(xviii) Portable Emergency Generators and UPS;

(xix) Vehicle CBTC reaction times and safe braking model;

(xx) Vehicle CBTC System Redundancy and failover;

(xxi) Vehicle CBTC Antenna Placement;

(xxii) CBTC frequencies and compatibility with the Public Safety Service Radio and the high speed Data Radio;

(xxiii) CBTC Vehicle Location System design, durability, accuracy and operational description;

(xxiv) Method for dealing with spins and slides;

(xxv) Vehicle to Vehicle Network used by CBTC (WTB or separate CBTC network);

(xxvi) Operator's CBTC Panel Layout;

(xxvii) Automatic Station Stopping Algorithm;

(xxviii) Approach to Degraded Modes of Operation;

(xxix) Zone Controller and Interlocking Controller interface;

(xxx) ATS and Interlocking Controller interface;

(xxxi) Interlocking test procedures;

(xxxii) CBTC system test procedures; and

(xxxiii) Environmental and EMI/EMC test reports.

(c) Overhead Catenary Systems Submittals shall include, without limitation:

(i) OCS Overlap Chart and Tension Lengths;

(ii) OCS Sectionalizing, Manual or Remote Control Type;

(iii) Conductor Particulars, Typical Tension and Sags;

(iv) Typical Loading Tables; Wind, Ice and Radial Loads and Calculations;

(v) Hanger Lengths: Standard Spans, Overlap and Termination Spans;

(vi) Along Track Movement, Stagger Change and Effect, Auto-Tension Catenary;

(vii) Vehicle Pantograph Clearance;

(viii) OCS Profiles and Calculations for Clearances underneath Overhead Bridges and Structures;

(ix) Typical OCS Arrangements, Overlap, Crossover, etc.;

(x) Typical OCS Detail Drawings;

(xi) Feeder and Jumper Details;

(xii) Typical OCS Pull-Off and Push-Off Cantilevers with Calculations;

(xiii) Headspan Assemblies with Calculations;

(xiv) Downguy and Headguy Assemblies;

(xv) Midpoint Anchor Assemblies;

(xvi) Balance Weight Assembly with Calculations;

(xvii) Fixed Termination Assemblies;

(xviii) OCS Mounting Details in Tunnel and Calculations;

(xix) Section Insulator Hardware and Type;

(xx) Wire Splice and Contact Bridge Assemblies;

(xxi) Catenary Hangers and Suspension Assemblies;

(xxii) Contact Wire and Messenger Knuckles;

(xxiii) Lightning Arrestors and Connection Details;

(xxiv) Switch Heater Connection Details;

(xxv) OCS Feeder Assemblies;

(xxvi) By-Pass Disconnect Switch Assembly and Type;

(xxvii) OCS Foundation and Pole Design Calculations;

(xxviii) OCS Layout Plans and Schedules;

(xxix) OCS Yard Wiring Plans and Schedules;

(xxx) OCS Door Bridge Details and Type;

(xxxi) Rail Isolation Joints Plan in the Storage and Maintenance Buildings;

(xxxii) Design Reports;

(xxxiii) OCS Specifications;

(xxxiv) OCS Acceptance Measurements Procedures;

(xxxv) Electrical Equipment and Material Testing Procedures;

(xxxvi) OCS Integration Testing Procedures; and

(xxxvii) Standard Operating Procedures.

(d) Vehicle Design Submittals shall contain, without limitation:

(i) A Work breakdown structure (WBS) for vehicle and its associated subassemblies;

(ii) Passenger capacity calculations/approach;

(iii) Passenger flow modeling at 12,000 PPHPD and 24,000 PPHPD;

(iv) Applicability of design for OLRT passenger load (quick boarding/alighting/short dwell time);

(v) Applicability of design for OLRT climatic conditions (such as heating capacity, sleet scraper, snow plow, threshold heaters, temperature rating of components, derating for humidity, etc.) including worst case failure modes;

(vi) Overall vehicle dimensions and vehicle dynamic envelope;

(vii) Basic design parameters – acceleration, deceleration, top speed;

(viii) Experience with multiple car consists;

(ix) RAMS data for proposed vehicle;

(x) Carbody details;

(xi) Propulsion details;

(xii) Truck details;

(xiii) Communication system details;

(xiv) Brake system details;

(xv) Proportioning valve requirements (oil cleanliness, maintenance tasks, failure rate);

(xvi) Passenger door system details;

(xvii) Auxiliary/LVPS/battery system details;

(xviii) HVAC and heating system details;

(xix) HVAC heating and cooling calculations;

(xx) Friction brake and propulsion thermal calculations;

(xxi) Pantograph design and interface with catenary;

(xxii) Wheel profile and interface with rail;

(xxiii) Vehicle dynamics modeling results;

(xxiv) Vehicle electrical modeling results;

(xxv) Cab layout/ergonomics;

(xxvi) Passenger seating/stanchions/level of comfort;

(xxvii) On board CBTC system;

(xxviii) Emergency lighting and signage;

(xxix) FMECA and hazard analyses;

(xxx) Waiver requests;

(xxxi) Compression test results;

(xxxii) FEA results & stress analyses;

(xxxiii) Crashworthiness analyses;

(xxxiv) Climate room test results;

(xxxv) Noise test results;

(xxxvi) Flange lubrication/wayside squeal suppression;

(xxxvii) Load leveling functional description;

(xxxviii) Diagnostics and monitoring functional description;

(xxxix) Operator's display functional description;

(xl) Bench test units and portable test unit details;

(xli) Spin/Slide control functional description;

(xlii) Cab mock up;

(xliii) Passenger compartment mock up;

(xliv) Vehicle electrical schematics;

(xlv) Ride Quality Plan;

(xlvi) Ride Quality Test Report;

(xlvii) Train to Wayside Emissions Safety Analysis;

(xlviii) Fatigue Allowable Stresses;

(xlix) FEA Models and Load Cases;

(l) FEA Results;

(li) Carbody Clearances;

(lii) Hostler Panel Layout drawings;

(liii) Battery load Calculations;

(liv) Battery Load Shed Schedule; and

(lv) Tow Mode Performance Simulations.

(e) Communications Systems Submittals shall include, without limitation:

(i) Network equipment interface details:

(A) Bandwidth Calculations including optical power budgets and losses(if required) for LAN elements;

(B) Bandwidth Calculations, including optical power budgets and losses (if required) for WAN elements;

(C) Network diagram; and

(D) Network security analysis.

(ii) SCADA system diagram and input/output list:

(A) Traction Power SCADA;

(B) Train Control SCADA.

(iii) Building Management System (BMS):

(A) Building Automation System (BAS);

(B) MSF BMS.

(iv) BMS system diagram and input/output list;

(v) Typical station field equipment layouts to include but not limited to cable and conduit schedules and Communication room equipment layouts:

(A) CTS;

(B) PA;

(C) PIDS;

(D) CCTV;

(E) IAC;

(F) Telephone, E Phone and Intercom Systems;

(G) Train-to-Wayside Wireless System; and

(H) Radio equipment locations and spatial envelopes.

(vi) TSCC room layouts and modifications:

(A) Overview display layout;

(B) Wiring diagrams for new TSCC equipment;

(C) Data room equipment layouts and modifications.

(vii) MSF Communication room equipment layouts:

(A) BCC equipment layouts, including desks and displays;

(B) YCC equipment layouts, including desks and displays;

(C) Wiring diagrams for interconnection of MSF communication elements.

(viii) GUI interface layouts for TSCC, BCC, and YCC consoles;

(ix) CCTV camera coverage layouts:

(A) Interface details for Transit Law systems.

(x) Fiber Optic backbone routing and termination details;

(xi) Duct bank configuration, maintenance holes, access points, termination boxes and duct capacity allocations;

(xii) Fare collection interface provisions.

3.11 **Stations**

Submissions to include all proposed manufacture information on proposed materials and products. The first Pre-final, second Pre-final and Final Design Development Submittals shall, without limitation contain the following:

(a) Landscaping:

(i) A description of the proposed approach to meeting the hard and soft landscaping requirements of the Project Agreement including approach to salvaging and reuse of any existing plant material;

(ii) Landscape drawings:

(A) landscape plans in accordance with the City of Ottawa's Guide to Preparing Plans and Studies available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html;

(B) conceptual landscape plan drawings showing significant utility conflicts and relocation proposals;

(C) details of any relevant drainage;

(D) detail planting plan;

(E) planting details;

(F) hard Landscape plans and details;

(G) landscape accessories details, e.g. site furniture, bicycle; and

(H) lighting details.

(b) Station architectural design:

Project Co shall provide sufficient information to demonstrate the ability of the proposed station and station services to meet the functional requirements and performance standards as set out in this Project Agreement and the objectives set out below:

(i) how well the stations serves the Transit users, particularly in terms of ease of access, comfort, usability and safety and security;

(ii) how well the stations serve OC Transpo and Project Co staff in carrying out their roles and responsibilities in terms of: customer service; maintenance, and services;

(iii) how well the Stations will complement the profile of the community and the City of Ottawa as the capital and a vital part of Ottawa, Ontario, and Canada's history and culture;

(iv) how well the stations meet the standards and functional requirements specified herein;

(v) how well the proposed design response (as outlined in the written description) fulfills the objectives set out above as well as the standards for the OLRT as described in this Project Agreement;

(vi) Project Co must address the Station design at an appropriate level of detail, as set out in or otherwise referenced in Article 15.2 of this Project Agreement, and is to include the following:

(A) Provide written statement describing Project Co's architectural design intent with respect to the following subjects. The statement should be organized as follows:

(1) Design response to the general design principles must be addressed in detail, and in terms of the design concept proposed for the NCC Stations.

(c) General architectural description:

General architectural design description, including reference to the following subjects:

(i) the functional layout of all the spaces as per the Functional Program. All horizontal and vertical relationships and adjacencies shall be indicated;

(ii) the arrival and movement within the facility of the public, staff and all transit vehicles;

(iii) the exterior and interior appearance of the proposed premises;

(iv) special enhancements or features;

(v) servicing;

(vi) building construction;

(vii) relationship / separations;

(viii) design response to the existing site and existing buildings;

(ix) description of the overall platform design, functional and technical requirements;

(x) description of design response to the interface between the station, platform edge doors (or other platform edge track protection systems) and vehicle operations;

(xi) response to future adaptability requirements;

(xii) design description of building image, including selection and use of materials in the building elevations;

(xiii) response to the requirements for natural daylight where possible, throughout the building;

(xiv) design response to stated objectives for the design of the public spaces of the station;

(xv) description of Art integration with detailed drawings; and

(xvi) description of Signage and Wayfinding with detail drawings.

(d) Materials and finishes:

(i) provide a detailed description of the proposed use of materials and finishes and how these selections serve to enhance the station design and contribute to the durability of the building, life cycle considerations, etc.; and

(ii) provide Room Finish Schedules identifying all spaces with proposed materials for floor, wall and ceiling finishes, ceiling height(s),etc.

(e) Life cycle analysis:

Provide a report describing life cycle approach to all building components, systems and major pieces of equipment including but not limited to:

(i) building envelope, exterior finishes & components;

(ii) interior finishes; and

(iii) mechanical and electrical equipment.

(f) Code analysis:

Provide a Code Analysis as per Article 6 – Code Analysis and Life Safety for each submission.

(g) Accessibility analysis:

Provide a description of how the proposed design complies with universal accessibility requirements including the Accessibility for Ontarians with Disabilities Act and associated regulations and standards, the Ontario Building Code, CSA Publication B651-04 "**Accessible Design for the Built Environment**", and the City of Ottawa Accessibility Design Guidelines.

(h) Acoustical design:

Provide a report from an acoustical design specialist describing in detail how the acoustical requirements of this Project Agreement are proposed to be achieved and identifying measures proposed to control the sound environment in the station.

(i) Net and gross floor area summary:

Provide a final floor area summary chart consistent with the chart format submitted during the Design Consultation Process indicating:

(i) final summary listing individual space requirements identified in the Agreement articles and Project Co-proposed measured areas by element and individual space. Analysis shall also identify final building gross areas on a floor by floor basis and total building gross area.

(j) Architectural drawings including, but not limited to:

(i) Context Plan scale: 1:1000 or larger;

(ii) Site plan scale – 1:400 or larger in accordance with the City of Ottawa's Guide to Preparing Plans and Studies available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html;

(iii) floor plans – scale 1:100, showing all rooms/areas numbered. List additional rooms not previously identified. Include:

(A) all existing and new walls and partitions in actual thickness;

(B) doors, windows, sidelights and interior glazing;

(C) structural grid lines and references cross-referenced on all drawings;

(D) all millwork/casework, built-in and modular;

(E) all furniture and equipment;

(F) all room equipment and systems and accessories;

(G) integration of structural, mechanical, electrical and information & communications technology systems, in terms of columns, service shafts, risers, etc., in sufficient detail to demonstrate that functional and net area requirements are compliant; and

(H) connection(s) and layout for the future building elements;

(iv) Reflected Ceiling Plans – scale 1:100 of all levels indicating ceiling materials, configuration of lighting, mechanical diffusers and grilles;

(v) Detailed drawings:

(A) 1:100 and 1:50 scale floor plans including roof plan(s), interior elevations and reflected ceiling plans indicating development of design intent and showing resolution of material and finish use, special floor treatments, furnishings/millwork, special features such as, ornamental, iconographic and/or commemorative features, stairs, escalator, and elevators, lighting and all other security, electrical and mechanical items for the platform. Demonstrate details including allowance for future interface and installation of platform edge doors in underground stations;

(vi) Plan detailing how Stations platform width has been maximized;

(vii) Plan detailing how the Stations platform is sloped to match the vertical profile of the LRT Tracks alongside the station;

(viii) Exterior Building Elevations – scale 1:200:

(A) all building elevations including all hidden or partial elevations with a legend describing the extent of all glazing and cladding materials;

(ix) Building Sections – scale 1:100 through entire building indicating relative location of grade. Sections. Building sections to be taken through the main platform space, and any other special conditions;

(x) Exterior Wall Assembly Details – scale 1:50, representative wall sections and plan details through principal facade elements on the platform elevations. Details will indicate proposed components of exterior wall assemblies and will be referenced to other drawings;

(xi) Provide material and finish sample boards of:

(A) All exterior finish materials; and

(B) All interior finishes of platform and service rooms.

(k) Engineering design:

Provide a written statement describing the engineering design intent for the construction of the facility with respect to the following subjects. The statement shall include:

(i) Structural:

Provide a written description of the proposed structural system. Demonstrate how each component will comply with the Structural Standards specified in this Project Agreement. Include design criteria and references to the applicable standards.

Provide a structural design brief, including outline specifications and drawings or sketches as appropriate. Describe the main structural elements in a preliminary manner, including but not limited to the following:

(A) Foundations, floor, roof and wall framing systems, including materials and spans;

(B) lateral load resisting system;

(C) design dead and live loads for all areas in which records may be found;

(D) design or specification measures to meet serviceability criteria;

(E) special or unique structural framing or features; and

(F) column spacing and layout.

For retrofit, provide a written description of the investigation completed to assess the suitability of the existing structure. Verify that the existing structures are capable of supporting the required floor loads and meeting current OBC requirements for earthquake resistance, and/or describe the strengthening measures proposed in order to make the structure comply with these requirements.

Provide a written description of the lateral load resisting system, its capability to resist live loads due to earthquakes, and an estimate of the equivalent seismic importance.

(ii) Structural drawings:

Structural floor plans – scale 1:100, of every level and roof showing connections to the existing substructure, structural systems, framing and lateral force resisting systems and typical sections and details. (scale 1:50).

(iii) Mechanical:

Provide a written description and design summary for the mechanical systems demonstrating how they will meet the required performance standards set out in this Project Agreement.

Provide drawings and diagrams that fully illustrate how the mechanical systems, including HVAC, fire protection, plumbing and drainage will meet the required performance standards as set out in this Project Agreement. Drawings shall include:

(A) heating system flow diagram including primary and secondary systems;

(B) humidification system schematic/flow diagram;

(C) air handling unit drawings illustrating all as follows:

(1) specialized smoke ventilation unit;

(2) air handling unit for air conditioning purposes;

(D) fire protection system schematics to illustrate sprinklers as intended for the applications, and a system descriptive brief;

(E) BAS description and description of sensor layout;

(F) General design approach to mechanical systems including HVAC, plumbing and drainage systems, equipment selection, etc. with specific references to the Agreement articles requirements;

(G) Product cuts for primary equipment and fixtures including all public space diffusers, grilles and sprinklers, and plumbing fixtures, etc.; and

(H) Main mechanical equipment schedules including, air handlers, pumps, domestic hot water systems, etc.

(iv) Mechanical drawings:

(A) Mechanical floor plans - scale 1:100, of every level including mechanical room(s) and roof(s) showing location and basic layout of primary mechanical equipment, routing of main feeds and

associated shafts and risers, and preliminary sizing of the primary mechanical equipment;

(B) System schematics for all major systems including, but not limited to:

(1) Incoming water and fire protection systems;

(2) Plumbing distribution systems including domestic cold, domestic hot and recirculation systems; and

(3) Air handling and air distribution systems; Controls Storm drainage systems; and

(C) Zoning diagrams showing zoning for standpipe systems, sprinkler systems and air distribution systems.

(v) Electrical:

Provide a written description and design summary for the electrical systems demonstrating how they will meet the required performance standards set out in this Project Agreement.

Provide drawings and diagrams that fully illustrate how the electrical systems, including power, lighting, life safety and emergency services will meet the required performance standards as set out in the agreement articles. Drawings and documentation shall include:

(A) layout drawings (scale 1:100);

(B) single line diagrams;

(C) schematic diagrams;

(D) Panel and motor control schedules;

(E) Operation descriptions;

(F) General design approach to electrical systems including redundancy and emergency power, equipment selection, etc. with specific references to the agreement articles requirements;

(G) Product cuts for primary equipment and fixtures; and

(H) General design approach to provision of CCTV, PA, etc.

(vi) Electrical drawings:

(A) Floor plans - scale 1:100, of every level showing location and basic layout of electrical and communications rooms, routing of main feeds and associated risers and routing for equipment removal;

(B) Single line diagram, preliminary sizing of equipment and feeders to provide a clear understanding of the electrical distribution, emergency and critical power systems along with the expected station electrical demand load calculations;

(C) Life safety system riser diagram including sequence of operation;

(D) Lightning protection and grounding systems if required;

(E) Site electrical plans; and

(F) Exterior photometric plans.

(vii) Civil:

(A) Provide a Servicing Study for each station in accordance with the City of Ottawa's "**Servicing Study Guidelines for Development Applications**" available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/servicing_study_en.html;

(B) Provide an Erosion and Sediment Control Plan for each station in accordance with the City of Ottawa's Guide to Preparing Plans and Studies available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html;

(C) Provide a comprehensive Pavement Design Report for the Roadways, Bus Terminals and Laybys in accordance with the requirements of Schedule 15.2 Part1 Article 5; and

(D) Street lighting Design together with the lighting calculation summary shall be submitted in accordance with requirements of Schedule 15.2 Part 1 Article 5.

(viii) Civil Drawings:

(A) Grade control and drainage plans in accordance with the City of Ottawa's "**Servicing and Grading Plan Requirements**" available at the following link: http://www.ottawa.ca/residents/planning/ dev_review_process/guide/servicing_grading_en.html;

(B) Site servicing plans in accordance with the City of Ottawa's "**Servicing and Grading Plan Requirements**" available at the

following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/servicing_grading_en.html;

(C) Composite utility plans in accordance with the City of Ottawa's Composite Utility Plan requirements available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/cup_en.html;

(D) Pavement Marking and Signing CAD drawings shall be prepared and submitted by Project Co at a 1:250 scale in accordance with City of Ottawa Standard requirements as specified in Schedule 15.2 Part 1 Article 5;

(E) Permanent signing plan and a permanent signing table a minimum of 30 calendar days prior to the implementation of the plan. The permanent signing table shall include, but not be limited to information detailing sign location (station of final location, removal location and on which side of the road to be installed in relation to the direction of travel), height to bottom of sign, lateral offset to post, support type with dimensions, alpha-numeric sign code with dimensions and the message/description, etc;

(F) prepare sign details for the following types of ground-mounted guide Signs: Roadway identification, direction & destination, and location identification. Project Co shall Design and provide all overhead Sign Structures, ground-mounted sign break-away steel supports and associated Sign footings;

(G) Temporary signing plan and a temporary signing table a minimum of 30 calendar days prior to the implementation of the plan. The temporary signing table shall include, but, not be limited to information detailing sign location (station of final location, removal location and on which side of the road to be installed in relation to the direction of travel), height to bottom of sign, lateral offset to post #1, support type with dimensions, alpha numeric sign code with dimensions and the message/description;

(H) Roadways, Bus terminal and Layby design review documents and drawings submissions to be done at first Pre-final, second Pre-final and Final Design Development Submittals. Drawings shall be prepared in accordance with City of Ottawa CADD Standards for Contract Drawings.

(ix) Transportation Impact Assessment

(A) Provide a Transportation Impact Assessment for each station and prepare a roadway modification plan for any proposed roadway modifications in accordance with the "**City of Ottawa**

Transportation Impact Assessment Guidelines" available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/tia/index_en.html.

(x) Planning Rationale

(A) Provide a Planning Rationale including a Design Statement and an Integrated Environmental Review Statement for each station in accordance with the City of Ottawa's Guide to Preparing Plans and Studies available at the following link: http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html.

(xi) Tree Conservation Report

(A) Provide a Tree Conservation Report for each station in accordance with the "**City of Ottawa Tree Conservation Report Guidelines**" available at the following link: http://www.ottawa.ca/env_water/tlg/trees/preservation/guidelines_en.html.

3.12 Maintenance and Storage Facility

First Pre-final, second Pre-final and Final Design Development Submittal are to include all proposed manufacture information on proposed materials and products.

(a) Landscaping:

(i) A description of the proposed approach to meeting the hard and soft landscaping requirements of the Project Agreement including approach to salvaging and reuse of any existing plant material;

(ii) Landscape drawings in accordance with the City of Ottawa's Guide to Preparing Plans and Studies available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html

(A) conceptual landscape plan drawings showing significant utility conflicts and relocation proposals;

(B) details of any relevant drainage;

(C) detail planting plan;

(D) planting details;

(E) hard Landscape plans and details;

(F) landscape accessories details (e.g. site furniture, bicycle); and

(G) lighting details.

(iii) Tree Conservation Report

(A) Provide a Tree Conservation Report in accordance with the City of Ottawa Tree Conservation Report Guidelines available at the following link:

http://www.ottawa.ca/en/env_water/tlg/trees/preservation/guidelines/index.html

(b) MSF architectural design:

Project Co shall provide sufficient information to demonstrate the ability of the proposed MSF to meet the functional requirements and performance standards as set out in this Project Agreement and the objectives set out below.

(i) how well the MSF serves the maintenance of vehicles, particularly in terms of industrial function, sustainability, usability and safety and security;

(ii) how well the MSF serves Project Co and OC Transpo staff in carrying out their roles and responsibilities;

(iii) how well the MSF will complement the profile of the community and the City of Ottawa as the capital and a vital part of Ottawa, Ontario, and Canada's history and culture;

(iv) how well the MSF meet the standards and functional requirements specified herein;

(v) how well the proposed design response (as outlined in the written description) fulfills the objectives set out above as well as the standards for the OLRT as described in this agreement articles;

(vi) Project Co must address the MSF design at an appropriate level of detail, as set out in or otherwise referenced in Article 15.2 of this Project Agreement, and is to include the following:

(A) Provide written statement describing Project Co's architectural design intent with respect to the following subjects. The statement should be organized as follows:

(1) Design response to the general design principles must be addressed in detail;

(2) Design response to LEED® certification goal.

(c) General architectural description:

General architectural design description, including reference to the following subjects:

(i) the functional layout of all the spaces as per the Functional Program. All horizontal and vertical relationships and adjacencies shall be indicated;

(ii) the arrival and movement within the facility of the public, staff and all transit vehicles;

(iii) the exterior and interior appearance of the proposed premises;

(iv) special enhancements or features;

(v) servicing;

(vi) building construction;

(vii) relationship / separations;

(viii) design response to the existing site and existing buildings;

(ix) description of the overall facility design, functional and technical requirements;

(x) response to future expansion requirements;

(xi) design description of building image, including selection and use of materials in the building elevations; and

(xii) response to the requirements for sustainability, throughout the property.

(d) Materials and finishes:

(i) provide a detailed description of the proposed use of materials and finishes and how these selections serve to enhance the MSF design and contribute to the durability of the building, life cycle considerations, etc.; and

(ii) provide Room Finish Schedules identifying all spaces with proposed materials for floor, wall and ceiling finishes, ceiling height(s), etc.

(e) Life cycle analysis:

Provide a report describing life cycle approach to all building components, systems and major pieces of equipment including but not limited to:

(i) building envelope, exterior finishes & components;

(ii) interior finishes; and

(iii) industrial, mechanical and electrical equipment.

(f) Code analysis:

Provide a Code Analysis as per Article 6 – Code Analysis and Life Safety for each submission.

(g) Accessibility analysis:

Provide a description of how the proposed design complies with the AODA and CSA accessibility requirements.

(h) Acoustical design:

Provide a report from an acoustical design specialist describing in detail how the acoustical requirements of this Project Agreement are proposed to be achieved and measures proposed to control the sound environment throughout the MSF, particularly as relates to neighbouring properties.

(i) Net and gross floor area summary:

Provide a final floor area summary chart consistent with the chart format submitted during the Design Consultation Process indicating:

(i) final summary listing individual space requirements identified in the Agreement articles and Project Co-proposed measured areas by element and individual space. Analysis shall also identify final building gross areas on a floor by floor basis and total building gross area.

(j) Architectural drawings including, but not limited to:

(i) context Plan scale: 1:1000 or larger;

(ii) site plan scale – 1:400 or larger in accordance with the City of Ottawa's Guide to Preparing Plans and Studies available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html;

(iii) floor plans – scale 1:100, showing all rooms/areas numbered. List additional rooms not previously identified. Include:

(A) all existing and new walls and partitions in actual thickness;

(B) doors, windows, sidelights and interior glazing;

(C) structural grid lines and references cross-referenced on all drawings;

(D) all millwork/casework, built-in and modular;

(E) all furniture and equipment;

(F) all room equipment and systems and accessories;

(G) integration of structural, mechanical, electrical and information and communications technology systems, in terms of columns, service shafts, risers, etc., in sufficient detail to demonstrate that functional and net area requirements are compliant; and

(H) connection(s) and layout for the future building elements.

(iv) Reflected Ceiling Plans – scale 1:100 of all levels indicating ceiling materials, configuration of lighting, mechanical diffusers and grilles.

(v) Detailed drawings:

(A) 1:100 and 1:50 scale floor plans including roof plan(s), interior elevations and reflected ceiling plans indicating development of design intent and showing resolution of material and finish use, special floor treatments, furnishings/millwork, special features such as equipment, lighting and all other security, electrical and mechanical items.

(B) Plan detailing how the operational flexibility of the MSF has been maximized.

(C) Exterior Building Elevations – scale 1:200:

(1) all building elevations including all hidden or partial elevations with a legend describing the extent of all glazing and cladding materials;

(D) Building Sections – scale 1:100 through entire building indicating relative location of grade. Building sections to be taken through the industrial service areas (pits and equipment), and any other special conditions.

(E) Exterior Wall Assembly Details – scale 1:50, representative wall sections and plan details through principal facade elements on the platform elevations. Details will indicate proposed components of exterior wall assemblies and including references to other drawings.

(F) Provide material and finish sample boards of:

(1) All exterior finish materials; and

(2) All interior finishes of Driver occupied rooms.

(k) Engineering design:

Provide a written statement describing the engineering design intent for the construction of the MSF including the following:

(i) Structural

Provide a written description of the proposed structural system. Demonstrate how each component will comply with the Structural Standards specified in this Project Agreement. Include design criteria and references to the applicable standards.

Provide a structural design brief, including outline specifications and drawings or sketches as appropriate. Describe the main structural elements in a preliminary manner, including but not limited to the following:

(A) Foundations, floor, roof and wall framing systems, including materials and spans;

(B) lateral load resisting system;

(C) design dead and live loads for all areas in which records may be located;

(D) design or specification measures to meet serviceability criteria;

(E) special or unique structural framing or features;

(F) column spacing and layout; and

(G) Provide a written description of the lateral load resisting system, its capability to resist live loads due to earthquakes, and an estimate of the equivalent seismic importance.

(ii) Structural drawings:

Structural floor plans - scale 1:100, of every level and roof showing connections to the existing substructure, structural systems, framing and lateral force resisting systems and typical sections and details. (scale 1:50).

(iii) Mechanical:

Provide a written description and design summary for the mechanical systems demonstrating how they will meet the required performance standards set out in this Project Agreement.

Provide drawings and diagrams that fully illustrate how the mechanical systems, including HVAC, fire protection, plumbing and drainage will meet the required performance standards as set out in this Project Agreement. Drawings shall include:

(A) heating system flow diagram including primary and secondary systems;

(B) humidification system schematic/flow diagram;

(C) air handling unit drawings illustrating all as follows:

(1) specialized shop ventilation units;

(2) air handling unit for air conditioning purposes; and

(3) separation of shop and vehicle washer.

(D) fire protection system schematics and design brief to illustrate sprinklers as intended for the applications;

(E) BAS description and description of sensor layout;

(F) General design approach to mechanical systems including HVAC, plumbing and drainage systems, equipment selection, etc. with specific references to the functional requirements and performance standards set out in the Project Agreement;

(G) Product cuts for primary equipment and fixtures including all public space diffusers, grilles and sprinklers, and plumbing fixtures, etc.; and

(H) Main mechanical equipment schedules including, air handlers, pumps, domestic hot water systems, etc.

(iv) Mechanical drawings:

(A) Mechanical floor plans – scale 1:100, of every level including mechanical room(s) and roof(s) showing location and basic layout of primary mechanical equipment, routing of main feeds and associated shafts and risers, and preliminary sizing of the primary mechanical equipment;

(B) System schematics for all major systems including, but not limited to:

(1) Incoming water and fire protection systems;

(2) Plumbing distribution systems including domestic cold, domestic hot and recirculation system, industrial water treatment systems; and

(3) Air handling and air distribution systems; Controls Storm drainage systems.

(C) Zoning diagrams showing zoning for standpipe systems, sprinkler systems and air distribution systems.

(v) Electrical:

Provide a written description and design summary for the electrical systems demonstrating how they will meet the required functional requirement and performance standards set out in this Project Agreement.

Provide drawings and diagrams that fully illustrate how the electrical systems, including power, lighting, life safety and emergency services, including emergency back-up power systems, will meet the required functional and performance standards as set out in this Project Agreement. Drawings and documentation shall include:

(A) layout drawings (scale 1:100);

(B) single line diagrams;

(C) schematic diagrams;

(D) Panel and motor control schedules;

(E) Operation descriptions;

(F) General design approach to electrical systems including redundancy and emergency power, equipment selection, etc. with specific references to the agreement articles requirements;

(G) Product cuts for primary equipment and fixtures; and

(H) General design approach to provision of CCTV, PA, etc.

(vi) Electrical drawings:

(A) Floor plans - scale 1:100, of every level showing location and basic layout of electrical and communications rooms, routing of main feeds and associated risers and routing for equipment removal;

(B) Single line diagram, preliminary sizing of equipment and feeders to provide a clear understanding of the electrical distribution, emergency and critical power systems along with the expected MSF electrical demand load calculations;

(C) Life safety system riser diagram including sequence of operation;

(D) Lightning protection and grounding systems if required as per NFPA 780;

(E) Site Electrical plan; and

(F) Exterior photometric plan.

(vii) Civil:

(A) Provide a Servicing Study in accordance with the City of Ottawa's "Servicing Study Guidelines for Development Applications" available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/servicing_study_en.html;

(B) Provide an Erosion and Sediment Control Plan in accordance with the City of Ottawa's Guide to Preparing Plans and Studies available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/index_en.html;

(viii) Civil Drawings:

(A) Grade control and drainage plan in accordance with the City of Ottawa's "Servicing and Grading Plan Requirements" available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/servicing_grading_en.html;

(B) Site servicing plan in accordance with the City of Ottawa's "Servicing and Grading Plan Requirements" available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/servicing_grading_en.html;

(C) Composite utility plan in accordance with the City of Ottawa's Composite Utility Plan requirements available at the following link:

http://www.ottawa.ca/residents/planning/dev_review_process/guide/cup_en.html;

(ix) Transportation Impact Assessment

(A) Provide a Transportation Impact Assessment and prepare a roadway modification plan for any proposed roadway modifications in accordance with the "City of Ottawa Transportation Impact Assessment Guidelines" available at the following link:

http://ottawa.ca/residents/planning/dev_review_process/guide/tia/index_en-04.html

3.13 Traffic and Transit Management Plan

(a) General Requirements

(i) No later than 60 days following Financial Close, and in accordance with the requirements of Part 7 of Schedule 15-2, Project Co shall submit an initial TTMP to the City. The initial TMP shall document how Project Co plans on managing traffic during the Initial Works.

(ii) Detailed TCPs complete with traffic control layout drawings and fully integrated with the approved Project schedule, shall be submitted outlining the provision of all forms of traffic control required throughout the duration at the Project.

(iii) For each stage of the Work that affects traffic, Project Co shall submit drawings that address stage-specific activities and requirements.

(iv) Prior to the closure of Rideau Street to vehicular traffic, shall submit a Traffic Study with detailed intersection and network modelling to identify LOS, queue lengths, turning movements, and traffic signal requirements. The Study shall identify all provisions required to maintain a LOS of "E" or better at all intersections within the limits of the detour.

(v) A pedestrian study for Rideau Street shall be submitted to confirm the pedestrian movements, location for the crosswalk(s) and crosswalk width requirements.

(b) Submission Requirements

(i) Design Review documents and drawings submissions to be done at first Pre-final, second Pre-final and Final Design Development Submittals.

(ii) The Final Design Development Submittals shall contain, without limitation, the following:

(c) The following sub-plans for Project Co's TMP are required and shall be submitted as part of the Works Submittals:

(i) Traffic Control Plan;

(ii) Emergency Traffic Plan;

(iii) Incident Management Plan;

(iv) Implementation Plan;

(v) Transit Management Plan;

(vi) Advisory Temporary Signing Plan;

(vii) Risk Assessment Plan; and

(viii) Traffic and Transit Management Communications Plan.

(d) Traffic Control Plans

(i) Project Co shall prepare Project specific TCPs in accordance with the OTM, City of Ottawa Policies, Procedures and Guidelines and other Reference Documents for all activities that affect traffic operations, including but not limited to:

(A) identify hours of Work;

(B) identify the Work zone location and direction and distance to nearest landmarks;

(C) identify the size of the Work zone;

(D) identify lanes affected by the Works;

(E) identify lane configuration in the Work zone;

(F) indicate whether accesses or intersections will be affected by the Work zone or by traffic control devices;

(G) identify traffic volume capacity during Project;

(H) identify proposed delays or closure times; and

(I) include scale drawing(s) identifying:

(1) the location of the Work zone using landmarks and LKI where applicable;

(2) accesses or intersections affected by the Work zone or by traffic control devices;

(3) traveled lanes affected;

(4) resultant lane configuration including widths;

(5) location of restricted width lanes;

(6) posted speeds;

(7) location of hazardous areas created by road geometry or local geography;

(8) the location of vehicle storage areas if delays are anticipated;

(9) any local roads used for a detour route;

(10) the design speed and the design vehicle for each road used as a detour route; and

(11) any traffic signal changes required by the detour route or Project Works.

(J) include scale custom traffic control layouts showing the placement of all traffic control devices and traffic control persons.

(ii) Custom traffic control layouts shall:

(A) show schematically the placement of all TCDs;

(B) place all TCDs in accordance with the standards contained in the OTM;

(C) follow symbol conventions for identifying TCDs as per the OTM;

(D) have all dimensions and explanatory notes on the drawing; and

(E) show traffic operations at all phases of the Project.

(iii) Traffic analysis for each Construction stage of the Design and Construction within each phase where traffic operations are affected.

(iv) The TCP shall include engineered Designs for each detour route, diversion and lane closure. The locations and details of all signs, PVMS, Pavement Markings, barriers, and protective works shall be indicated on the drawings.

(e) Emergency Traffic Plan

(i) Project Co shall prepare and submit an Emergency Traffic Plan. The Emergency Traffic Plan shall specify how Project Co shall facilitate access for emergency vehicles to and through affected sites based on consultation with local municipalities and Emergency Service Providers.

(f) Incident Management Plan

(i) Project Co shall prepare and submit an Incident Management Plan in accordance with City of Ottawa Emergency Management Plan. The plan shall specify how Project Co will provide access for emergency vehicles and assistance to emergency personnel.

(g) Implementation Plan

(i) Project Co shall prepare and submit an Implementation Plan that identifies the Traffic Control Supervisor, Traffic Engineer and Traffic Manager, along with the qualifications and experience of those named individuals. This plan shall also define processes to ensure that the Traffic Control Plans and the Emergency Traffic Plan are developed and implemented efficiently and appropriately, and that they are kept up-to-date with necessary modifications during the Project.

(h) Transit Management Plan

(i) Project Co shall submit a Transit Management Plan that is integrated with the TTMP. The Transit Management Plan shall outline how the quality of transit services shall be maintained during all phases of Construction. The Transit Management Plan shall contain the following information with respect to how Project Co intends to maintain transit service routes and comply with the requirements:

(A) Accommodation of transit service routes as detailed in Part 7 of Schedule 15-2;

(B) Accommodation of the requirements of Part 7 Article 5, existing BRT of Schedule 15-2;

(C) Overall strategy and approach that Project Co intends to implement to maintain the quality of transit service routes throughout the Construction Period and minimize disruption to the City users;

(D) Identify Project Co's scheduled Construction activities, closures, full closures, detour routes, lane shifts and diversions that have an impact on the existing BRT; and

(E) Identify all temporary passenger platforms, bus laybys and passenger shelters, to current the City standards,. The location and Design of the temporary platforms and shelters shall be provided in drawing format.

(i) Temporary Signage Plan

(i) Project Co shall submit a Temporary Signing Plan. The primary objective of a Temporary Signing Plan is to notify the City, the City and other stakeholders in advance of scheduled Construction activities, closures, full closures, detour routes, lane shifts and diversions.

(j) Risk Assessment Plan

(i) Project Co shall submit an independent assessment to identify any risks that could have an impact on traffic management or special conditions that shall be addressed through Project Co's Risk Assessment Plan. Project Co shall identify all risks and state the measures to be implemented to manage, reduce or eliminate the risks.

(k) Traffic Management Communications Plan

(i) Project Co shall submit a Traffic and Transit Management Communications Plan to apply throughout the Project Term. The Traffic and Transit Management Communications Plan shall describe clearly how Project Co shall communicate to the City, the City and other stakeholders about all matters relating to traffic flow, including, specifically, how it shall provide timely notice of Construction related delays, closures, detours, traffic incidents and emergencies.

(ii) Project Co shall submit a narrative outlining the process which will be integrated with the City's communication procedures for traffic management to keep major user groups informed of planned an unplanned traffic pattern changes, including, but not limited to the following: hauling and truck routes, transit impacts, detours, lane shifts, lane closures, sidewalk closures, access restrictions, schedule changes, and other traffic control procedures.

3.14 Environmental Design

The first Pre-final, second Pre-final and Final Design Development Submittals shall contain, without limitation, the following:

(a) applicable construction drawings that include:

(i) extent of impacts to and mitigation of known contaminated sites;

(ii) quantity and location of re-used excavated material;

(iii) all built heritage and cultural landscape features along alignment;

(iv) all Project Co identified noise and vibration Sensitive Receivers along the alignment;

(v) all noise and vibration mitigation measures such as track design and noise barrier and/or berm locations;

(vi) location of all drainage facilities;

(vii) location and function of stormwater management facilities; and

(viii) areas of archaeological potential where monitoring by a licenced archaeologist is required;

(b) erosion and sediment control features during both the construction and maintenance phases;

(c) environmental design drawings that show environmental mitigation and compensation features and any environmental features to be constructed;

(d) environmental design documentation including:

(i) all licences, notifications, permits, authorisations and approvals specific to the work designed; and

(ii) all assessments, studies, surveys, monitoring reports, and plans specific to the work designed;

(e) an environmental design criteria checklist that lists general environmental commitments and assurances, including the commitments from the Environmental Assessments, environmental design commitments, site specific environmental features and environmental mitigation/compensation plans including all commitments, assurances and plans; and

(f) Resolution of all issues identified during Design Review Meetings and reviews of the first Pre-final Design Development Submittals and the second Pre-final Design Development Submittals.

4. CONSTRUCTION DOCUMENT SUBMISSIONS, REVIEW AND REPORTS

4.1 General

(a) Final Construction Document Submittals (Pre-Final and Final) shall be prepared and shall have indexes and sectional dividers. The design folders shall contain pertinent correspondence, shall be arranged by subject matter in chronological order, and shall include design calculations and backup information. Construction Document submissions shall include, without limitation, copies of all approvals, design reports, correspondence and calculations.

(b) Final Construction Document Submittals shall include all items contained with the Design Development Submittals, further refined into Construction Documents that set forth, in detail, requirements for the construction of the Project.

(c) Final Construction Document Submittals drawings and reports shall be signed and sealed by the responsible engineer, who shall be a Professional Engineer.

(d) For proprietary systems, the responsible engineer, who shall be a duly experienced Professional Engineer of the appropriate discipline, shall certify the design and construction of the systems.

4.2 Issued for Construction Drawings

Project Co shall submit copies of all drawings that are "**Issued for Construction**", together with manuals, instructions to the Construction Contractor and other relevant information as requested by the City Representative, to the City Representative and to the Independent Certifier.

5. SHOP DRAWINGS

(a) Project Co shall, in accordance with Schedule 26, provide the City with an electronic copy of all shop drawings for information purposes.

(b) Notwithstanding a) above, the following shop drawings will be submitted to the City for review in accordance with this Schedule 10:

(i) Implementation/integration of the fare collection system

(ii) Implementation/integration of the Public System safety radio system

(iii) Station interior/exterior signage

(iv) Modifications to existing private buildings to implement integrated station entrances, particularly as it relates to electrical/mechanical systems between the OLRT stations and adjacent developments.

(v) Substitution of finishes/materials that have been previously submitted for information to the City

(vi) Details related to the attachment of Systems Infrastructure to an existing structure

(vii) Integration of the TSCC/BCC particularly as it relates to common areas

(viii) Materials/work that are considered new municipal infrastructure including, but not limited to, the following:

(A) Concrete pressure pipe,

(B) Butterfly and tapping valves (400 mm and greater), and

(C) Valve chambers (non-standard chambers only).

(c) It is the intention of the Sponsor to discuss the shop drawing process for the above items with Project Co post PPN and mutually agree on an acceptable procedure for these items.

6. CHECKING OF STRUCTURAL DESIGN

6.1 For relevant design submissions submitted in accordance with the Review Procedure, Project Co shall submit an Independent Structural Design Check Certificate, in the form provided as Attachment 3 to this Appendix A.

ATTACHMENT 1

SAMPLE CONTENTS FOR A STRUCTURAL TAF

SAMPLE CONTENTS FOR A STRUCTURAL TAF

Ref. No.....

1. PROJECT DESCRIPTION

1.1 Name and location of structure.

1.2 Permitted traffic speed (for a Bridge give over and/or under).

2. PROPOSED STRUCTURE

2.1 Description of Structure.

2.2 Structural type. *(Include reasons for choice)*

2.3 Foundation type. *(Include reasons for choice)*

2.4 Span arrangements. *(Include reasons for choice)*

2.5 Barrier type.

2.6 Proposed arrangements for inspection and maintenance.

2.7 Materials and finishes.

3. DESIGN/ASSESSMENT CRITERIA

3.1 Live Loading, Clearances.

3.1.1 Bridge code loading;

3.1.2 Design vehicle;

3.1.3 Other live loading;

3.1.4 Provision for exceptional abnormal loads:

3.1.4.1 Gross weight;

3.1.4.2 Axle load and spacing; and

3.1.4.3 Location of vehicle track on deck cross-section;

3.1.5 Any special loading not covered above;

3.1.6 Minimum clearances provided (vertical and horizontal); and

3.1.7 Authorities consulted and any special conditions required.

3.2 List of relevant design documents.

4. STRUCTURAL ANALYSIS

4.1 Methods of analysis proposed for superstructure, substructure and foundations.

4.2 Description and diagram of structure to be used for analysis.

4.3 Assumptions intended for calculation of structural element property and stiffness.

4.4 Proposed earth pressure coefficients (ka, ko, or kp) to be used in design of earth retaining elements.

5. GROUND CONDITIONS

5.1 Acceptance of interpretative recommendations of the soils report to be used in the design and reasons for any proposed departures.

5.2 Describe foundations fully including the reasons for adoption of allowable and proposed bearing pressures/pile loads, strata in which foundations are located, provision for skin friction effects on piles and for lateral pressures due to compression of underlying strata, etc.

5.3 Differential settlement to be allowed for in design of structure.

5.4 Anticipated ground movements or settlement due to embankment loading, flowing water, and measures proposed to deal with these defects as far as they affect the structure.

5.5 Results of tests of ground water (e.g. pH value, chloride or sulphate content) and any counteracting measures proposed (as applicable).

5.6 Anticipated ground movements or settlement due to seismic loading, measures proposed to deal with these impacts as far as they affect the structure.

6. DRAWINGS AND DOCUMENTS

6.1 List of drawings (including numbers) and documents accompanying the submission. To include (without limitation):

6.1.1 a location plan;

6.1.2 a preliminary general arrangement drawing; and

6.1.3 relevant parts of the ground investigation report.

7. THE ABOVE DESIGN AND CONSTRUCTION PROPOSALS ARE SUBMITTED FOR REVIEW

Signed: .....

Design/Construction Manager

Name: .....

Engineering Qualifications:.....

Date: .....

Professional Registration Number: …….

Affix Professional Seal

Signed: .....

Project Co Representative

Name: .....

Date: .....

Professional Registration Number: …….

Affix Professional Seal

ATTACHMENT 2

SAMPLE CONTENTS FOR A TUNNEL TAF

SAMPLE CONTENTS FOR A TUNNEL TAF

Ref. No.....

1. PROJECT DESCRIPTION

1.1 Name and location of Tunnel.

2. PROPOSED TUNNEL STRUCTURE

2.1 Brief description of Tunnel including discussion of:

2.1.1 Temporary excavation or initial support system

2.1.2 Permanent Linings including waterproofing

2.1.3 Short-term and long-term ground water control system(s)

2.1.4 Proposed work site access

2.2 List of any proprietary materials and finishes.

2.3 Details of arrangements for long-term inspection and maintenance

2.4 Details of the Tunnel's emergency communication and escape facilities

2.5 Details of landscaping above Tunnel and protection of the Tunnel

3. TUNNEL GEOMETRY AND SPACEPROOFING DETAILS

3.1 Structural form of Tunnel

3.2 Geometry for both Temporary and Permanent Works

3.2.1 Horizontal and vertical Alignment of the Tunnel and Tunnel approaches

3.2.2 Dimensioned cross-section(s) clearly indicating spatial design envelopes

3.2.3 Plan and profile drawing showing set-out of the Tunnel with respect to the Right-of-Way and Adjacent Structures.

3.2.4 Accommodation of mechanical and electrical services in Tunnel

3.3 Spaceproofing of Tunnel

3.3.1 Compatibility with other adjacent projects

3.3.2 Multi-disciplinary design interfaces

4. DESIGN/ASSESSMENT CRITERIA

4.1 A summary of assumptions used for both Temporary works and Permanent Works. Assumptions to include:

4.1.1 Design Loads

4.1.2 Design standards, codes and reference guidelines

4.1.3 Performance and technical requirements (including fire and seismic)

5. GROUND CONDITIONS

5.1 Summary of geotechnical information and data used to validate basis of design/assessment.

5.2 Summary of the relevant geotechnical design parameters for each Tunnel Structure.

5.3 Summary of groundwater conditions (e.g. pH value, chloride or sulphate content) and any counteracting measures proposed

5.4 Summary of hydrogeological impacts and any control measures required.

5.5 Summary of the potential geological / geotechnical risks

6. STRUCTURAL ANALYSIS

6.1 Methods of analysis used

6.2 Assumptions of structural elements (strength, stiffness, etc). Provide a summary of key design properties and parameters used (including for example bond stress interaction assumptions for ground anchoring systems)

7. TUNNEL SUPPORT SYSTEM AND METHOD OF CONSTRUCTION

7.1 Basis of the design of the Tunnel's support system for Temporary and Permanent conditions and any proposals for ground treatment

7.2 Describe the construction sequence and methods. Provide information that demonstrates the Construction Activities will meet the Project's environmental requirements (noise/overpressure, lighting, vibration and groundwater contamination).

7.3 Provide details of predicted settlements of Existing Adjacent Structures and ground surface above and adjacent to the Tunnel and provide planned mitigation measures

7.4 State methods to be adopted to monitor and control the effects of Tunnel construction to ensure compliance with any criteria imposed to limit impacts to Existing Adjacent Structures (including environmental monitoring and Trigger and Action Levels for key monitoring points)

8. DRAINAGE AND WATERPROOFING

8.1 Details of proposed/existing drainage

8.1.1 Ground water seepage and run off

8.1.2 Accidental spillage, water carried in by vehicles

8.1.3 Fire main burst

8.1.4 Tunnel washing

8.1.5 Long-term maintenance of system

8.2 Details of proposed waterproofing

8.3 List special requirements of local drainage authority

9. DRAWINGS AND DOCUMENTS

9.1 List of drawings (including numbers) and documents accompanying the submission. To include (without limitation):

9.2 a location plan;

9.3 a general arrangement drawing;

9.4 geotechnical data or relevant parts of the geotechnical and hydrogeological reports

10. THE ABOVE DESIGN AND CONSTRUCTION PROPOSALS ARE SUBMITTED FOR REVIEW

Signed: .....

Design/Construction Manager

Name: .....

Engineering Qualifications: .....

Date: .....

Professional Registration Number: …….

Affix Professional Seal

Signed: .....

Project Co Representative

Name: .....

Date: .....

Professional Registration Number: …….

Affix Professional Seal

ATTACHMENT 3

Certificate Form Certificate Ref. No [ ]

INDEPENDENT STRUCTURAL DESIGN CHECK CERTIFICATE

*Defined terms and expressions used in this Certificate have the same meanings as given to them in the agreement between the City and Project Co dated February 12, 2013 ("**the Project Agreement**") relating to the Project.*

Form of certificate to be used by the Checking Team for certifying the design of structures incorporated in the System, in accordance with Schedule 15-2 – Design and Construction Requirements, to the Project Agreement.

1. We certify that we have the requisite professional qualifications, skill and experience to perform an independent check of the Design Data referred to herein in accordance with the requirements of the Project Agreement.

2. We certify that we have performed an independent check (as required by the Project Agreement for significant and complex Structures) of the Design Data for [.....] **[Name of the Structure and list of all elements of the Structure included in the Design Data]** listed in the Schedule hereto and utilizing the standards of care, skill and diligence that, in accordance with the standards of our profession, are required of experienced professionals undertaking such an independent check, and that in our professional opinion:

   i. the said Design Data meets performance expectations outlined in the Project Agreement, **[including Technical Appraisal Form]** No. [.....] dated [.....], as amended by the following:

      [List, if any, the changes made and any addenda to the foregoing Technical Appraisal Form]; and

   ii. the design, methodologies and assumptions are consistent with Good Industry Practice.

SCHEDULE

[Include here drawing numbers and titles and reports, calculations, etc.]

Signed: .....

Checking Team (Principal)

Name: .....

Title: .....

Date: .....

Professional Registration Number: …….

Affix Professional Seal

Signed: .....

Project Co Representative

Name: .....

Date: .....

SCHEDULE 10
REVIEW PROCEDURE

APPENDIX B
OTHER MINIMUM SUBMISSIONS BY PROJECT CO

1. GENERAL

1.1 The provisions of Appendix B of this Schedule 10 shall apply to Works Submittals to be submitted by Project Co only once, and shall apply without limitation to the Design Development Submittals, the Construction Document Submittals, the Design Data and any and all items, documents and anything else required or specified by this Project Agreement, including all Works Submittals listed in Appendix B to this Schedule 10, in respect of the Design and Construction Works to be submitted to, reviewed or otherwise processed by the City in accordance with the Review Procedure prior to or after Substantial Completion in respect of the completion of Minor Deficiencies, including any and all subsequent revisions, amendments and changes thereto (collectively and individually, "**Other Submissions**" as applicable in Appendix B of this Schedule 10).

2. OTHER SUBMISSIONS BY PROJECT CO

Table 2.1 – Other Submissions Requirements

Deliverable Name	Due Date	Submitted under the Review Procedure	Reference Section
Pre- and Post-Construction Condition Surveys	Pre construction surveys: at least 30 days and not more than 60 days prior to the relevant construction as indicated in Schedule 15-2 Part 1 Article 20. Post-construction surveys: within 60 days of completion of the relevant construction.	Yes	2.1
Blasting Plan	60 days prior to blasting operations	Yes	2.2
Project Management Plan (PMP)	30 days after Financial Close and updated as required throughout the Project Term	Yes	2.3
Risk Management Plan (RMP)	30 days after Financial Close and updated as required	Yes	2.4

Deliverable Name	Due Date	Submitted under the Review Procedure	Reference Section
	throughout the Project Term		

2.1 Pre- and Post-Construction Condition Surveys, which shall include, without limitation:

(a) Standard forms to be used when performing condition surveys.

(b) Schedule of Structures and Properties requiring condition surveys.

(c) Pre- and Post-Construction condition surveys reports for each Structure in the Zone of Influence consisting, at a minimum, of the completed standard form, photograph with photo description log sheet, and DVD of digital video and digital photographs.

2.2 Blasting Plans in accordance with City of Ottawa Standard Tender Documents for Unit Price Contracts Special Provisions F-1201 Use of Explosives.

2.3 Project Management Plan

(a) Project Co shall include the following sections under Project Management Plan:

(i) Overall Approach to Partnering, Communications and Integration;

(A) Plan for developing and maintaining a successful long-term partnership with the City for the purpose of achieving their vision, mission and core values;

(B) Managing technical interface structures and interdisciplinary relations, with a description of proposed reporting mechanisms and communications protocols with the City, core stakeholders, government agencies and the public;

(C) Maximizing integration of the activities of Project Co team members during the Design and Construction phase of the Project and the Maintenance and Rehabilitation Term of the Project, so as to validate and verify that the requirements of the Project are met;

(D) Approach to the design development process and issue resolution process including working in collaboration with user groups, design teams and stakeholders;

(E) Approach to incorporating stakeholder input into the Design Data submitted in accordance with the Project Agreement;

(F) Approach to achieving a fully co-ordinated and integrated design and construction phase in collaboration with the City, other agencies and third parties including local utility companies;

(G) Approach to achieving effective coordination of the Works Committee within the parameters of the Project Agreement; and

(H) Approach to resolving Disputes within the parameters of Schedule 27 – Dispute Resolution Procedure of the Project Agreement.

(ii) Team Structure and Processes;

(A) List of Key Individuals for the Design and Construction Works and the Maintenance and Rehabilitation Term of the Project;

(B) Organization chart clearly indicating the Project Co's team structure and lines of communication with the City. The organizational chart shall include the names of all staff and their reporting relationships for all Project activities;

(C) Approach to managing Project Co's staffing resources, staff substitution and replacement; and

(D) Approach to managing external stakeholder and approval bodies and internal decision making.

(iii) Design, Construction, Maintenance and Rehabilitation Quality Management Plan specific to the OLRT Project which reasonably demonstrates that Project Co will satisfy the requirements of International Standard ISO 9001:2008, ISO 9001 quality management principles and the minimum requirements stated in Schedule 11 of the Project Agreement. The Quality Management Plan shall include the following:

(A) General approach and statement describing Project Co's quality policy and philosophy;

(B) Required qualifications of Quality Managers and Quality Directors as stated in Schedule 11 of the Project Agreement;

(C) Training, education and other measures to be taken to ensure Project Co Parties compliance with all relevant management plans;

(D) Project Co's quality policy and quality control regime for design quality management, construction quality management, maintenance and rehabilitation quality management, as well as their respective integration;

(E) Processes for Non-Conformance review and disposition, including the approach for the development of the Non-Conformance Tracking System and its required components and corrective and preventative action response strategies for Non-Conformances; and

(F) An outline of how the key management activities (such as Project Co's controls, design, construction, maintenance and rehabilitation, traffic and transit management and mobility and environmental management) will interface with each other and with the Quality Management System including the reporting and internal governance within and between all activities.

(iv) Construction Safety Plan; and

(A) A description of the approach and process Project Co will undertake to provide a safe work site for all persons on Site (e.g. trades, supervisory and delivery personnel, visitors);

(B) Statement from the construction team emphasizing a commitment to the principles of construction safety;

(C) Valid corporate health and safety policy as prescribed in the Occupational Health and Safety Act, R.S.O. 1990 c.O.1 ("OHSA");

(D) Initial and ongoing safety training plans for the construction team's personnel including any site specific training necessary for issues related to the Site;

(E) The approach for dealing with Site specific hazards on the Project during the Design and Construction Works and the Maintenance and Rehabilitation Term;

(F) A description of the safety monitoring, inspection and record keeping process;

(G) Project Co shall provide an organizational chart and narrative that fully describes the roles, responsibilities, qualifications and experience of each member of the staff dedicated to site safety; and

(H) Process for accident and incident reporting and response including procedure for responding to occupational health and safety issues.

(v) Approvals strategy including a detailed description of Project Co's approach to obtaining required Proponent Permits, Licences and Approvals in time for successful completion of the Project and the key team members and agencies involved in the process.

2.4 Risk Management Plan Submission Requirements

(a) Project Co shall include the following sections under the Risk Management Plan (RMP):

(i) Overall Approach to Risk Management

(A) Project Co shall provide a narrative that outlines Project Co's risk management approach and methodologies. The narrative shall address, but is not limited to the following:

(1) How risks will be identified, assessed, responded to, and monitored throughout the Project;

(2) Categorizations and definitions to be used in support of qualitative analysis of risks;

(3) Tools and techniques to be used for quantitative analysis of risks;

(4) How contingency and/or mitigation plans will be developed, implemented, and monitored;

(5) How Project reserves will be allocated to handle risks; and

(6) How Project Co's Risk Management process will be integrated with Proponent Team Members

(ii) Initial Risk Assessment Planning

(A) Project Co shall provide a narrative that outlines Project Co's understanding of the risks and challenges specific to the Project. Project Co shall identify and describe features of Project Co's Design and Construction Plan that Project Co considers unique and/or innovative relative to reducing or eliminating Project risk.

(iii) Risk Register

(A) Project Co shall provide a detailed risk register that identifies:

(1) Project risk items;

(2) Probability/likelihood of such risks manifesting themselves on the Project;

(3) Potential severity of impact to Project objectives should such risks occur;

(4) Allocation to work breakdown, activities, or groups/types of activities;

(5) Triggering events or root causes;

(6) Ability to predict or control occurrence;

(7) Timeline horizon (i.e. near-tern, mid-term, or long-term);

(8) Response strategy and plans for managing each risk;

(9) Residual risk assessment after implementation of response plan; and

(10) Regularity of reassessment (i.e. monthly, quarterly, annually; or after a particular Project event or milestone).

SCHEDULE 10
REVIEW PROCEDURE

APPENDIX C
ADDITIONAL SPECIFIC SUBMISSIONS BY PROJECT CO

1. GENERAL

1.1 The provisions of Appendix C of this Schedule 10 shall apply to Works Submittals to be submitted by Project Co without limitation to the Design Development Submittals, the Construction Document Submittals, the Design Data and any and all items, documents and anything else required or specified by this Project Agreement, including all Works Submittals listed in Appendix C to this Schedule 10, in respect of the Design and Construction Works to be submitted to, reviewed or otherwise processed by the City in accordance with the Review Procedure prior to or after Substantial Completion in respect of the completion of Minor Deficiencies, including any and all subsequent revisions, amendments and changes thereto (collectively and individually, "**Additional Specific Submissions**" as applicable in Appendix C of this Schedule 10). Project Co shall submit the Additional Specific Submissions, without limitation, per occurrence unless otherwise noted.

2. ADDITIONAL SPECIFIC SUBMISSIONS BY PROJECT CO

Table 2.1 – Other Submissions Requirements

Deliverable Name	Reference Section in this Project Agreement	Submitted under the Review Procedure
Dwell time Calculations	Schedule 15-2, Part 1, Article 2 – Operational Performance Requirements	Yes
Requests for Legal Surveys	Schedule 15-2, Part 1, Article 4 – Design and Construction	Yes
Pavement design report(s)	Schedule 15-2, Part 1, Article 5 – Roadways, Bus Terminals and Laybys	Yes
Traffic Control Plans	Schedule 15-2, Part 1, Article 5 – Roadways, Bus Terminals and Laybys	Yes
Temporary signing plan and temporary signing table	Schedule 15-2, Part 1, Article 5 – Roadways, Bus Terminals and Laybys	Yes

Deliverable Name	Reference Section in this Project Agreement	Submitted under the Review Procedure
Lighting design and lighting calculation summary	Schedule 15-2, Part 1, Article 5 – Roadways, Bus Terminals and Laybys	Yes
Safety Management Plan (SMP)	Schedule 15-2, Part 1, Article 9 – Safety Management Plan	Yes
Design Criteria Conformance Checklist	Schedule 15-2, Part 1, Article 10 – Safety and Security Certification	Yes
Construction Specification Conformance Checklist	Schedule 15-2, Part 1, Article 10 – Safety and Security Certification	Yes
Safety-Related Testing Conformance Checklist	Schedule 15-2, Part 1, Article 10 – Safety and Security Certification	Yes
Preliminary Hazard Analysis (PHA)	Schedule 15-2, Part 1, Article 10 – Safety and Security Certification	Yes
Hazard Tracking Matrix (HTM)	Schedule 15-2, Part 1, Article 10 – Safety and Security Certification	Yes
Threat Vulnerability Analysis (TVA)	Schedule 15-2, Part 1, Article 10 – Safety and Security Certification	Yes
Vulnerability Tracking Matrix (VTM)	Schedule 15-2, Part 1, Article 10 – Safety and Security Certification	Yes
Reliability, Availability, Maintainability and Safety (RAMS) Analysis/Report	Schedule 15-2, Part 1, Article 10 – Safety and Security Certification	Yes
Emergency Response Plan (ERP)	Schedule 15-2, Part 1, Article 11 – Emergency Response Plan	Yes
Developers Guide	Schedule 15-2, Part 1, Article 19 – Future Adjacent Construction Requirements	Yes

Deliverable Name	Reference Section in this Project Agreement	Submitted under the Review Procedure
Pedestrian Access Plan	Schedule 15-2, Part 1, Article 21 – Implementation Constraints	Yes
Reliability Demonstration Plan	Schedule 15-2, Part 4, Article 3 – Revenue Vehicles	Yes
Preliminary Hazard List (PHL)	Schedule 15-2, Part 4, Article 3 – Revenue Vehicles	Yes
System Hazard List (SHL)	Schedule 15-2, Part 4, Article 3 – Revenue Vehicles	Yes
Subsystem Hazard List	Schedule 15-2, Part 4, Article 3 – Revenue Vehicles	Yes
EMC Management Plan	Schedule 15-2, Part 4, Article 9 – EMI/EMC	Yes
Traffic and Transit Management Plan (TTMP)	Schedule 15-2, Part 7 – Traffic Management and Construction Access	Yes
All sub-plans related to the TTMP	Schedule 15-2, Part 7 – Traffic Management and Construction Access	Yes
All plans, reports and submission requirements identified in Section 3.9 of Schedule 17 – Environmental Obligations	Schedule 17 – Environmental Obligations	Yes

SCHEDULE 11

QUALITY MANAGEMENT

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Appendix B Design Quality Management Plan
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Appendix D Maintenance and Rehabilitation Quality Management Plan
Appendix E Traffic Quality Management Plan
Appendix F Environmental Quality Management Plan
Appendix G Audit of Temporary Traffic Management – Sample Site Report

PART 1
DEFINITIONS

The following definitions shall have the following meanings:

(a) "**Construction Quality Management Plan**" or "**CQMP**" means the plan for the quality management of the Works prepared by Project Co in accordance with Appendix C – Construction Quality Management Plan to this Schedule 11.

(b) "**Corrective Action**" means an action to eliminate the cause of an existing Non-Conformance, defect or other undesirable situation to prevent its recurrence.

(c) "**Design Quality Management Plan**" or "**DQMP**" means the plan for the quality management of the design of the project prepared by Project Co in accordance with Appendix B – Design Quality Management Plan to this Schedule 11.

(d) "**External Quality Audit**" means either or both:

(i) a second party Quality Audit conducted by parties having an interest in Project Co or the relevant Project Co Party, such as parties with commercial contracts with Project Co or a relevant Project Co Party or customers/clients of Project Co or a relevant Project Co Party; and

(ii) a third party Quality Audit conducted by an external independent organization such as a certification or registration body.

(e) "**Environmental Quality Management Plan**" or "**EQMP**" means the plan for environmental management of the Works prepared by Project Co in accordance with Appendix F – Environmental Quality Management Plan to this Schedule 11.

(f) "**Inspection and Test Plan**" means the plan prepared in accordance with Section C.1(f) of Appendix C of this Schedule 11.

(g) "**Internal Quality Audits**" means a first party Quality Audit of Project Co's or a Project Co Party's own processes conducted by or on behalf of the relevant organization.

(h) "**ISO 9001 Lead Auditor Course**" means an accredited ISO 9001 course for lead auditors who meet the training portion of the requirements for current certification of individual quality system auditors with the International Register of Certified Auditors.

(i) "**ISO/IEC**" International Organization for Standardization / International Electrotechnical Commission.

(j) "**Non-Conformance**" means any failure by Project Co to perform any of its obligations under the Project Agreement in respect of any aspect of the Works or Maintenance and which failure is not rectified by Project Co within the applicable time period, if any, stipulated in this Project Agreement.

(k) "**Non-Conformance Report**" means a document issued by either the City or Project Co pursuant to Section 7.1 Non-Conformance Reporting Process of this Schedule 11 detailing the description of an identified Non-Conformance and the proposed rectification and action taken or to be taken to deal with such Non-Conformance.

(l) "**Non-Conformance Tracking System**" means a system to track Non-Conformance Reports issued by the City or Project Co as set out in Section 7.2 of this Schedule 11.

(m) "**Maintenance and Rehabilitation Quality Management Plan**" or "**MRQMP**" means the plan for the quality management of the Maintenance prepared by Project Co in accordance with Appendix D – Maintenance and Rehabilitation Quality Management Plan to this Schedule 11.

(n) "**Performance Monitoring Report**" has the meaning given in Part 8 – Performance Reporting of this Schedule 11.

(o) "**Preventive Action**" means an action to eliminate the cause of a potential Non-Conformance or other undesirable situation in order to prevent its occurrence.

(p) "**QMS 2000 Auditor**" means a quality auditor certified by the International Register of Certified Auditors in the "**QMS 2000 Auditor**" grade of certification.

(q) "**Quality Audit**" means a systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which audit criteria are fulfilled.

(r) "**Quality Audit Plan**" means Project Co's audit plan defining the Internal Quality Audits and External Quality Audits that Project Co shall perform or cause to be performed on its own processes and the processes of Project Co Parties.

(s) "**Quality Director**" has the meaning given in Section 3.1 (a) of this Schedule 11.

(t) "**Quality Management Plans**" includes the DQMP, EQMP, MRQMP, CQMP and any other quality management plan required for the purposes of undertaking any material and substantial aspect of the Works.

(u) "**Quality Management System**" means the quality management system to be developed and implemented by Project Co in accordance with this Schedule 11.

(v) "**Quality Manager**" means an individual quality manager responsible for each of the Quality Management Plans as described in Section (c) of each of the appendices B-F of this Schedule 11.

(w) "**Quality Manual**" means Project Co's quality manual meeting the requirements set out in Appendix A – Quality Manual to this Schedule 11.

(x) "**Quality Objectives**" means the objectives related to quality that are measurable and consistent with the Quality Policy and which are to be formally expressed and recorded in

the Quality Manual in accordance with this Schedule 11, provided that, alternatively, each Quality Management Plan may have its own Quality Objectives which are directly related to the applicable Quality Policy expressed or recorded in the Quality Manual.

(y) "**Quality Policy**" means the overall intentions and direction of Project Co related to quality applicable to Project Co and all Project Co Parties involved in performing the Works which are to be formally expressed and recorded in the Quality Manual in accordance with this Schedule 11, provided that, alternatively, each Quality Manual may have its own Quality Policy which is directly related to applicable Quality Objectives expressed or recorded in the Quality Manual.

(z) "**Quality Records**" has the meaning given in Section 6.8 of this Schedule 11.

(aa) "**Surveillance Quality Audits**" means Quality Audits conducted by or on behalf of City as contemplated in Section 5.3 – City's Quality Audits of this Schedule 11.

(bb) "**Traffic Control Plan**" means the sub-plan or sub-plans of the Traffic Management Plan prepared by Project Co in accordance with Part 7, Article 6 – Traffic and Transit Management Plan of Schedule 15-2 – Design and Construction.

(cc) "**Traffic Quality Management Plan**" or "**TQMP**" means the plan for the traffic management during construction of the project prepared by Project Co in accordance with Appendix E – Traffic Quality Management Plan to this Schedule 11.

PART 2
QUALITY MANAGEMENT SYSTEM

2.0 Timing Principle

For the avoidance of doubt, this Schedule 11 – Quality Management System shall be interpreted in accordance with the Timing Principle set out in Section 1.5(c) of this Agreement.

2.1 Quality Management System

(a) Project Co shall develop and implement a Quality Management System in accordance with the requirements of this Schedule. Project Co acknowledges and agrees that Project Co is solely responsible for the quality of the Works and the Maintenance and that a comprehensive Quality Management System is critical for the proper and timely completion of the Works and the Maintenance.

2.2 Project Co Responsibilities

(a) Project Co is responsible for all quality assurance and quality control activities set out in this Schedule that are required to manage its own processes as well as those of the Project Co Parties throughout the Project Term. Project Co shall ensure that all aspects of the Project are the subject of a Quality Management System that complies with the provisions of this Schedule, and shall comply with and cause all Project Co Parties to comply with the requirements of such Quality Management System. For greater certainty and without limiting Project Co's ability to contractually assign responsibilities and obligations to Project Co Parties in accordance with this Project Agreement, Project Co shall not be relieved of any of Project Co's responsibilities or obligations set out in this Schedule by the assignment of such responsibilities or obligations to Project Co Parties.

2.3 Quality Management System Requirements

(a) The Quality Management System shall, at a minimum, include the Quality Documentation described in Part 6 – Quality Documentation of this Schedule and shall comply with:

(i) the requirements and principles of the ISO 9001:2008 Standard and any other applicable standards specified in this Schedule;

(ii) Good Industry Practice; and

(iii) all other requirements set out in this Schedule and this Project Agreement.

2.4 Compliance

(a) Specific Requirements

(i) The Quality Management System must be compliant with ISO 9001:2008 within 90 days from Financial Close.

(ii) Compliance shall be subject to review and must be approved by the City, which compliance shall be maintained by Project Co throughout the Project Term.

(iii) The scope of compliance for the Quality Management System should be clearly defined to address the Works, including traffic management and environmental considerations in respect of the Project.

(iv) Project Co shall update its Quality Management System and all Quality Documentation as required to ensure that the Quality Management System and all Quality Documentation are and at all times remain in full compliance with the ISO 9001:2008 Standard and the requirements of this Schedule.

2.5 Documentation Deliverables

(a) Deliverables and Performance Measures

(i) Without limiting the generality of Section 2.3 – Quality Management System Requirements of this Schedule, Project Co will prepare and submit to the City, by the dates shown in Table 2.5.1, each of the following:

Table 2.5.1 − Schedule of Plans and Reports (Response Time Measures)

Performance Measure*	Deliverable Name	Schedule 11 Specification Reference	Due Date	Submitted under the Review Procedure
n/a	Quality Manual	Appendix A	Submitted 30 days following Financial Close	Yes
n/a	Design Quality Management Plan	Appendix B	Submitted 45 days following Financial Close	Yes
n/a	Construction Quality Management Plan	Appendix C	Submitted 60 days following Financial Close	Yes
n/a	Maintenance and Rehabilitation Quality Management Plan	Appendix D	Submitted 90 days following Financial Close	Yes

Performance Measure*	Deliverable Name	Schedule 11 Specification Reference	Due Date	Submitted under the Review Procedure
n/a	Traffic Quality Management Plan	Appendix E	Submitted 45 days following Financial Close	Yes
n/a	Environmental Quality Management Plan	Appendix F	Submitted 30 days following Financial Close	Yes
n/a	Other Quality Management Plans (as required by Section 2.5 (b))	Section 2.5	Submitted 45 days following Financial Close	Yes
n/a	Quality Audit Plan	Section 5.1	Submitted 30 days following Financial Close	Yes
PQ5.1	Quality Audit Plan updates	Section 5.1	At twelve monthly intervals following Quality Audit Plan submittal	Yes
PQ6.9	Monthly Quality Management System reports	Section 6.9	By 15th of each month (in respect of previous month)	No
PQ5.2b	Quality Audit reports	Section 5.2	Submitted 14 days following audit completion	No
PQ5.3	Corrective Action plan	Section 5.3	Submitted 20 Business Days following the closing meeting	No

(ii) Where specified, the documents listed above shall be submitted to the City for approval in accordance with the Review Procedure.

(b) Specific Requirements

(i) Project Co shall prepare and submit a Quality Management Plan for the Construction Contractor and the Maintenance Contractor, in each case in respect of the activities covered by that party's contract with Project Co and meeting the requirements of the Quality Manual, and Project Co shall cause all other contractors engaged by Project Co for the purposes of undertaking any material or

substantial aspect of the Works or the Maintenance to comply with the Quality Manual.

(c) Timing of Implementation

(i) The Quality Manual and all Quality Management Plans must be fully implemented within 180 days from Financial Close. Project Co shall not commence or permit the commencement of any aspect of the Works or the Maintenance before those parts of the Quality Documentation that concern such aspect of the Works or the Maintenance have been submitted to the City in accordance with this Schedule.

(d) Compliance with Quality Management System

(i) Project Co shall ensure that:

(A) Project Co complies with the Quality Management System detailed in the Quality Manual;

(B) the Design Team complies with the Design Quality Management Plan in connection with its design activities;

(C) the Construction Contractor complies with the Design Quality Management Plan, the Construction Quality Management Plan, the Traffic Quality Management Plan and the Environmental Quality Management Plan in connection with all activities under the Construction Contract;

(D) the Maintenance Contractor complies with the Maintenance and Rehabilitation Quality Management Plan, the Traffic Quality Management Plan and the Environmental Quality Management Plan in connection with all activities under the Maintenance Contract;

(E) any other contractor engaged by Project Co either complies with Project Co's relevant Quality Management Plan prepared and implemented pursuant to Specific Requirements of this Schedule in connection with the activities covered by that party's contract with Project Co or provides evidence of the contractor's own quality system and the required quality assurance interfaces to Project Co; and

(F) Project Co shall ensure that any Project Co Party who performs any portion of the Works or the Maintenance shall comply with the Quality Management System as it relates to that portion of the Works or the Maintenance.

2.6 Continuous Improvement in Quality Management System

(a) Project Co shall implement a program and shall have mechanisms in place, such as management reviews and Quality Audit programs, to allow all identified opportunities for

improvement of the effectiveness of the Quality Management System to be recorded, tracked and implemented or closed out.

(b) Project Co shall ensure that all Project Co Parties are aware of the importance of continuous improvement and are actively engaged in its implementation in connection with the performance of the Works and the Maintenance.

PART 3
QUALITY DIRECTOR

3.1 Appointment and General Responsibilities

(a) At all times during the Project Term, Project Co shall employ a Quality Director who shall,

(i) irrespective of such person's other responsibilities, have defined authority for ensuring the establishment and maintenance of the Quality Management System and auditing and reporting on the status of, and compliance with the Quality Management System, including the requirements set forth in Section 3.2 (a) of this Schedule; and

(ii) be a certified QMS 2008 Auditor or shall have experience in a similar quality management representative role for a transit project of a similar scope and shall have successfully completed an ISO 9001 Lead Auditor Course.

(b) The identity of the Quality Director (and any replacement thereof) and his/her job specification and responsibilities shall be subject to the approval of the City (such approval not to be unreasonably withheld or delayed), and the Quality Director shall be a Key Individual.

3.2 Specific Responsibilities

(a) Without limiting the generality of the foregoing, the job specification and responsibilities of the Quality Director shall include the following:

(i) developing, implementing and maintaining, and ensuring the effective operation of, the Quality Management System;

(ii) initiating management reviews, not less frequently than annually, and taking other actions necessary to ensure the effective operation and continuous improvement of the Quality Management System;

(iii) preparing Quality Audit Plans and scheduling and coordinating Internal Quality Audits and External Quality Audits of key processes with the relevant Project Co Parties;

(iv) ensuring that all Quality Audits required under Section 5.2 – Project Co's Quality Audits of this Schedule and under the Quality Documentation are conducted, and reporting the findings of such audits to the City;

(v) having the authority to immediately stop any work or activity which is not being performed or carried out in accordance with the Quality Documentation applicable thereto;

(vi) liaising with the City and acting as the primary representative for Project Co on all matters relating to quality management;

(vii) coordinating all matters and issues relating to the certification of the Quality Management System;

(viii) preparing and submitting to the City monthly Quality Management System reports;

(ix) ensuring that relevant Quality Records are retained in accordance with the Quality Management System and the requirements of Schedule 26 of the Project Agreement – Record Provisions;

(x) developing and implementing a program for Corrective Action and Preventive Action for Non-Conformances; and

(xi) carrying out any other matters which, in accordance with this Project Agreement, are the responsibility of the Quality Director.

PART 4
TESTING

4.1 Testing Requirements

(a) Where Project Co is required by this Project Agreement or any Quality Documentation to carry out any calibration, sample, test or trial, such calibration, sample, test or trial shall be carried out in accordance with the provisions of this Part 4 and the provisions of the relevant Quality Documentation.

4.2 Accreditation Standards

(a) All on and off site calibrations, samples, tests and trials shall be carried out by laboratories that are duly accredited for the carrying out of such calibrations, samples, tests and trials.

(b) Laboratory accreditation shall be in accordance with ISO/IEC 17025, as amended, updated or replaced from time to time, provided that, for specific activities, the City may accept other industry-recognized accreditation in lieu of ISO/IEC 17025, including:

(i) concrete and concrete materials: CSA A283-00, "**Qualification Code for Concrete Testing Laboratories**", to the appropriate category for the tests being done;

(ii) structural steel and welding: CSA W178.1-02, "**Certification of Welding Inspection Organizations**", to the level appropriate for the inspection being carried out;

(iii) aggregates, bituminous paving mixtures: "**Canadian Council of Independent Laboratories**", as appropriate to the work being carried out; and

(iv) protective coatings: "**National Association of Corrosion Engineers**", as appropriate to the work being carried out.

(c) Project Co may request the approval of the City to use other industry-recognized accreditations, which approval shall not be unreasonably withheld or delayed if such other accreditation is applicable to the Works or the Maintenance for which it is proposed and meets the intent of ISO/IEC 17025.

4.3 Remedial Work

(a) Project Co shall be responsible at its own cost for any remedial work required as a result of any failure to pass any calibration, sample, test or trial required in accordance with this Project Agreement or any Quality Documentation or as a result of any laboratory not being duly accredited as required by Section 4.2 – Accreditation Standards of this Schedule.

PART 5
QUALITY AUDITS AND MONITORING

5.1 Quality Audit Plans

(a) Specific Requirements

(i) Project Co shall provide a Quality Audit Plan to the City within 30 days after Financial Close and provide an updated Quality Audit Plan at twelve month intervals thereafter.

(ii) The Quality Audit Plan shall detail the Internal Quality Audits and the External Quality Audits that will be conducted by Project Co on its own processes and those of Project Co Parties, and the planned dates of such Quality Audits.

(b) Project Co shall provide an updated Quality Audit Plan at twelve month intervals following submission of the initial Quality Audit Plan.

5.2 Project Co's Quality Audits

(a) General

(i) Project Co shall conduct Internal Quality Audits and External Quality Audits of its own processes and those of Project Co Parties in accordance with the requirements of this Schedule, and the Quality Documentation, including the Quality Audit Plan referred to therein. These audits shall be conducted at least quarterly or as agreed upon with the City. The purpose of Project Co's quality auditing process is to confirm that all activities comprising the Works and the Maintenance are in compliance with the Quality Manual and Quality Management Plans, to identify all Non-Conformances and necessary Corrective Actions and Preventive Actions and to facilitate continuous improvement.

(ii) The Quality Director shall schedule Internal Quality Audits and External Quality Audits at least quarterly or as agreed upon with the City.

(iii) Within 14 days of completion of any Quality Audit, Project Co shall document, or cause to be documented, the results of such Quality Audit in an audit report and make such report available to the City upon request.

(b) Specific Requirements

(i) The Quality Director shall schedule Internal Quality Audits and External Quality Audits to ensure that all key processes are reviewed regularly (at least quarterly or as agreed upon with the City).

(ii) Where necessary, follow-up audits shall be scheduled to ensure that identified Corrective Actions and Preventive Actions are carried out in a timely fashion.

(iii) Internal Quality Audits and External Quality Audits shall be scheduled taking into account the status and importance of the processes being audited as well as the results of previous audits.

5.3 City's Quality Audits

(a) General

(i) The City shall, following the submission of the Quality Documentation in accordance with this Schedule, review the Quality Documentation to identify the critical activities and processes described in the Quality Manual and Quality Management Plans on which City's auditing efforts and resources should be directed. City shall determine the frequency of auditing through regular and ongoing review of Project Co's performance and management systems. Procedures and activities relating to the Works and the Maintenance that show good audit performance may have the frequency of auditing decreased, while those that show poor performance or increased risk of Non-Conformances may have the frequency of auditing increased. Without limiting Project Co's obligations under the Project Agreement, Project Co shall provide and shall ensure Project Co Parties provide City's auditors with all documentation, records, access, facilities and assistance requested in connection with City's Quality Audit activities.

(ii) Project Co shall prepare a Corrective Action plan, and, if appropriate, a Preventive Action plan, and submit it to the City within 20 Business Days of the closing meeting.

(b) Specific Requirements

(i) City reserves the right to conduct follow up reviews on reasonable, but not less than one Business Day's, notice to Project Co to determine if Project Co's Corrective Action plan or Preventive Action plan has been implemented and completed.

(c) Types of Quality Audits

(i) The following two types of Quality Audits may be conducted by, or on behalf of, City in its discretion:

(A) Surveillance Quality Audits – scheduled or unscheduled field audits conducted on a random basis or on specific areas of interest throughout the Project Term. The objective of these surveillance audits is to monitor Project Co's activities involving the Works and the Maintenance, including but not limited to workmanship, performance measures and general quality of materials. The City shall, during the performance of Surveillance Quality Audits, record any observations and inform Project Co of any deficiencies that require further evaluation. Any noted

deficiencies shall be resolved to the satisfaction of the City through evidence of Project Co's deficiency evaluation findings or the Non-Conformance process set forth in Part 7 of this Schedule; and

(B) Quality Management System Audits – scheduled audits conducted at specific times to assess the performance of and compliance with the Quality Management System. City's lead auditor shall contact the Quality Director and confirm the scope and schedule of the audit, and schedule for associated audit meetings. At the audit opening meeting with Project Co, City's lead auditor shall review the audit scope and objectives. City's auditors shall conduct audit interviews, and document any observations on prepared checklists. At the end of the audit interviews, City's lead auditor shall evaluate the observations and identify observed procedural or performance Non-Conformance that require Corrective Action. At the audit closing meeting, occurring as soon as reasonably possible after completion of the audit, City's lead auditor shall discuss the observations and inform Project Co of any observed Non-Conformances and audit recommendations.

(ii) Additional information relating to City Quality Audits with respect to particular Quality Management Plans is identified in the appendices to this Schedule.

5.4 City Monitoring

(a) In addition to carrying out any scheduled and unscheduled External Quality Audits of the Quality Management System (including audits relating to compliance with all Quality Documentation) as provided in Section 5.3 – City's Quality Audits of this Schedule, the City may, at its discretion, monitor and verify the operation of the Quality Management System by, inter alia, carrying out spot checks and making independent inspections and tests of any Works, Maintenance, or material including any Works, Maintenance, or material which fails any test or is suspected by the City of not complying with the requirements of this Project Agreement.

5.5 Deficient Quality Audits

(a) If either:

(i) the City reasonably believes that Project Co is failing to conduct Quality Audits of its Quality Management System as required by this Project Agreement in any material respect or if such Quality Audits are not conducted in compliance with the ISO 9001:2008 Standard by personnel competent to conduct such Quality Audits; or

(ii) any auditing, monitoring or spot-checks of the Quality Management Systems reveals material deficiencies in the Quality Management System or the implementation thereof,

City may carry out increased levels of External Quality Audits (whether in number, duration or detail) of all or any aspect of the Quality Management System until such time as the City is reasonably satisfied that none of the circumstances described in this Section continue to exist.

5.6 Costs of Audits

(a) If the City carries out any audit pursuant to Section 5.3 – City's Quality Audits, Section 5.4 – City Monitoring or Section 5.5 – Deficient Quality Audits of this Schedule, and the results of such audit shows any Non-Conformance that materially interferes with the delivery of the Works or the Maintenance in accordance with the Output Specifications, Quality Manual and Quality Management Plans, then without limiting any other rights and remedies of City, Project Co shall compensate City for all costs incurred in carrying out such audit (including the relevant administrative expenses of City, including an appropriate sum in respect of general staff costs and overheads). All other audits carried out by the City pursuant to Section 5.3 – City's Quality Audits, Section 5.4 – City Monitoring or Section 5.5 – Deficient Quality Audits, of this Schedule shall be at City's cost.

5.7 Third Party Audits

(a) Third party Quality Audits shall be conducted as required under the ISO 9001:2008 Standard on the Quality Management System by an accredited certification agency acceptable to City and Project Co, each acting reasonably, and audit reports in respect of such External Quality Audits initiated by Project Co shall be made available to the City upon request.

(b) The first Third Party Quality Audit shall be conducted following 120 days after Financial Close. Subsequent Third Party Quality Audits shall be conducted annually or as agreed upon with the City.

5.8 Traffic Management Auditing

(a) For the purpose of facilitating the conduct of Internal Quality Audits and External Quality Audits relating to traffic management during both the Works and the Maintenance, Project Co shall develop and implement a checklist (a "site condition rating checklist") acceptable to City, for use by each of Project Co and City.

(b) The site condition rating checklist shall provide the framework for auditing the safety and overall management of traffic against the requirements contained in the Traffic and Transit Management and Mobility Plan, the requirements of Part 7 – Traffic and Transit Management and Construction Access of the Output Specifications.

(c) The site condition rating checklist, at a minimum, shall include the following information categories:

(i) Traffic and Transit Management and Mobility Plan – in relation to the approved site specific plan as required by Article 7 – Traffic and Transit Management and Mobility Plan of Part 7 – Traffic and Transit Management and Construction Access of the Output Specifications; and

(ii) General Traffic Management Requirements – in relation to Article 1 – General Traffic Management Requirements of Part 7 – Traffic and Transit Management and Construction Access of the Output Specifications, including:

(A) Storage of materials;

(B) Traffic control devices;

(C) Roadside barriers;

(D) Drop-offs; and

(E) Temporary Pavement Markings.

(d) The requirements of this Section 5.8 – Traffic Management Auditing are in addition to, and do not limit, Project Co's other obligations under this Schedule, including Project Co's obligations under Part 7 – Non-Conformances of this Schedule.

PART 6
QUALITY DOCUMENTATION

6.1 Principles

(a) The minimum requirements and principles which apply to the Quality Documentation are set out in appendices A to F inclusive to this Schedule. Project Co's Quality Management System shall also comply with the requirements and principles of the ISO 9001:2008 Standard and this Schedule.

6.2 ISO Reference Documents

(a) Without limiting the requirement of the Quality Management System to comply with the ISO 9001:2008 Standard, Project Co's Quality Management System shall also incorporate the requirements of the following reference documents:

(i) ISO 9001:2008 Quality Management Systems – Requirements;

(ii) ISO 9000:2008 Quality Management Systems – Fundamentals and Vocabulary; and

(iii) ISO 19011:2002 Guidelines for Quality and/or Environmental Management Systems Auditing.

6.3 Quality Documentation Requirements

(a) The minimum documentation requirements for the Quality Management System are:

(i) the Quality Manual as required pursuant to Section 2.5 – Documentation Deliverables of this Schedule;

(ii) the Quality Management Plans for all aspects of the Works and the Maintenance as required pursuant to Section 2.5 – Documentation Deliverables of this Schedule;

(iii) that each Quality Management Plan includes quality system procedures and process flow charts documenting who performs the Works, what they do, and what evidence shall be generated that they have performed quality related aspects of the Works correctly;

(iv) the Quality Audit Plan required pursuant to Section 5.1 – Quality Audit Plans of this Schedule; and

(v) the Quality Records required pursuant to Section 6.8 – Quality Records of this Schedule.

6.4 Submission of Quality Documentation

(a) If any Quality Documentation relies on or incorporates any supporting Quality Documentation then such supporting Quality Documentation or the relevant parts thereof shall (unless the City otherwise agrees) be submitted to the City at the time that the relevant Quality Documentation or part thereof or change, addition or revision to the Quality Documentation is submitted in accordance with the Review Procedure and the contents of such supporting Quality Documentation shall be taken into account in the consideration of the relevant Quality Documentation or part thereof or change, addition or revision to the Quality Documentation in accordance with the Review Procedure. The City may require the amendment of any such supporting Quality Documentation to the extent necessary to enable the relevant Quality Documentation to satisfy the requirements of this Schedule.

6.5 Project Co Obligation to Update

(a) Project Co shall be responsible for proactively updating its Quality Management System and all Quality Documentation from time to time, in accordance with the procedures set forth in this Project Agreement, to ensure that the Quality Management System and all Quality Documentation are, and at all times remain, in full compliance with the ISO 9001:2008 Standard and the requirements of this Project Agreement.

6.6 Changes to Quality Documentation

(a) Project Co shall submit to the City in accordance with the Review Procedure any proposed changes or additions to or revisions of any of the Quality Documentation.

(b) If Project Co does not propose any change, pursuant to Section 6.6 (a) of this Schedule, which City determines to be required then City may propose such change and it shall be dealt with as though it had been proposed by Project Co pursuant to Section 6.6 (a) of this Schedule and shall not be treated as a Variation. Any dispute between the Parties in respect of any such change shall be resolved in accordance with the Dispute Resolution Procedure.

6.7 Amendment of Quality Documentation

(a) If there is no unresolved objection by the City under the Review Procedure to a part of the Quality Documentation pursuant to Section 6.4 – Submission of Quality Documentation of this Schedule or to a change, addition or revision proposed pursuant to Section 6.6 (a) – Changes to Quality Documentation of this Schedule, then the Quality Documentation shall be amended to incorporate such part, change, addition or revision.

6.8 Quality Records

(a) Project Co shall establish and maintain complete and accurate quality management records (the "**Quality Records**").

(b) The Quality Records shall provide objective evidence of conformance with all requirements of this Project Agreement, compliance with the ISO 9001:2008 Standard and the effective operation of the Quality Management System.

6.9 Quality Management System Reports

(a) For each month of the Project Term, Project Co shall prepare, and submit to the City within 15 Business Days of the start of the following month, a comprehensive Quality Management System report.

(b) Specific Requirements

(i) The monthly Quality Management System report shall address all quality management activities under each of the Quality Management Plans for that month and any outstanding quality issues from prior months.

(ii) The monthly Quality Management System reports shall, at a minimum, include the following information separately identified for the Quality Manual and for each Quality Management Plan:

(A) a Non-Conformance Report log summarizing all Non-Conformance Reports opened, closed, or still open from the previous report, in the relevant month and providing the following: “date open”, “date closed”, “status” (open, pending, closed), “disposition” (repair, rework, reject) and “description of status” which describes the current status of the Non-Conformance Report and if closed, when and how it was closed;

(B) Corrective Action and Preventive Action logs providing details of the Corrective Actions and Preventive Actions performed during the month and their close-out status;

(C) a summary of any inspection and testing activities conducted during the month;

(D) Internal Quality Audits and External Quality Audits performed during the month and a four month look-ahead schedule for planned future Quality Audits;

(E) any continual improvement initiatives taken during the month;

(F) any other information required to be included in the monthly Quality Management System reports pursuant to any of the appendices to this Schedule or the terms of the relevant Quality Management Plan; and

(G) any changes made to the Quality Management System or the Quality Documentation in compliance with the provisions of this Project Agreement.

(iii) Project Co's monthly Quality Management System reports shall include a summary of all environmental quality management activities during each month.

6.10 Additional Information

(a) Notwithstanding any other provision of this Schedule, Project Co shall provide the City with such information as the City may request from time to time to demonstrate compliance with this Schedule.

PART 7
NON-CONFORMANCES

7.1 Non-Conformance Reporting Process

(a) The Non-Conformance reporting process, from initial creation through to closeout of a Non-Conformance, shall follow the process outlined below:

(i) If Project Co or City discovers a Non-Conformance, it shall initiate a Non-Conformance Report in compliance with the ISO 9001:2008 Standard as follows:

(A) Project Co initiated Non-Conformance Reports – Project Co shall provide a Non-Conformance Report identifying the Non-Conformance to the City within 2 Business Days of discovery of the Non-Conformance; or

(B) City initiated Non-Conformance Reports – If at any time City is notified, or otherwise becomes aware, that there is any Non-Conformance relating to the Works or the Maintenance, the City may issue a Non-Conformance Report, without prejudice to any other right or remedy available to City, including the assignment of quality failure points pursuant to Schedule 20 – Payment Mechanism.

(ii) A Non-Conformance Report initiated by either Party is issued to the Quality Director, thereby activating the Non-Conformance Report. The date of issue shall be recorded denoting the commencement of the time period for which the Non-Conformance Report has an 'open' status.

(iii) The Quality Director shall in response to the Non-Conformance Report describe a disposition of the Non-Conformance and a Corrective Action in compliance with the ISO 9001:2008 Standard. Acceptable responses are set out in Table 7.1 for various scenarios.

Table 7.1

Non-Conformance Status	Disposition	Corrective Action
Physical rectification has been undertaken	Provide confirmation that the rectification work has remedied the Non-Conformance	Describe any improvements to delivery process
Physical rectification is proposed	Provide a plan committing to scope and timing of rectification works	Describe any improvements to delivery process
No physical rectification is proposed	Objection	N/A

(iv) Project Co shall investigate and respond to all Non-Conformance Reports.

(v) Project Co may object to the issuance of any Non-Conformance Report by the City. If such objection has not been resolved by mutual agreement between the City and Project Co within 5 Business Days of delivery by Project Co to the City of a notice of the objection, then either Party may refer the matter to the Dispute Resolution Procedure for determination.

(vi) If Project Co fails to object to the issue by the City of a Non-Conformance Report within 5 Business Days, Project Co is deemed to have accepted that Non-Conformance Report.

(vii) If there is no outstanding notice of objection, and an acceptable disposition and Corrective Action are documented, the Quality Director records the date denoting the end of the time period for which the Non-Conformance Report has an 'open' status. The Quality Director shall then change the Non-Conformance Report status to 'closed' once the nonconformity has been implemented and verified, and shall provide a copy of the Non-Conformance Report to the City within 2 Business Days thereafter.

7.2 Non-Conformance Report Tracking System

(a) Project Co shall implement and maintain a Non-Conformance Tracking System to monitor the status of all Non-Conformance Reports initiated by City and Project Co.

(b) The Non-Conformance Tracking System shall be fully operating, with the following minimum requirements, within 90 days from Financial Close:

(i) comprise a single repository containing both Project Co and City initiated Non-Conformance Reports;

(ii) have the ability to attach supporting material such as photos and documents;

(iii) provide live access to the current Non-Conformance Report status to both Project Co and City;

(iv) record quality failure points in accordance with Part E of Schedule 20 – Payment Mechanism; and

(v) produce monthly summary reports for delivery to the City of "open" Non-Conformance Reports, quality failure points accrued within each performance threshold category in any given month, and the total quality failure points accrued across all performance threshold categories in any given month.

7.3 Performance Measures

(a) Project Co shall resolve Non-Conformances within the response time specified on the Non-Conformance Reports.

7.4 Non-Conformance Records

(a) In addition to the maintenance of the Non-Conformance Tracking System under Section 7.2 – Non-Conformance Report Tracking System of this Schedule, Project Co shall maintain and make available to City upon request, records of:

(i) each Non-Conformance;

(ii) the reference numbers of all Non-Conformance Reports;

(iii) a description of all Non-Conformance Reports;

(iv) the proposed actions by Project Co to rectify each Non-Conformance;

(v) the date at which each Non-Conformance was identified; and

(vi) the date and time at which a Non-Conformance specified in a Non-Conformance Report was rectified.

PART 8
PERFORMANCE REPORTING

8.1 Obligation to Report

(a) Project Co shall prepare a report (a "**Performance Monitoring Report**") in respect of each Payment Period. The Performance Monitoring Report shall be submitted to the City within 5 Business Days following the end of each Payment Period, and shall describe performance of the Maintenance Services for the purposes of Schedule 20 – Payment Mechanism in respect of the relevant Payment Period. The Performance Monitoring Report shall set out Project Co's calculation of each of the following (each stated separately), and shall be in accordance with the Daily Operating Reports for the relevant Payment Period:

(i) Scheduled Revenue Service Vehicle Kilometres for the relevant Payment Period, for both Peak Period and Off-Peak Period;

(ii) Revenue Service Vehicle Kilometres for the relevant Payment Period, for both Peak Period and Off-Peak Period;

(iii) Total Vehicle Kilometers for the relevant Payment Period, including amounts for pull-in/pull-out movements and for training purposes;

(iv) Total of all Revenue Service Vehicle Kilometres credited to Project Co for the relevant Payment Period due to a Non-Project Co. Cause;

(v) Total of all Scheduled Station Hours for the relevant Payment Period (broken down by station name and station group);

(vi) Total of all Station Availability Failure Hours (broken down by Peak Period, Off-Peak Period, station name and station group);

(vii) any Service Failures and associated Service Failure Points, in respect of that month;

(viii) any Quality Failures and associated Quality Failure Points in respect of that month; and

(ix) total of all Failure Points assigned due to Station Availability Failure and/or Vehicle Availability Failure.

(b) The following aspects of Performance Monitoring Reports are addressed in Schedule 20 – Payment Mechanism:

(i) the applicability of Performance Monitoring Reports to the Payment Mechanism;

(ii) claims regarding errors or omissions in a Performance Monitoring Report; and

(iii) failure by Project Co to monitor or report.

PART 9
PERFORMANCE MEASURES

9.1 Application of Performance Criteria

(a) The Quality Failures set out below and associated payment penalties shall not be applicable until following the Revenue Service Availability Date.

9.2 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency
AF = Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime St. Avail = Captured by the Station Availability deduction regime	N/A = Not Applicable	N/A = Not Applicable ND = Correct by start of service the following day	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. or Rem. Time	Recording Frequency	Application (Maximum Project Co Exposure)
5.1(b)	Project Co shall provide an updated Quality Audit Plan at twelve month intervals following submission of the initial Quality Audit Plan.	QF	Medium	NA	1 Month	M	1 QF per Contract Month

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. or Rem. Time	Recording Frequency	Application (Maximum Project Co Exposure)
5.2(ii)	The Quality Director shall schedule Internal Quality Audits and External Quality Audits at least quarterly or as agreed upon with the City.	QF	Medium	NA	1 day	Q	1 QF per day
5.2(iii)	Within 14 days of completion of any Quality Audit, Project Co shall document, or cause to be documented, the results of such Quality Audit in an audit report and make such report available to the City upon request.	QF	Medium	NA	1 day	PE	1 QF per day
5.3(ii)	Project Co shall prepare a Corrective Action plan, and, if appropriate, a Preventive Action plan, and submit it to the City within 20 Business Days of the closing meeting.	QF	Medium	NA	1 day	PE	1 QF per day

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. or Rem. Time	Recording Frequency	Application (Maximum Project Co Exposure)
6.9(a)	For each month of the Project Term, Project Co shall prepare, and submit to the City within 15 Business Days of the start of the following month, a comprehensive Quality Management System report.	QF	Medium	NA	1 day	PE	1 QF per day
7.3	Project Co shall resolve Non-Conformances within the response time specified on the Non-Conformance Reports.	QF	Medium	NA	1 day	PE	1 QF per day
8.1	The Performance Monitoring Report shall be submitted to the City within 5 Business Days following the end of each Payment Period.	QF	Medium	NA	1 day	PE	1 QF per day

APPENDIX A
QUALITY MANUAL

A.1 Quality Manual

(a) Project Co shall provide a comprehensive Quality Manual that describes the Quality Management System for all aspects of the Works and the Maintenance. The Quality Manual shall establish the Quality Policy and Quality Objectives for all aspects of the Works and the Maintenance and, in compliance with the requirements of the ISO 9001:2008 Standard, shall describe the processes that shall be established, implemented, controlled, and continually improved to achieve the established Quality Objectives.

(b) The Quality Objectives shall be measurable, consistent with the Quality Policy and linked to meeting the needs and performance expectations of City in respect of the Project. The Quality Management System described in the Quality Manual shall include all the activities required to achieve these Quality Objectives, including project controls such as scope, cost, schedule and general document control management activities. All of these activities shall be subject to Internal Quality Audits and External Quality Audits.

(c) The Quality Manual shall describe the Project Co Parties involved in performing the Works and the Maintenance and how key management activities (such as Project control, traffic management and management of Project design, Construction Activities, the Maintenance and environmental matters) shall interface with each other. The Quality Manual shall also provide the organization chart identifying the authority and responsibilities of all Key Individuals and other key personnel involved with the aforementioned aspects of the Project. The Quality Manual shall also show how the various levels of Quality Management System documentation are linked together.

(d) The Quality Manual shall clearly define the reporting function and authority of Project Co's Quality Director who shall liaise with the City and act as the single point representative of Project Co for all matters relating to quality management.

APPENDIX B
DESIGN QUALITY MANAGEMENT PLAN

B.1 Design Quality Management Plan

(a) Project Co shall provide a comprehensive Design Quality Management Plan ("**DQMP**") that describes how it intends to manage the design processes for the Project in compliance with the ISO 9001:2008 Standard, its Quality Manual and the provisions of this Project Agreement. The DQMP is to apply throughout the Works and for rehabilitation work throughout the Project Term.

(b) The DQMP shall contain an organizational chart identifying Key Individuals and other key personnel responsible for design management and their relationship (see Appendix D) with the Quality Director for Project Co's overall Quality Management System as documented in Project Co's Quality Manual. It shall also contain a description of the responsibilities, qualifications, and authority of the above personnel and the organizational interfaces between those responsible for design management and other engineering and construction management disciplines.

(c) Project Co shall appoint a Quality Manager who shall be responsible for the DQMP and shall:

(i) have experience in a similar role on a successful project of similar scope and have successfully completed an ISO 9001 Lead Auditor Course; and

(ii) report to the Quality Director.

(d) The DQMP shall, at a minimum, include or reference detailed quality system procedures and process flow charts for the following processes:

(i) design input and output review;

(ii) design verification to ensure that design input requirements have been met;

(iii) design validation to ensure that the completed project is capable of meeting its intended use;

(iv) design changes;

(v) quality assessment and procurement of Project Co Parties responsible for design;

(vi) External Quality Audits of Project Co Parties responsible for design;

(vii) Internal Quality Audits;

(viii) Corrective Actions, Preventive Actions and opportunities for improvement;

(ix) document management; and

(x) control of Quality Records.

(e) The above procedures and flow charts shall document who does the work, what they do, and what evidence is generated that they have done the work correctly.

APPENDIX C
CONSTRUCTION QUALITY MANAGEMENT PLAN

C.1 Construction Quality Management Plan

(a) Project Co shall provide a comprehensive Construction Quality Management Plan ("**CQMP**") that describes how it intends to manage the Construction Activities in compliance with the ISO 9001:2008 Standard, its Quality Manual and the provisions of this Project Agreement. The CQMP is to apply throughout the Project Term.

(b) The CQMP shall contain an organizational chart identifying Key Individuals and other key personnel responsible for construction management and their relationship (see Appendix D) with the Quality Director for Project Co's overall Quality Management System as documented in Project Co's Quality Manual. It shall also contain a description of the responsibilities, qualifications, and authority of the above personnel and the organizational interfaces between those responsible for construction management and other disciplines such as design management, Maintenance, environmental management and traffic management.

(c) Project Co shall appoint a Quality Manager who shall be responsible for the CQMP and shall:

(i) have experience in a similar role on a successful project of similar scope and have successfully completed an ISO 9001 Lead Auditor Course; and

(ii) report to the Quality Director.

(d) The CQMP shall, at a minimum, include or reference detailed quality system procedures and process flow charts for the following processes:

(i) construction safety audits;

(ii) inspection, testing and monitoring;

(iii) materials identification and traceability;

(iv) quality assessment and procurement of Project Co Parties responsible for construction;

(v) External Quality Audits of Project Co Parties responsible for construction;

(vi) Internal Quality Audits;

(vii) control of nonconforming product;

(viii) Corrective Actions, Preventive Actions and opportunities for improvement;

(ix) document management; and

(x) control of Quality Records.

(e) The above procedures and flow charts shall document who does the work, what they do, and what evidence is generated that they have done the work correctly.

(f) The CQMP shall also include or reference an inspection and test plan, which if referenced, shall also be submitted through the Review Procedure, detailing all major on and off site inspection and test activities for Works performed by Project Co and the Project Co Parties. The inspection and test plan shall, at a minimum, include:

(i) a description of the inspection, testing and monitoring activity;

(ii) frequency of inspections, tests and monitoring;

(iii) reference to standards, codes, specifications, and acceptance criteria;

(iv) reports and checklists required;

(v) personnel responsible for inspection, testing and monitoring activity;

(vi) quality assurance review, witness and hold points; and

(vii) description and frequency of geotechnical instrumentation monitoring and adherence to acceptance criteria.

APPENDIX D
MAINTENANCE AND REHABILITATION QUALITY MANAGEMENT PLAN

D.1 Maintenance and Rehabilitation Quality Management Plan

(a) Project Co shall provide a comprehensive Maintenance and Rehabilitation Quality Management Plan ("**MRQMP**") that describes how it intends to monitor and measure its performance of the Maintenance in compliance with the ISO 9001:2008 Standard, its Quality Manual and the provisions of this Project Agreement. The MRQMP shall also be aligned with all relevant Project Agreement performance measures. The MRQMP is to apply following Substantial Completion.

(b) The MRQMP shall contain an organizational chart identifying Key Individuals and other key personnel responsible for management of Maintenance and their relationship with the Quality Director for Project Co's Quality Management System as documented in Project Co's Quality Manual. It shall also contain a description of the responsibilities, qualifications, and authority of the above personnel and the organizational interfaces between those responsible for management of Maintenance and other disciplines such as design management, construction management, environmental management and traffic management.

(c) Project Co shall appoint a Quality Manager who shall be responsible for the MRQMP and shall:

(i) have experience in a similar role on a successful project of similar scope and have successfully completed an ISO 9001 Lead Auditor Course; and

(ii) report to the Quality Director.

(d) Project Co shall develop documented quality system procedures and process flow charts to ensure that all Project Agreement requirements in respect of the Maintenance are met or exceeded. These procedures and flow charts shall document who does the work, what they do, and what evidence is generated that they have done the work correctly.

(e) The MRQMP shall include a compliance monitoring process to track compliance with all performance measures. The performance measures compliance monitoring process must clearly describe the approach taken in assessing compliance, and define the frequency and method of monitoring and reporting such compliance. The City shall review Project Co's performance measures compliance monitoring process and may request changes that the City considers appropriate to facilitate the accurate and appropriate monitoring and reporting of compliance with the performance measures and otherwise to meet the requirements of this Project Agreement. Project Co shall promptly implement any such changes requested by the City. Project Co's performance measures compliance monitoring process shall be subject to ongoing review by the City throughout the Project Term.

APPENDIX E
TRAFFIC QUALITY MANAGEMENT PLAN

E.1 Traffic Quality Management Plan

(a) Project Co shall provide a comprehensive Traffic Quality Management Plan ("**TQMP**") that describes how it intends to administer the traffic management processes in connection with the Project in compliance with the ISO 9001:2008 Standard, its Quality Manual and the provisions of this Project Agreement. The TQMP is to apply throughout the Project Term.

(b) The TQMP shall contain an organizational chart identifying Key Individuals and other key personnel responsible for traffic management and their relationship with the Quality Director for Project Co's overall Quality Management System as documented in Project Co's Quality Manual. It shall also contain a description of the responsibilities, qualifications, and authority of the above personnel and the organizational interfaces between those responsible for traffic management and other disciplines such as design management, construction management, the Maintenance and environmental management. The TQMP shall address the manner in which traffic management relates to Project design, Construction Activities and Maintenance.

(c) Project Co shall appoint a Quality Manager who shall be responsible for the TQMP and shall:

(i) have experience in a similar role on a successful project of similar scope and have successfully completed an ISO 9001 Lead Auditor Course; and

(ii) report to the Quality Director.

(d) The TQMP shall at a minimum, include or reference detailed quality system procedures and process flow charts for the following processes:

(i) major processes outlined in the Traffic Management Plan and the associated sub plans listed in Part 3, Article 7 of the Design and Construction Specifications;

(ii) External Quality Audits of Project Co Parties responsible for traffic management;

(iii) Internal Quality Audits;

(iv) management of Non-Conformances;

(v) Corrective Actions and Preventive Actions;

(vi) document management; and

(vii) control of Quality Records.

(e) The above procedures and flow charts shall document who does the work, what they do, and what evidence is generated that they have done the work correctly.

(f) When the above processes are already covered as part of another Quality Management Plan, the process heading still needs to be identified as part of the TQMP; however the details can be minimized to a reference to the other Quality Management Plan and section or paragraph where the details are provided. The referenced Quality Management Plan and section or paragraph must indicate specific requirements with regards to the above processes as it relates to traffic quality management. Notwithstanding the above, processes that fall within the specific requirements of the Traffic Management Plan must include detailed quality system procedures and process flow charts under the TQMP.

APPENDIX F
ENVIRONMENTAL QUALITY MANAGEMENT PLAN

F.1 Quality Management Plan – Environmental

(a) Project Co shall provide as part of a comprehensive Quality Management Plan ("**QMP**") a section that describes how it intends to manage the environmental components of the Project in compliance with Project Co's Environmental Management Plan the requirements of which are described in Schedule 17, its Quality Manual and the provisions of this Project Agreement. The QMP for the environmental component is to apply throughout the Project Term.

(b) The environmental component of the QMP shall contain reference to Project Co's Environmental Management Plan as described in Schedule 17, an organizational chart identifying Key Individuals and other key personnel responsible for environmental management and their relationship with the Quality Director for Project Co's overall Quality Management System as documented in Project Co's Quality Manual. It shall also contain a description of the responsibilities, qualifications, and authority of the above personnel and the organizational interfaces between those responsible for environmental management and other discipline such as management of Project design, construction and maintenance and rehabilitation disciplines.

(c) Project Co shall appoint a Quality Manager who shall be responsible for the environmental component of the QMP and shall:

(i) have experience in a similar role on a successful project of similar scope and have successfully completed an ISO 9001 Lead Auditor Course; and

(ii) report to the Quality Director.

(d) The environmental component of the QMP shall include or reference detailed quality system procedures and process flow charts for the following processes:

(i) satisfying and ensuring compliance with Project Co's environmental obligations, including compliance with the Environmental Approvals and in particular, the preparation and implementation of an Environmental Management System and specific plans as detailed elsewhere in this Project Agreement;

(ii) obtaining and maintaining applicable Permits, Licences and Approvals;

(iii) environmental monitoring and reporting;

(iv) environmental incident reporting and tracking;

(v) External Quality Audits of Project Co Parties responsible for environmental aspects of the Project;

(vi) Internal Quality Audits;

(vii) control of Non-Conformances;

(viii) Corrective Actions, Preventive Actions and opportunities for improvement;

(ix) document management; and

(x) control and retention of Quality Records.

(e) The above procedures and flow charts shall document who does the work, what they do, and what evidence is generated that they have done the work correctly.

(f) The City, in the course of its Quality Documentation review, shall pay special attention to Project Co's environmental component of the QMP to verify that Project Co has taken full responsibility for all of the environmental requirements as specified in Schedule 17 – Environmental Obligations and elsewhere in the Project Agreement, including obtaining approvals from relevant Governmental Authorities.

APPENDIX G
AUDIT OF TEMPORARY TRAFFIC MANAGEMENT – SAMPLE SITE REPORT

Contractor ..... **Location** .....

Activity .....

Auditor ..... **Date & time** .....

Y/N = Yes / No *A-S-N = All – Some – None*

Advanced Warning Area

- Signage *A - S - N* .....
- Visibility A - S - N .....
- Placement A - S - N .....
- Quality A - S - N .....

Transition Area, Buffer Space, Work Area

- **Signage** A - S - N.....
  - Visibility *A - S - N*.....
  - Placement A - S - N.....
  - Quality A - S - N.....
  - **Delineation** A - S - N.....
- Placement A - S - N.....
  - Quality A - S - N.....
- Spaced Correctly Y / N .....

Other issues

- Excavations *Y / N*.....
- Pedestrians from work Y / N.....
- Pedestrians from traffic Y / N.....
- Cyclists from work Y / N.....
- Cyclists from traffic Y / N.. .....
- Advance Warning area A - S - N.....
- Transition area A - S - N.....
- Buffer Space A - S - N.....
- Work Area A - S - N.....
- Warning lights A - S - N.....
- Vehicles operating with traffic flow A - S - N.....
- Vehicles parked with traffic flow A - S - N.....
- Vehicles outside zone A - S - N.....
- Entering/leaving with traffic flow A - S - N.....
- Workers safety A - S - N.....
- Traffic Control Plan (TCP) or TCP Supervisor on site Y / N.....

Termination Area

- **Sign placement** A - S - N .....
- **Sign quality** A - S - N .....

General Observations .....

SCHEDULE 12

[Intentionally Deleted]

SCHEDULE 13

PROJECT CO PROPOSAL EXTRACTS

[REDACTED]

SCHEDULE 14

COMMISSIONING

1.1 Applicable Standards

(a) Project Co shall plan, schedule, coordinate and execute the Project Co Commissioning of the complete operating System Infrastructure. The System Infrastructure provided as part of the Works shall be in accordance with the standards set out in this Schedule 14.

(b) Commissioning includes required work for LEED Certification at the MSF. Project Co shall be responsible for achieving all commissioning prerequisites and credits to achieve the LEED Certification of the MSF administration building and maintenance building.

(c) Project Co shall comply with Good Industry Practice (Works) for Project Co Commissioning for all commissioning activities set out in this Schedule 14. Project Co shall provide all of the documentation to the City in accordance with the requirements of Schedule 10 - Review Procedure.

1.2 Project Co Commissioning Coordinator

(a) Project Co shall appoint a commissioning coordinator (the "**Project Co Commissioning Coordinator**") to perform the obligations of Project Co as set out in this Schedule 14.

(b) The Project Co Commissioning Coordinator shall be an individual, company or agency having a minimum of 10 years experience in the design or commissioning of vehicles, systems, equipment and facilities of similar scope and complexity, shall be licensed or authorized by the Association of Professional Engineers of the Province of Ontario and shall be familiar with and knowledgeable about each of the standards set out in this Schedule 14.

(c) The Project Co Commissioning Coordinator shall satisfy the requirements with respect to independence from the design or construction firms, as agreed by Project Co and the City 30 days prior to the start of the testing and commissioning activities.

1.3 Project Co Commissioning Parameters

(a) Project Co shall be responsible for preparing and executing a commissioning plan/strategy required to successfully demonstrate the performance of the System Infrastructure in accordance with the Project Agreement. The scope of the testing and commissioning plan/strategy will include Trial Running of the System in segments and as a fully integrated System to the extent necessary to demonstrate the functional capability and safety of the System.

(b) The testing and commissioning plan/strategy shall include, but not be limited to, the following:

(i) Relationship to safety and security management and other related System safety and security requirements;

(ii) Resumes of key personnel involved detailing years of experience;

(iii) Organization chart of the testing and commissioning team and their discipline responsibilities;

(iv) Planned resources;

(v) Specific requirements for the City interfaces;

(vi) Testing regime and test documentation procedures; and

(vii) Scheduling of the testing and commissioning activities.

(c) The testing and commissioning plan/strategy shall demonstrate how Project Co intends to validate and verify that the functional and technical requirements, Trial Running, performance criteria, quality and safety aspects of the system have been met or exceeded and that the overall OLRT System is fit for purpose.

(d) The commissioning plan/strategy shall be developed and modified as required to address the evolution of the Project.

(e) Project Co is solely responsible for all checking and verification activities relating to individual components, sub-systems, Vehicles, System, all associated equipment and facilities required prior to the formal testing and commissioning and acceptance testing programs necessary to demonstrate the fully integrated operation of the System Infrastructure to the satisfaction of Independent Certifier.

(f) Project Co shall formally issue the test and commissioning plan/strategy 60 days in advance of the test and commissioning program. The test and commissioning plan/strategy shall undergo review and modification as the project progresses as agreed by the City and Project Co.

(g) The test and commissioning plan/strategy shall permit the oversight and monitoring of testing and commissioning activities for the duration of the Project.

(h) With the exception of the obligation to supply drivers and controllers for commissioning, the City accepts no responsibility for Project Co Commissioning. Each element of the System Infrastructure shall be, wherever possible, thoroughly tested and commissioned as standalone subsystems operating in simulated worst case environments prior to being placed into service. This shall be demonstrated at FAI, FAT or SAT, whichever is applicable.

(i) Project Co shall prepare a test plan within six months of Financial Close. The test plan shall be subject to review and acceptance by the City, in accordance with Schedule 10 - Review Procedure.

(j) In addition to the tests specified in Schedule 15-2, the City (and its representatives) shall have the right, when acting reasonably, to identify specific testing requirements that will require validation.

(k) Project Co shall prepare individual test plans for each System test, and provide advance notice to the City 30 days prior to such testing. Individual test plans shall be subject to review and acceptance by the City, in accordance with Schedule 10 - Review Procedure.

(l) The Project Co Commissioning Coordinator shall convene a meeting of the Commissioning Team to review the Project Co Commissioning plan/strategy, set commissioning parameters, designate the responsibilities of the various parties and establish the documentation requirements for each stage of the Works and the Project Co Commissioning.

(m) Project Co shall create a schedule of commissioning activities (the "**Commissioning Schedule**") and shall incorporate the Commissioning Schedule into the Works Schedule.

(n) The Project Co Commissioning Coordinator shall submit monthly reports to the City in regards to progress of Project Co Commissioning.

(o) Project Co is responsible for the supply, installation, start-up, testing, adjustment and cleaning of each item of the System provided as part of the Works. Where applicable, Project Co Commissioning shall be completed in accordance with the equipment vendor's guidance.

(p) Project Co in implementing the Project Co Commissioning plan/strategy shall verify that:

(i) the System Infrastructure have been installed and are operating in accordance with the requirements of this Project Agreement;

(ii) the System Infrastructure performance meets or exceeds the requirements of the Output Specifications and this Project Agreement;

(iii) training has been provided and meets or exceeds the requirements of this Project Agreement;

(iv) As-Built Drawings and operating and maintenance manuals have been provided in accordance with this Project Agreement;

(v) LEED commissioning documentation required for achieving the LEED Certification has been prepared and copied to the City; and

(vi) LEED commissioning documentation for achieving the LEED Certification has been submitted per the requirements of LEED.

(q) Project Co shall provide System Infrastructure orientation to the Ottawa Emergency Services, including; the Fire Departments, Paramedics, and Police pursuant to Schedule 15-2 Part 1 Article 26.

1.4 Commissioning Team

(a) The Commissioning Team (the "**Commissioning Team**") shall be comprised of:

(i) a representative of Project Co including, where applicable, subcontractors;

(ii) a representative of the City;

(iii) the Project Co Commissioning Coordinator;

(iv) the Independent Certifier; and

(v) where applicable, representatives of the relevant Vehicle manufacturers and Equipment manufacturers.

(b) Project Co and each of its Subcontractors shall assign, where applicable, individuals from each relevant trade to the Commissioning Team and shall ensure that representatives of the relevant Equipment manufacturers and testing agencies are present during the relevant Project Co Commissioning meetings.

(c) Project Co shall provide all necessary labour, materials, equipment, testing apparatus and incidentals necessary to completely start-up, verify, performance test and commission each item System Infrastructure provided as part of the Works.

(d) After Financial Close, the Commissioning Team shall, when applicable, meet monthly to review the progress of the Project Co Commissioning.

1.5 Commissioning Procedures

(a) Project Co shall ensure that all regulation and code references in the Reference Documents, in addition to the provisions of Schedule 15-4 – OLRT Regulatory Framework, have been fully complied with.

(b) Project Co and the Project Co Commissioning Coordinator shall plan, prepare documentation and execute the Project Co Commissioning plan/strategy, process and procedures.

(c) Project Co shall ensure that each of the requirements set out in this Schedule 14 and those identified in Schedule 15 are completed.

(d) Training:

(i) Project Co shall provide a training schedule and agenda for each training session to the City for acceptance in accordance with Schedule 10 - Review Procedure. Operational and maintenance training shall be provided for all System Infrastructure. A complete listing of all training programs that Project Co is responsible for is located in Schedule 15-2 Part 1 Article 26.

(ii) The Project Co Commissioning Coordinator or designated delegate shall attend a sample of every training session to ensure the agenda is maintained and that quality training is provided. One training session for each category shall be video recorded in digital format. The disks shall be submitted to the City and labelled accordingly.

(iii) Project Co's design consultants shall provide an overview of the System Infrastructure, including an explanation as to why types of systems and Equipment were selected, identification of the design intent and discussion of the operating procedures required to maintain the design intent. These sessions shall be video recorded in digital format.

(iv) A portion of the training sessions for Equipment shall be conducted at the location of the Equipment.

(v) A portion of the training sessions for the System shall be conducted at the System operating stations (workstations).

(vi) All training sessions shall be logged and personnel shall be recorded as receiving training. Further refreshers shall be scheduled in line with safety, quality and training requirements.

(e) Integrated Revenue Service Availability Testing:

(i) Trial Running Objectives

(A) Project Co shall conduct Trial Running when the integrated System has been tested and is essentially ready for Revenue Service Commencement. Trial Running will be the final step in confirming readiness for Revenue Service Commencement.

(B) The fundamental objective of Trial Running is to exercise the complete integrated System, including all subsystems, operating personnel and operating procedures, to confirm readiness for Revenue Service Commencement. This can be subdivided into the following key objectives:

(I) to familiarize the operating and maintenance staff with the operation of the integrated system and Standard Operating Procedures;

(II) to exercise and validate the operating schedules and operational performance requirements; and

(III) to exercise and confirm the operating reliability of the subsystems simulated under various operating conditions (normal and emergency). The basic design requirements and safety and security requirements will have been verified through the testing and commissioning program prior to this stage of Trial Running.

(ii) Scope of Trial Running

(A) Project Co shall conduct the trial running for final acceptance which will be conducted for a period of 12 consecutive days following successful completion of testing and commissioning; verification by Project Co that there are no deficiencies to prevent safe running of the System; and verification that there are an adequate number of trained staff to operate the System. At the end of this exercise, the integrated system will be ready for Revenue Service Commencement.

(B) Trial Running shall be reviewed on a day by day basis by the Commissioning Team.

(C) The objective of this stage is to operate a full regular scheduled service on the full line using the peak and non-peak schedules for an extended period. Passengers will not be carried. The tests will include a variety of failure management scenarios that could reasonably be expected to occur in regular Revenue Service. The City will have the opportunity to review and approve the failure management scenarios that will be tested during Trial Running.

(iii) Performance Criteria for Trial Running Acceptance

(A) Project Co shall use the trial running period to collect operating data and evaluate system reliability, availability, and maintainability performance and to demonstrate that the process to collect, evaluate, and validate the operating data has been properly established. Using prescribed procedures, data on service deviations will be collected and assigned against the Vehicles and specific subsystems down to the LRU level. The database shall provide verification of system reliability to the LRU level. If the cumulative failure of any LRU exceeds 10% of the total LRU population, up to and including the completion of the Reliability Acceptance Test; Project Co shall redesign and replace the defective LRU's.

(B) Validation of the Trial Running acceptance shall be performed by the Independent Certifier.

(C) The Trial Running of the System will demonstrate to the satisfaction of the Independent Certifier that the specified travel times, headways and operational performance requirements can be achieved.

1.6 Project Co Commissioning Submittals

(a) Project Co shall prepare a design brief describing the System Infrastructure design and performance requirements, including the requirements of the Output Specifications prior to beginning the construction process.

(b) Project Co shall prepare and submit to the City the Project Co Commissioning plan/strategy identified in this Schedule 14.

(c) Project Co shall prepare and submit to the City test forms, verification forms and performance test forms for all equipment and systems. Test procedures should include but not be limited to the following:

(i) Test objectives;

(ii) Required Safety methods and prerequisite training required;

(iii) Associated tests and pass/fail criteria;

(iv) Reference specifications /standards and supporting literature;

(v) Staffing required, including requirements from the City;

(vi) Test methods;

(vii) Test equipment, jigs and supporting systems required;

(viii) Test schedule;

(ix) Test location;

(x) Identification of professional personnel and resumes of those responsible for sign-off; and

(xi) Test results and recommendations.

(d) Project Co shall prepare and submit to the City the performance testing and the commissioning progress management forms and the commissioning summary forms to be used for monthly reporting.

(e) Project Co shall prepare and submit to the City a detailed Commissioning Schedule each item of System Infrastructure provided as part of the Works.

(f) Project Co shall prepare and submit to the City detailed commissioning manuals for each item of System Infrastructure provided as part of the Works (the "**Commissioning Manuals**").

(g) All Commissioning Manuals shall include:

(i) name and logo as directed by the City;

(ii) name of the Project;

(iii) project number;

(iv) identification of each item of System Infrastructure commissioned;

(v) the date each item of System Infrastructure was commissioned;

(vi) the signature of the Project Co Commissioning Coordinator;

(vii) issue and date;

(viii) document version control; and

(ix) document amendments table.

(h) All Commissioning Manuals shall include:

(i) test reports;

(ii) configuration control records;

(iii) equipment check sheets (start-up, verification and performance) for each item of the System Infrastructure provided as part of the Works; and

(iv) interim and final acceptance check sheets for each item of the System Infrastructure provided as part of the Works.

(i) Project Co shall prepare and submit a system operation manuals in accordance with the requirements of Schedule 10 - Review Procedure.

(j) Project Co shall prepare and submit a re-commissioning manual in accordance with the requirements of Schedule 10 - Review Procedure.

(k) Project Co shall prepare and submit configuration control records in accordance with the requirements of Schedule 10 - Review Procedure.

1.7 Coordination with the City and the Independent Certifier

(a) The Project Co Commissioning Coordinator shall co-ordinate with the City and the Independent Certifier, throughout the Project Co Commissioning process.

(b) This co-ordination shall include:

(i) review of test, verification and performance test forms;

(ii) review of commissioning progress management forms and performance testing;

(iii) review of the Project Co Commissioning plan/strategy;

(iv) review of the Commissioning Schedule;

(v) sample witnessing of tests and performance testing;

(vi) review of the training curriculum and materials as outlined in Schedule 15-2 Part 1 Article 26 and scheduling;

(vii) review of the maintenance manuals;

(viii) sample witnessing of seasonal performance testing;

(ix) review of the commissioning reports;

(x) attend commissioning meetings; and

(xi) report to the City regarding the progress of commissioning.

1.8 Light Rail Systems and Vehicles to be Commissioned

(a) The Project Co Commissioning shall include the commissioning of all System and Vehicle items of the System Infrastructure provided as part of the Works including, but not limited to, the following:

(i) Traction Power System;

(ii) Revenue Vehicles;

(iii) Non-Revenue Vehicles;

(iv) Train Control Systems;

(v) Communication system;

(vi) YCC/BCC and TSCC;

(vii) Corrosion control system;

(viii) Tracks; and

(ix) OCS.

1.9 Guideway and Building Systems to be Commissioned

(a) The Project Co Commissioning shall include the commissioning of all Guideway and building system items of the System Infrastructure provided as part of the Works including, but not limited to, the following:

(i) SCADA system;

(ii) Maintenance equipment systems;

(iii) Site development;

(iv) Building envelope;

(v) Elevators and escalators;

(vi) Fire protection systems;

(vii) Plumbing systems;

(viii) HVAC systems;

(ix) Building automation systems;

(x) Electrical systems;

(xi) Security and safety systems;

(xii) Communication systems (excluding radio system);

(xiii) CCTV;

(xiv) Interfaces with buildings connected to OLRT stations;

(xv) Passenger information systems; and

(xvi) Intrusion detection systems.

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SCHEDULE 15-1
TECHNICAL DEFINITIONS AND REFERENCE DOCUMENTS

ARTICLE 1 DEFINITIONS

The Parties acknowledge that in so far as Schedule 15-3 – Maintenance Specification makes reference to standards or requirements within the Expanded Design and Construction Specifications in respect of the Stage 2 System and/or the Belfast MSF Expansion Works, any defined terms used within such specifications shall be understood by reference to the meanings defined therein, notwithstanding that such definitions may be different to the defined terms set out below.

Access Points (AP) means radio transceivers connected to the CBTC Network that allow network communications between trains and wayside CBTC equipment.

Action Levels means an instrumentation monitoring level unique to specific geotechnical instruments which, upon reaching, requires an action.

Advisory Temporary Signing Plan is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7.

Alignment Envelope is as defined in Schedule 15-2, Part 1, Section 1.7.

Ancillary Facilities means those facilities, buildings, or structures adjacent to or directly linked to OLRT stations. They can also be standalone facilities or structures located within or adjacent to the OLRT right of way. They include the following elements:

(a) Pedestrian overpass or underpass structures;

(b) Passenger shelter structures;

(c) Structures containing mechanical, electrical, communications or other service equipment;

(d) TPSS Buildings;

(e) Signal equipment enclosures;

(f) Parking areas;

(g) Entrances;

(h) PPUDO;

(i) Bus terminals;

(j) Bus layby areas; and

(k) Bus Operations support building.

Annual Preventive Maintenance Plan means at any time during the Maintenance Term, that component of the Maintenance and Rehabilitation Plan describing the Preventive Maintenance for the then current or immediately following Contract Year, as the context requires.

Applicable Codes means all federal, provincial, and municipal statutes, regulations, acts, by-laws.

Asset Management Plan means a plan which identifies the replacement schedule for the OLRT System components based on their expected Design Life, which plan forms part of the Maintenance and Rehabilitation Plan.

Authorities Having Jurisdiction has the meaning given in NFPA 130.

Automatic Train Control (ATC) means a vital system for controlling train movement.

Automatic Train Control Zone Controller means a microprocessor based system which tracks train location, signal and switch positions and which provide Movement Authority limits to trains.

Automatic Train Operation means a non-vital overlay for controlling train speed and operation within the limits allowed by the ATP system. Automatic Train Operation provides automatic station stopping, door opening and closing and automatic operation between stations.

Automatic Train Operation Mode means an LRV Train operation mode in which CBTC Automatic Train Operation capabilities are enabled on top of Automatic Train Protection.

Automatic Train Protection means a vital system for enforcing safe train movement and speeds.

Automatic Train Protection Only Mode means a mode of LRV train operation in which only CBTC ATP functions are enabled.

Automatic Train Supervision means a non-vital system providing supervisory commands to adjust train speeds and station dwell times and to request interlocking systems to set up and cancel routes.

Backup Control Centre (BCC) means an emergency control center facility providing a remote location complete with the basic functioning systems to dispatch, monitor, and control operations of the OLRT in case the TOCC at 875 Belfast is unavailable.

Barrier-Free means a feature of a building and its related facilities whereby it can be approached entered and accessed by persons who are physically, mentally or sensory challenged.

Base Kilometres has the meaning given to it in Schedule 15-3.

Baseline Vehicle Kilometers means the scheduled annual Revenue Service Vehicle Kilometers set out for each Service Level in the Operations Service Plan as of Financial Close.

Booking means the schedule of work assignments for Drivers established by the City, several times a year (beginning of January, end of April, end of June, beginning of September) in accordance with the Operations Service Plan.

Bridge means a structure that provides a Roadway or walkway for the passage of vehicles, pedestrians or cyclists (or other similar forms of transportation) across an obstruction, gap or facility that is greater than 6 metres in span.

Bus Rapid Transit Service Management Plan has the meaning provided in Schedule 10 – Review Procedure.

Central Instrument House means a wayside control room housing all the controls for an interlocking or group of interlockings.

Change means:

(a) a request by the City for a Non Maintenance Repair;

(b) a request by the City or Project Co for a variation, whether by addition, amendment, substitution, omission or otherwise, to any of the Maintenance and Rehabilitation Requirements; and

(c) does not include a request by the City relating to any matter arising out of a Maintenance Emergency.

City means the bus and light rail transit system run by the City of Ottawa.

City Central Area is as defined in the City of Ottawa Transportation Master Plan

City Change means a Change requested by the City in accordance with Schedule 15-3.

City Change Certificate has the meaning given to it in Schedule 15-3.

City Direction has the meaning given to it in Schedule 15-3.

Closed Circuit Television means a video transmission system monitoring a location, recording images and presenting the images to a central location.

Communication Based Train Control means a system of tracking train movement and safely controlling that movement based upon communications between trains and wayside controllers.

Communications System is as defined in Schedule 15-2 Part 4 Article 1 – Introduction.

Comparable LRT Safety Standards means operating rules, standard operating procedures and standard Safety practices based on best practices for such rules, procedures and practices used under similar operating conditions in comparable LRT systems.

Compensating Construction has the meaning given to that term in the OBC.

Constant Failure Rate means the constant failure rate specified by Project Co.

Construction Monitoring Zone has the meaning given in Part 1 Article 20 – Protection of Existing Adjacent Structures.

Corrective Maintenance means the repair of failed E&M and/or Vehicles or the repair of any portion of the Fixed Facilities to restore normal operating condition to a state in accordance with the Standard and includes the repair or replacement of a failed system or subsystem through actions such as:

(a) investigation, localization and isolation of faults (troubleshooting);

(b) disassembly, reassembly, repair or replacement of the affected part or parts;

(c) retesting of the repaired system or subsystem; and

(d) correcting Defects.

Corrective Maintenance Plan means the plan establishing the general policies, procedures and methodology which Project Co shall apply to perform Corrective Maintenance, including without limitation to identify and analyze existing and anticipated Deficiencies, including inspection and testing, and which shall be employed by Project Co to affect the Repairs and Correction of Deficiencies when they occur during the Maintenance Term.

Cost Recovery means total actual net cost to Project Co based on an open book system.

Coupling Mode means a mode of LRV train operation in which the CBTC system allows a Train or LRV to close in on another LRV or Train to couple the two together.

Culvert means a drainage structure designed to allow the passage of surface water, livestock or pedestrians under a Roadway, railway or roadside entrance.

Current Level of Service means the level of service operated by OC Transpo and STO, as of September 4, 2011.

Custodial Maintenance means all forms of custodial maintenance and all activities, standards and obligations related to custodial maintenance for the System which are set out in Schedule 15-3, but excluding City Custodial Maintenance with respect to City Custodial Maintenance Areas.

Custodial Maintenance Areas means those areas and elements of the System included in Schedule 15-3 and identified therein as the responsibility of Project Co with respect to Custodial Maintenance, and for further certainty, includes Vehicles, the Maintenance and Storage Facilities, the Alignment, the Tracks and, to the extent identified in Schedule 15-3, the Stations.

Cycling Traffic Planning Study has the meaning given in Schedule 10 – Review Procedure.

Daily Maintenance Report has the meaning given to it in Schedule 15-3.

Defect means the condition of any part of the work which does not meet the contract document requirements; cause a train or a portion of the Work to cease operating or operate in a degraded mode; or inflicts damage or harm on any other portion of a train or the Work.

Deficiency means any condition which exists with respect to any aspect of the System and which requires Maintenance, including without limitation any failure of the System to meet the Standard, other than a Non Maintenance Repair.

Design Criteria means established parameters used during design.

Design Life is defined as either of the following:

(a) In Schedule 15-2, Design Life has the meaning given to that term in CAN/CSA-S6-06; or

(b) In Schedule 15-3, Design Life means the interval during which a Constant Failure Rate will occur with respect to a component, subsystem or system.

Developer's Guide has the meaning given in Part 1 Article 19 – Future Adjacent Construction Requirements.

Disposed, Disposed of or Disposal means disposal as identified in the "Waste and Excess Materials Management for Maintenance (MTO)" operational specification.

Ditch means an open drainage facility constructed to carry water to an outlet.

Drained Structure (Tunnel) means a Structure (or Tunnel) partly or fully below the groundwater table where a drainage system is provided to permanently prevent the build-up of hydrostatic pressure around the Structure (or Tunnel).

Driver means a City employee who has been trained and certified by an OLRT Trainer to operate on the OLRT.

Driver Training means a program of Driver Training a City employee must attend prior to becoming a certified OLRT Driver. The program is provided by an OLRT Trainer.

Dwell Time means the amount of time a Train resides at a Station.

Epidemic Defect shall be deemed to have occurred at any time during the Maintenance Term when the Failure Rate within a Population of a component, subsystem or system exceeds the Constant Failure Rate by 10% measured over the time period in which the constant Failure rate is expressed but, for the avoidance of doubt, an Epidemic Defect shall exclude any Defect which arises:

(c) as a result of the failure by the Operator to operate the System in accordance with the Operation Requirements;

(d) out of the replacement or repair of any component, subsystem or system where such replacement or repair is the responsibility of the Operator or the City;

(e) out of the replacement or repair of any component, subsystem or system by the Maintenance Contractor where such replacement or repair is a product of the Design Life and Constant Failure Rate of the applicable component, subsystem or system; and/or

(f) any Defect which occurs after the expiration of the Design Life of such component, subsystem or system.

For the purposes hereof, the "**Population**" of a component, subsystem or system means the total number of identical line replaceable units (as identified in the Response) of a distinct type and function, whether the line replaceable unit consists of individual components, subassemblies or unit assemblies, incorporated in the fleet of vehicles provided as part of the Project.

Electromagnetic Compatibility and Test Plan has the meaning given in Schedule 10 – Review Procedure.

Electromagnetic Compatibility Control Plan has the meaning given in Schedule 10 – Review Procedure.

Emergency Costs has the meaning given to it in Schedule 15-3.

Emergency Response Plan has the meaning given in Schedule 10 – Review Procedure.

Emergency Response Standard Operating Procedures means the mandatory standard operating procedures for response to an Emergency, being part of the Standard Operating Procedures established for the System.

Emergency Traffic Plan has the meaning given in Schedule 15-2, Part 7.

Employee Security Standard means the security clearance and identification procedures and requirements mandated by the hiring policies, practices and standards of the City's Human Resources Department, as may be amended from time to time

Entry and Exit Points means the point where the VIA Rail corridor intersects with the tracks which lead to and from the Belfast MSF, and where Moodie Drive intersects with the tracks which lead to the Moodie MSF.

Erosion and Sediment Control Plan has the meaning given in Schedule 10 – Review Procedure.

Essential Services Code is as defined in the OBC and in addition shall include all components and elements, including but not limited to the building envelope, mechanical systems, communication systems, and electrical systems to maintain uninterrupted function during and after an event.

Existing Adjacent Structures means Adjacent Structures and other structures that are susceptible to ground movements caused by construction activities.

Failure means an event primarily due to Design inadequacy for the duty cycle or stress level, a quality defect, or an inability to survive the operational environment. A Constant Failure Rate is therefore an indication that the Design criteria are consistent with the Operation Requirements and Specifications and that the quality standard as provided in the Response is appropriate to the required Design Life.

Failure Rate means the probability of Failure in a given time interval.

Federal Lands mean all lands owned and managed by all federal government departments.

Federally Mandated Stations means those stations within the project that are subject to Federal Land Use Agreement letters.

Foundation means a structure that transfers loads to the earth.

Ground Movement means the movement of ground directly or indirectly caused by construction activities. Ground Movement may manifest itself in such ways as surface settlement, ground settlement, the movement of retained excavation systems, the movement of slopes, and the ground vibrations arising from construction activities.

Handover Maintenance means the testing, disassembly, refurbishment, rebuilding and/or repair of any components of the System to be completed by Project Co within the last sixty (60) months of the Maintenance Term and prior to the expiry of the Maintenance Term in accordance with the requirements contained in Schedule 15-3.

Handover Maintenance Period means the last 60 calendar months of the Maintenance Term.

Handover Maintenance Plan means the documented plan for the performance of the Handover Maintenance in compliance with the requirements of Schedule 15-3.

Handover Maintenance Work Plan has the meaning given to it in Schedule 15-3.

Immediate or **Immediately** means the initiation of an activity as soon as possible after Detection or being Made Aware and no later than 2 hours from the time of Detection or being Made Aware, save in respect of Schedule 15-3 Appendix A Attachments 3 to 10 (inclusive), where “Immediate” or “Immediately” has the meaning given to it in Article 7.0 of Appendix A to Schedule 15-3. If more than one activity requires immediate action at the same time, Project Co shall give priority to the highest degree of Hazard.

Implementation Plan is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7.

Incident Management Plan is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7.

Initiating Notice has the meaning given to it in Schedule 15-3.

Inter-modal Transfer Facility means the movement, or transfer, of passengers from one mode of transportation such as bus transit to another mode of transportation such as the OLRT.

Interruption Period has the meaning given to it in Schedule 15-3.

ISO 9001:2008 means the quality management system so designated and established by the International Organization for Standardization.

Landscape Plan means a plan that specifies the hard and soft landscape material.

Light Rail Vehicles means a form of urban rail public transportation that generally has a lower capacity and lower speed than heavy rail and metro systems, but higher capacity and higher speed than traditional street-running tram systems. The term is typically used to refer to rail systems with rapid transit-style features that usually use electric rail cars operating mostly in private rights-of-way. LRVs are typically powered by a pantograph collecting power from an overhead catenary.

LRT Rules means the documented rules which Project Co shall establish in consultation with the City, taking into account Comparable LRT Safety Standards and implement to govern (i) the movement of Trains and other non-passenger vehicles within the System and (ii) the conduct and coordination of Maintenance work and other activities on the Tracks, signalling systems within the System, and electrical equipment and systems forming part of the E&M, as approved and amended from time to time by the City, identifying the mandatory rules to be followed by the City and Project Co (including personnel employed in the performance of Operations and Maintenance), including in response to conditions, events, or Deficiencies which cause interruption to or interference with the Operation of the System.

LRT Systems means communications, Traction Power and distribution, stray current, EMI, intrusion detection, and all other required and necessary elements, components and appurtenances to ensure the safe operation of the OLRT System.

Maintain means to perform the Maintenance, as required in accordance with the Project Agreement including the Maintenance and Rehabilitation Requirements, and "**Maintained**" shall have a corresponding meaning.

Maintenance means Preventive Maintenance, Corrective Maintenance, Custodial Maintenance and Handover Maintenance.

Maintenance and Rehabilitation Plan means the documented plan for the performance of the Maintenance Services, provided to the City and with respect to which the City has no material objection at the time of the Final Design Submittal as contemplated in the RFP, which shall thereupon be attached as Appendix A Attachment 1, as revised from time to time in accordance with the Project Agreement.

Maintenance and Rehabilitation Services means Maintenance to be provided by Project Co to the City in accordance with Schedule 15-3 and the other terms of the Project Agreement and shall also include the supply, operation and maintenance of any vehicle and or equipment used to provide Maintenance.

Maintenance and Storage Facility means each of the maintenance, operation and storage facilities for the Vehicles and System and includes the Maintenance Buildings, Operations Crew Facilities, Storage Yards and Vehicle Storage facilities.

Maintenance Change Instruction has the meaning given to it in Schedule 15-3.

Maintenance Change Report has the meaning given to it in Schedule 15-3.

Maintenance Dispute has the meaning given to it in Schedule 15-3

Maintenance Dispute Resolution Procedure has the meaning given to it in Schedule 15-3.

Maintenance Emergency means any Emergency which is caused by, or which arises as a result of:

(a) Project Co's performance of, or failure to perform, the Maintenance Services;

(b) a Defect or Deficiency of the Fixed Equipment, Vehicles or Fixed Facilities;

(c) any act or omission of Project Co or any Employee or officer, agent or contractor of Project Co; or

(d) except to the extent that such Emergency is not caused by or does not arise as a result of any of subparagraphs (a), (b) and (c) above, and except to the extent that such Emergency is caused by or arises as a result of a Force Majeure.

Maintenance Spare Vehicle(s) means the number of Vehicles, as determined by Project Co, required to provide the necessary spare Vehicle capacity to allow Project Co to conduct Maintenance Services on the Vehicle Fleet such that the Vehicle Maintenance Service Standards, as identified in Schedule 15-3 are met.

Maintenance Management System has the meaning given to it in Schedule 15-3.

Maintenance Responsibility Table means the table set out in Schedule 15-3.

Major Maintenance Works means any Preventive, Corrective, and Handover Maintenance, including rehabilitation or life cycle replacement of components of the System and based upon the work being completed in accordance with the applicable sub plans of the Maintenance and Rehabilitation Plan, Handover Maintenance Plan, and Good Industry Practice, that cannot be completed while meeting the standards as provided in Schedule 15-3 Appendix A, Article 2.1 – Maintenance and Performance Standards, in whole or in part, within the time available during Off Peak Periods or outside of Revenue Service Hours.

Major Service Change means any Service Level Increase, Service Level Decrease, or other modification to the Operations Service Plan which requires Project Co to increase or decrease the size of its peak in-service vehicle fleet.

Manual Release Mode means a latched mode of train operation for moving trains at restricted speeds when communications with the wayside CBTC systems has failed.

Major Maintenance Shutdown Period means any period of time during the Maintenance Term during which Project Co is permitted to partially or fully shut down the System during Revenue Service Hours without deductions under the Payment Mechanism, compliance with Section 1.5 of Schedule 15-3, in order to carry out major maintenance works.

Major Municipal Roads means a City freeway, Arterial Roadway or Major Collector Road as defined in the City of Ottawa Transportation Master Plan (2008). For the purposes of the OLRT Project, Queen Street shall be considered a Major Municipal Roadway.

Medium Service Change means any modification or set of modifications to the Operations Service Plan which is not a Major Service Change, but results in Revenue Service Vehicle Kilometers in any Contract Year exceeding the Baseline Vehicle Kilometers for that Service Level by greater than 120%.

Minor Municipal Roads means a Collector Road or Local Road as defined in the City of Ottawa Master Transportation Plan (2008).

Minor Service Change means any modification or set of modifications to the Operating Service Plan which is not a Major Service Change or a Medium Service Change.

Monthly Activity Report has the meaning given to it in Schedule 15-3.

Movement Authority means the limit of train movement allowed to a train by the ATC Zone Controller.

New Municipal Infrastructure at any time means Infrastructure constructed by Project Co on the Municipal Reconveyed Lands as part of the carrying out of the Initial Works and includes any Municipal Infrastructure that has been altered, upgrade or augmented at that time by the carrying out of Initial Works, but excluding Infrastructure and other property of Railway Companies and Utility Companies, the limits whereof relative to the Lands as set forth in the Design and Construction Specifications.

Noise Control Plan has the meaning given in Schedule 10 – Review Procedure.

Non Maintenance Emergency means an Emergency that is not a Maintenance Emergency.

Non-Revenue Vehicles means vehicles that are used by staff in the performance of maintenance and operational duties on the OLRT and its related facilities.

Off Peak Period means any period of time during Revenue Service Hours which is not a Peak Period.

OLRT Controller means a City employee that will be assigned to the TOCC and will be responsible for all dispatching functions for the OLRT.

OLRT Controller Training means a program of OLRT Controller Training a City employee must attend prior to becoming a certified OLRT Controller. The program is provided by a Project Co Trainer.

OLRT Trainer means a City employee or contractor who has been trained and certified to instruct OC Transpo employees in certain classifications who are assigned to or have any duties and responsibilities on the OLRT. These classifications include but are not limited to Driver, Station Attendant, Fare Collectors, Public Information, and security personnel.

Onboard Computer means a Communications Based Train Control computer located on a rail vehicle that calculates train location and enforces Movement Authorities and Speed Restrictions based on communication with wayside CBTC systems and its own Track Database.

Open Data is defined in Schedule 15-2 Part 4 Article 6.

Operating Scenario means the ridership service scenarios to be used by Project Co to design and construct the System as outlined in Schedule 15-2 Part 1.

Operations Crew Facility means the spaces within each MSF occupied and used by the City for purposes of the operation of the System, including dispatching of Drivers and Trains, lunch rooms and locker rooms, training centre, and reception area for Drivers and supervisors.

Operations Service Plan means the operations schedule as outlined in Schedule 15-3, and includes Train movements in support of Revenue Service.

Out-of-Service Vehicle(s) means a Vehicle or Vehicles which are unavailable for Revenue Service for reasons unrelated to the Maintenance Services and beyond Project Co's control; for example a Vehicle removed from service due to a collision beyond Project Co's control.

Overhead Catenary or **Overhead Catenary System** means a system that distributes DC power from the Traction Power System to the Vehicle via a pantograph on the Vehicle. The OCS consists of a conductive messenger wire suspending a contact wire between poles and/or attachments along the OLRT to provide the DC propulsion power requirements of the Vehicle to the train consist maintaining continuous contact between the pantograph and the contact wire.

Passenger Pick Up and Drop-off means a designated pick-up and drop-off area for passengers from private vehicles adjacent to an OLRT Station or a Transit Centre.

Pavement means all structural elements or layers above the subgrade of a road, including granular driving surfaces and shoulders.

Peak Period means the AM and PM periods each weekday as defined in the Operations Service Plan or otherwise determined by the City in its Discretion by written notice to Project Co.

Pedestrian Access Plan means a plan that outlines and shows the pedestrian flow, directions, route, volumes to and from and around all facilities, Guideway and Stations.

Pedestrian and Cyclist Movement Study means a study that addresses all the elements for pedestrian and cyclist requirements.

Performance Improvement Notice has the meaning given to it in Schedule 15-3.

Permanent Lining has the meaning given to that term in Part 3 Article 2.

Permit to Take Water required for any taking of more than a total of 50,000 litres of water in a day under the *Ontario Water Resources Act*.

Platform means that portion of the Station directly adjacent to the tracks where trains stop to load and unload passengers. There are two basic types of platform configuration: centre loading which has the platform located between each set of tracks, and side loading, which has the platforms located on the outside of each set of tracks. Both platform types are in use on the OLRT system.

Pre Handover Inspections has the meaning given to it in Schedule 15-3.

Preventive Maintenance means any action that is performed at scheduled intervals in accordance with the Maintenance and Rehabilitation Plan or as otherwise required to maintain the System at a constant level of performance to comply with the Maintenance and Rehabilitation Requirements and ensuring that the Maintenance of the System is sufficient to permit the Operation of the System in accordance with the Operation Requirements and Specifications (and, for further certainty, to meet or exceed the Maintenance Service Requirements), including the detection and correction of deviations from normal operation before a major system or subsystem failure occurs, periodic inspections and testing, condition monitoring, critical item replacement, lubrication, adjustment, cleaning and calibration.

Preventive Maintenance Plan means the plan establishing the Preventive Maintenance which Project Co is required to perform, which plan forms part of the Maintenance and Rehabilitation Plan.

Project Co Driver means a Project Co employee or contractor who is trained and certified to operate a revenue service vehicle without passengers on the OLRT.

Project Co Driver Training means a program of Driver Training a Project Co employee or contractor must attend prior to being allowed to operate an out of service revenue vehicle anywhere on the alignment or the MSF. The program is provided by a Project Co Trainer.

Project Co Trainer means a Project Co employee or contractor who is assigned the task of instructing and certifying a Project Co employee, Contractor or an OLRT employee in a specific classification.

Quality Performance Criteria means the qualitative standards of service and the performance criteria set out in Schedule 15-3.

Radio System Supplier means the City corporate radio nominated manufacturer determined by an external radio contract issued by the City. The radio supplier shall have the responsibility for

citywide supply, maintenance, installation, testing and licensing for all public services radio systems specified and procured by Project Co. The radio supplier shall enter into third party agreements with Project Co to ensure OLRT radio performance is in accordance with the PSOS requirements for the concession period.

Record Drawings means the final completed as constructed drawings in electronic (CADD) and hard copy format of all structures that was built.

Reference Concept means the plans, drawings, reports and other information prepared during the preliminary design for the OLRT Project and which reside in the Project Data Room.

Reference Documents means the references, codes, standards, specifications, guidelines, policies, reports, publications, manuals, bulletins and other such documents listed throughout the Output Specifications and summarized in Schedule 15-1.

Reliability Acceptance Test means the requirements (as defined and described in the RFP) to be satisfied following the expiry of the second anniversary of the Revenue Service Availability Date provided for in the Project Scope and the Design and Construction Performance Requirements.

Remedial Action Notice has the meaning given to it in Schedule 15-3.

Replacement Parts has the meaning given to it in Schedule 15-3.

Retaining Wall means a structure that holds back soils and is not a wingwall connected to a Bridge or Culvert.

Revenue Service means the carriage of paying Passengers on the System.

Revenue Service Fleet means, at any given time, the System Vehicle Fleet excluding the Maintenance Spare Vehicles.

Revenue Service Hours means the hours during which Revenue Service is provided on the System as set out in Schedule 15-3.

Revenue Service Vehicle Kilometres means the distance travelled by Vehicles while in Revenue Service, measured in kilometres.

Revision Notice Period has the meaning given to it in Schedule 15-3.

Risk Assessment Plan is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7.

Roadway means the driving surfaces of the highway, including the travelled lanes, shoulders and shoulder rounding.

Safety and Security Certification means the process of verifying compliance with a set of formal safety and security requirements. The requirements are defined by the OLRT Safety and Security Certification Plan, OLRT Design Criteria and Technical Specifications and applicable

codes and industry standards. Specifically, certifiable elements need to be identified, verification activities need to be performed and documented, and Certificates of Conformance need to be signed and issued by the responsible parties.

Safety Audit means an inspection by the City of the System, the books and records and/or procedures of Project Co relating to the Safety Standards, and includes an inspection of the Safety Management System and the Safety Case.

Safety Case means the documented demonstration by Project Co, as approved and audited by the General Manager of the City and filed with the General Manager of the City, that the System complies with the Safety Standards, in accordance with the Safety Standards to be established by Project Co for the Maintenance Term.

Safety Management System means the Safety protocol (including without limitation the activities, resources, procedures, methodologies, responsibilities and organizational structure) which Project Co shall establish in consultation with the City, taking into account the Design and Construction Specifications and is implemented to ensure the Safety of the System and compliance with the Safety Standards, and which is authorized by the General Manager of the City and filed with the General Manager of the City, adherence to which Safety protocol shall be mandatory in all Operations and Maintenance activities, and which shall without limitation include the LRT Rules and the Standard Operating Procedures.

Safety Standards means all mandatory Safety standards for the System, being the requirements of Law relating to health and Safety matters respecting the Design, Construction, Maintenance and Operation of the System, including all such Safety standards established by Project Co, in conjunction with the City, taking into account Comparable LRT Safety Standards, the Safety Case, and all Safety standards established by the Design and Construction Performance Requirements.

Security means surveillance and protection of persons and property by direct or remote means.

Security Management System means the Security protocol (including without limitation the activities, resources, procedures, methodologies, responsibilities and organizational structure) which Project Co shall establish in consultation with the City, taking into account the Design and Construction Specifications and the initial Threat and Vulnerability Assessment, and implement to ensure the Security of the System and compliance with the Safety Standards, and which is authorized by the General Manager of the City and filed with the General Manager of the City, adherence to which Security protocol shall be mandatory in all Operations and Maintenance activities, and which shall without limitation include the LRT Rules and the Standard Operating Procedures.

Security Standard means all mandatory Security standards for the System, being the requirements of Law relating to Public and System Security matters respecting the Design, Construction, Maintenance and Operation of the System, including all such Security standards established by Project Co, in consultation with the City, taking into account all Security standards established by the Design and Construction Specifications and the initial Threat and Vulnerability Assessment (TVA), as approved and amended from time to time by the City,

identifying the mandatory Security Standards to be followed by the City and Project Co (including personnel employed in the performance of Operations and Maintenance), including in response to conditions, events, or Deficiencies which cause interruption to or interference with the Operation of the System.

Service Level means the sets of operational parameters set out by the City in the Operations Service Plan and labeled as Service Levels 1 to 9, describing the system capacity (PPHPD), headways, consist sizes, hours of operation, and other key parameters to be attained by the System in each case, which Project Co's provision of the Maintenance Services must accommodate, and the term also includes any additional or modified operational parameters which may be developed and agreed by the City and Project Co from time to time.

Service Level Decrease means a requirement by the City for Project Co to provide a Service Level with a lesser system capacity (PPHPD) as compared to the then-prevailing Service Level.

Service Level Increase means a requirement by the City for Project Co to provide a Service Level with a greater system capacity (PPHPD) as compared to the then-prevailing Service Level.

Service Proven Control System means a Control System that is compliant with the following characteristics:

(a) The major control system equipment and associated sub systems (including, but not limited to, Train Control, CTS,TOCC, YCC, BCC, PIDS, PA, SCADA, PBX, CCTV and fire life safety have been integrated and used in a comparable LRT system currently in Revenue Service, and

(b) The system has been operating in Revenue Service for a minimum of one year, and

(c) has been operated in similar climatic conditions and service conditions to those specified for the OLRT project, and

(d) Authority data is available confirming that the system and sub-systems have attained an availability of 99.99%.

Service Proven Vehicle means a Vehicle that is substantially compliant with the following characteristics:

(a) the major vehicle sub systems (including trucks, braking systems, propulsion systems, articulation joints), have been integrated in a comparable LRV currently in revenue service; and

(b) a minimum of 10 of these vehicles have been in Revenue Service for a minimum of two years; and

(c) have been operated in similar climatic conditions and service conditions to those specified for the OLRT project; and

(d) have authority data confirming that the Vehicle has attained a minimum "in-service" MDBF of 50,000 km. Failures are defined as malfunctions that cause Revenue Service delays of 4 minutes or more.

Shell means the roof slab, exterior walls and invert slab of an underground box structure, including any beams integral with the slabs and walls.

the Standard means a standard of Maintenance which complies with all of the standards and terms set out in Article 2 – Maintenance and Performance Standards.

Standard Operating Procedures means the standard operating procedures which Project Co shall establish in consultation with the City, taking into account the Design and Construction Specifications, Maintenance Services, Operation of the System, and Best Industry Practice, as approved and amended from time to time by the City, identifying the mandatory procedures to be followed by the City and Project Co (including personnel employed in the performance of Operations and Maintenance), including in response to conditions, events, or Deficiencies which cause interruption to or interference with the Operation of the System. The Standard Operating Procedures shall incorporate as required the provisions of the Safety Management System, Security Management System, LRT Rules, and regulations governing the Operation and Maintenance of the System.

Station means a Facility where Trains and or buses stop to pick up or drop off customers. The Station primarily consists of Platform areas for Passenger loading/unloading, fare control equipment, and Passenger information. Other related components include; service rooms, stairs, ramps, escalators, elevators, advertising, public art, and Train and bus Operator support Facilities, customer amenities, etc. On the Ottawa system, Confederation Line stations are classified, and are not mutually exclusive as follows:

(e) **At Grade Station**: A Station at which the platform is at grade, above grade, below grade, and meets the criteria for an open station as defined in NFPA 130

(f) **Transfer Station**: Station with the incorporation of Facilities to support the transfer of Passengers between modes of transportation or between the O-Train Lines within a Fare Paid Zone.

(g) **Underground Station**: An enclosed Station as defined by NFPA 130 in which the platform is constructed fully underground or enclosed within a building.

(h) **Terminal Station**: A Station that is located at the terminus of a line.

(i) **Line Station:** Station that is located along the alignment providing service in both directions of the line.

Storage Yard means the outdoor areas located within a Maintenance and Storage Facility, not including the Maintenance Buildings or the Operations Crew Facilities, but including the open space, parking areas, Track area, storage of Maintenance of Right-of-Way equipment and

supplies (unless incorporated within Maintenance Building), outdoor storage (ties, Track, poles, etc.) and Vehicle Storage.

Stormwater Management means the management of the quantity and quality of that portion of rain and snowmelt that does not soak into the ground or is intercepted by vegetation (surface runoff).

Stormwater Management Plan means the means through which the management of surface runoff from developed areas is addressed.

Structure means any building, Bridge, Tunnel, structural Culvert, Retaining Wall.

Subsystem Reliability Criteria means the subsystem reliability criteria set out in Part 4 of Schedule 15-3 (Design and Construction Requirements) to the Project Agreement.

Surplus Vehicle Fleet means, following a Service Level Decrease, any vehicles which are in excess of:

(a) the fleet size required to provide Peak Period service;

(a) the number of vehicle required to maintain Project Co's spare vehicle ratio; and

(b) the quantity of Non-Revenue Vehicles called for by Project Co's maintenance plans.

Sustainability Plan has the meaning given in Schedule 17 – Environmental Obligations.

System Vehicle Fleet means the Total Vehicle Fleet plus any additional Vehicles acquired by the City in accordance with the Vehicle Option.

Total Vehicle Fleet means the total number of Vehicles that Project Co is required to provide under the Project Agreement, and includes the number of Scheduled Revenue Service Vehicles, and Maintenance Spare Vehicle(s)

Total Vehicle Kilometers means the total distance travelled by Vehicles outside of the Entry and Exit Points, after having crossed from the MSFs over the Entry and Exit Points and prior to crossing back over the Entry and Exit Points when returning to the MSFs, measured in kilometres. For clarity, this distance includes Revenue Service Vehicle Kilometres, as well as additional distance travelled by vehicles for purposes of entering into or exiting from service, or training of operators.

Track Database means a database containing all station, switch, curve and end of track locations, all grades, and all civil and temporary speed restriction zones, and all work zones and all speed limits through these zones and over all switches in either position. The Track Database is used by the Onboard Computer to calculate a safe speed profile and station stopping braking profiles.

Track Protections means a verbal protection provided by a Project Co employee or an OLRT Controller assigned to the TOCC. Track protections are issued to employees or contractors who will be on the right of way.

Traction Power or **Traction Power System** means an electrical network of power conversion substations receiving MV electrical power from the Utility, transforming the power to a lower usable voltage, and converting the power from AC to DC power to supply the Train consists operating along the OLRT.

Traffic and Transit Management Communications Plan is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7.

Traffic and Transit Management Plan or **TTMP** means the manner that transit and traffic will be managed during construction activities and the method traffic management model used to for determining the magnitude of the impacts to traffic and mobility of associated with lane and/or intersection reconfigurations or closures, and the measures applied to address them.

Traffic Control Device(s) is a term used to describe any person, sign, signal, marking or device placed upon, over or adjacent to a roadway by or at the direction of a Relevant Authority or their designate, for the purpose of regulating, warning, guiding or informing a vehicle operator or pedestrian of an existing condition or hazard.

Traffic Control Persons means a person duly trained and authorized to direct traffic at a Work zone through the use of the Traffic Control Sign (STOP/SLOW Paddle).

Traffic Control Plan is a detailed plan for the control of traffic, including vehicular, cycling and pedestrian movements, required to allow Project Co to fulfill all conditions of the contract, taking into account the organized, systematic safe conduct of the Project, which includes detours, staging sequences, Work, public and emergency vehicle access and egress, public access and separation from hazardous areas, temporary barriers, removal of old pavement markings and signage, modification to curbside use, and the selection of appropriate traffic operation layouts and devices necessary for traffic control.

Traffic Protection Plan is a plan required by the OHSA and its regulations for the protection of workers in a Work zone.

Train means a 2-car consist of Vehicles.

Train Control or **Train Control System** means a safety critical computer based control system for Vehicle identification, Vehicle location control and monitoring, maintaining safe headway between vehicles, Vehicle speed control, maintaining safe brake rates, Vehicle route selection and fleet management, interlocking control and power consumption optimization.

Train Structures means any structures (excluding Tunnels) that support any form of Train loading including but not limited to grade-supported slabs, elevated Train supports, foundations supporting Train loads, retaining walls supporting Train surcharges and other similar Structures.

Train The Trainer means the training program conducted by a Project Co employee(s) or contractor(s) that trains and certifies a City employee to serve as an OLRT Trainer.

Transit Centre means a facility and a stopping point for buses and other types of transit service where passengers using one type of transit service can transfer to another. For example, bus passengers can transfer to the OLRT at this location if the Transit Centre is combined with an OLRT Station.

Transit Management Plan is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7.

Transit Operations Control Centre or **TOCC** is the communications control center responsible for all dispatching, supervision, and monitoring of all functions within the OLRT System.

Transit Priority Lanes is as defined by the City of Ottawa.

Tree Mitigation Plan means a plan to audit, monitor, protect, and preserve trees to comply with City regulations.

Trial Running means a twelve (12) consecutive day period that may commence upon the successful completion of testing and commissioning. Upon successful completion of trial running, the integrated system will be ready for revenue service.

Trigger Level means an instrumentation monitoring level unique to specific geotechnical instruments which, upon reaching, requires a review and verification of the instrumentation data.

Tunnel has the meaning given in Schedule 15-2, Part 3 Article 1 – Introduction.

Undrained Structure (Tunnel) means a Structure, or Tunnel, partly or fully below the groundwater table that is designed and constructed to allow the groundwater level to return to normal levels after construction.

Urban Design Elements means the elements of items covered in the Landscape Plan.

Vehicle Location System means an Onboard CBTC system to read tachometer pulses and wayside passive transponders for the purpose of determining vehicle location.

Vital Microprocessor Interlocking System means a vital microprocessor based system for controlling switches and signals at an interlocking. This system may also be known as a Computer Based Interlocking (CBI) controller.

Yard Control Centre means a facility within an MSF established to monitor and control yard and shop operations of train movements, video observation of maintenance functions, intrusion control, IAC security, and BMS system monitoring from one location.

Zone of Influence means the area within the subsurface and surface boundaries where Ground Movement arising from Project Co construction activities is expected to occur.

ARTICLE 2 ACRONYMS

The Parties acknowledge that in so far as Schedule 15-3 – Maintenance Specification makes reference to standards or requirements within the Expanded Design and Construction Specifications in respect of the Stage 2 System and/or the Belfast MSF Expansion Works, any acronyms used within such specifications shall be understood by reference to the acronyms as defined therein, notwithstanding that such definitions may be different to those applicable to the acronyms set out below.

AABC means Associated Air Balance.

AAMA means American Architectural Manufacturers Association.

AAR means Association of American Railroads.

AASHTO means American Association of State Highway and Transportation Officials.

ABS means Acrylonitrile Butadiene Styrene.

ACGIH means American Conference of Governmental Industrial Hygienists.

ACI means American Concrete Institute.

ADA means *Americans with Disabilities Act*.

AER means Approval Exemption Regulation.

AESS means Architecturally Exposed Structural Steel.

AFBMA means Anti Friction Bearing Manufacturer's Association.

AGMA means American Gear Manufacturers Association.

AHU means Air Handling Unit.

AIC means Amp Interrupting Capacity.

AISC means American Institute of Steel Construction.

AISI means American Iron and Steel Institute.

ALCTV means Automotive Lifts – Safety Requirements for Construction, Testing and Validation.

ALI means Automotive Lift Institute.

AMCA means Air Movement and Control Association.

AMS means Aerospace Material Specifications.

ANSI means American National Standards Institute.

AODA means *Accessibility for Ontarians with Disabilities Act*.

AP means Access Point.

APC means Automatic Passenger Counting.

APTA means American Public Transportation Association.

AREMA means American Railway Engineering Maintenance-of-Way Association.

ARI means Air-conditioning and Refrigeration Institute.

ASCE means American Society of Civil Engineers.

ASHRAE means American Society of Heating, Refrigerating and Air-Conditioning Engineers.

ASJ means All Service Jacket.

ASME means American Society of Mechanical Engineers.

ASPE means American Society of Plumbing Engineers.

ASSE means American Society of Safety Engineers.

ASTM means American Standards for Testing and Materials.

ATC means Automatic Train Control.

ATO means Automatic Train Operation.

ATOR means Above Top of Rail.

ATP means Automatic Train Protection.

ATS means Automatic Train Supervision or Automatic Transfer Switch.

AWG means American Wire Gauge.

AWI means Architectural Woodworking Institute.

AWMAC means Architectural Woodwork Manufacturers Association of Canada.

AWS means American Welding Society.

AWS BRH means American Welding Society Brazing Handbook.

AWS WHB means American Welding Society Welding Handbook.

AWWA means American Water Works Association.

BAS means Building Automatic System.

BCC means Back-up Control Centre.

BMS means Building Management System.

BRT means Bus Rapid Transit.

BSS means British Standards Society.

BWA means Balance Weight Assembly.

CADD means computer aided design drafting.

CBC means Canadian Broadcasting Corporation.

CBI means Computer Based Interlocking.

CBTC means Communication Based Train Control.

CCIP means Cement and Concrete Industry Publications.

CCOHS means Canadian Centre for Occupational Health and Safety.

CCTV means Closed Circuit Television System.

CDED means Contract Design Estimating and Documentation.

CEAA means Canadian Environmental Assessment Agency.

CEC means Canadian Electrical Code.

CFC means Chlorofluorocarbon.

CFR means Code of Federal Regulations.

CGC means Canadian Gypsum Company.

CGSB means Canadian General Standards Board.

CGVD means Canadian Geodetic Vertical Datum.

CHBDC means Canadian Highway Bridge Design Code. **[**(CHBDC) CAN/CSA S6-06.**]**

CIAR means Construction Impact Assessment Report.

CIH means Central Instrument Houses.

CISC means Canadian Institute of Steel Construction.

CISCA means Ceilings and Interior Systems Construction Association.

CMAA means Crane Manufacturers Association of America.

CNC means Computerized Numeric Control.

CNLA means Canadian Nursery Landscape Association.

COMAP means City of Ottawa Municipal Accessibility Plan.

CPCI means Canadian Precast/Prestressed Concrete Institute.

CPMA means Color Pigments Manufacturers Association, Inc.

CPR means Cardiopulmonary Resuscitation or Canadian Pacific Railway.

CPTED means Crime Prevention through Environmental Design.

CPVC means chlorinated polyvinyl chloride.

CQ means Commercial Quality.

CRAC means Computer Room Air Conditioning.

CRCA means Canadian Roofing Contractors Association.

CRTC means Canada Radio-Television and Telecommunications Commission Regulations.

CSA means Canadian Standards Association.

CSO means combined sewer overflow.

CSRS means Canadian Spatial Reference System.

CSSBI means Canadian Sheet Steel Building Institute.

CSST means combined sewage storage tunnel.

CTS means Communications Transmission System.

CWB means Canadian Welding Bureau.

CWR means continuous welded rail.

DAQ means Delivered Audio Quality.

DFF means Direct Fixation Fastener.

DFO means Fisheries and Oceans Canada.

DOT means U.S. Department of Transportation.

DOTT means Downtown Ottawa Transit Tunnel.

DOUDS means Downtown Ottawa Urban Design Strategy.

DSD means Decision Sight Distance.

DWA means Designated Waiting Area.

DX means Direct Expansion.

E&M means Electrical and Mechanical.

EA means Environmental Assessment.

EGFP means equipment ground fault protection.

EHU means Electro Hydraulic Unit.

EIA means U.S. Energy Information Administration.

EIFS means Exterior Insulation Finishing System.

EMC means Electromagnetic Compatibility.

EMI means electromagnetic interference.

EMO means Emergency Management Ontario.

EMS means Emergency Medical Services.

EPDM means ethylene propylene diene monomer.

ERP means Emergency Response Plan.

ESA means Electrical Standards Association or Electrical Safety Authority.

ETL means extract, transform, load.

FAI means First Article Inspection.

FAT means Factory Acceptance Testing

FBCU means Friction Brake Control Unit.

FCC means U.S. Federal Communications Commission.

FEA means Finite Element Analysis.

FHWA means Federal Highway Administration.

FIFO means First In, First Out.

FLS means fire life safety.

FLSSC means Fire Life Safety and Security Committee.

FLUA means Federal Land Use Approval.

FMEA means Failure Mode and Effects Analysis.

FMECA means Failure Mode, Effect, and Criticality Analysis.

FMS means Facility Management System.

FRA means Federal Railroad Administration.

FRP means fibre reinforced plastic.

FSK means Foil-Scrim-Kraft.

FTA means Federal Transit Administration.

FTMS means Freeway Traffic Management System.

GANA means Glass Association of North America.

GBC means Green Building Council.

GFI means Ground Fault Interrupter.

GFRP means glass fibre reinforced polymer.

GUI means Graphic User Interface.

HCFC means hydrochlorofluorocarbon.

HCL means Horizontal Control Line.

HDMI means High-Definition Multimedia Interface.

HFC means hydrofluorocarbon.

HMI means Hoist Manufacturers Institute or Human Machine Interface

HOL means Hydro Ottawa Limited.

HPPL means High Performance Photo Luminescent.

HSCB means High Speed Circuit Breaker.

HSLA means High Strength, Low Alloy.

HTM means Hazard Tracking Matrix.

HVAC means Heating, Ventilation and Air Conditioning.

IAC means Intrusion Access Control.

IAQ means Indoor Air Quality.

IBC means International Building Code.

ICEA means Insulated Cable Engineers Association.

IEC means International Electrotechnical Commission.

IEEE means Institute of Electrical and Electronics Engineers.

IESNA means Illuminating Engineering Society of North America.

IGBT means insulated gate bipolar transistor.

IGMAC means Insulating Glass Manufacturer's Association of Canada.

ILI means Indiana Limestone Institute of America, Inc.

IP means internet protocol.

ISD means Intersection Sight Distance.

ISFP means City of Ottawa Integrated Street Furniture Policy and Design Guidelines.

ISO means International Standards Organization.

ITA means International Tunnelling Association.

LAN means Local Area Network.

LED means light emitting diode.

LEED means Leadership in Energy and Environmental Design.

LKI means Landmark Kilometre Inventory.

LLEPM means Low Location **[**or level – in vehicles**]** Exit Path Marking.

LOS means Level of Service.

LRT means Light Rail Transit.

LRU means Line Replaceable Unit

LRV means Light Rail Vehicle.

LV means low voltage.

LVC means length of vertical curve.

LVPS means Low Voltage Power Supply.

M&R means maintenance and rehabilitation.

MCBCF means Mean Cycles Between Component Failure.

MCC means Motor Control Centre.

MCR means Main Communications Room.

MDE means Maximum Design Earthquake.

MERV means Minimum Efficiency Reporting Value.

MHIA means Materials Handling Industry of America.

MIL means U.S Military Standard.

MNECB means Model National Energy Code for Buildings.

MNR means Ontario Ministry of Natural Resources.

MOE means Ontario Ministry of the Environment.

MOL means Ministry of Labour.

MPA means mid-point anchor.

MPI means Magnetic Particle Inspection.

MSE means Mechanically Stabilized Earth.

MSF means Maintenance and Storage Facility.

MSHA means Mine Safety and Health Administration.

MTBF means Mean Time Between Failures.

MTM means Modified Transverse Mercator.

MTO means Ontario Ministry of Transportation.

MTTR means Mean Time To Repair.

MUP means Multi-Use Pathway.

MUTCD means Manual for Uniform Traffic Control Device.

MV means medium voltage

MVB means Multifunctional Vehicle Bus.

NAC means National Arts Centre.

NAD means North American Datum.

NB means northbound.

NBC means National Building Code of Canada.

NC means Noise Level Criteria.

NCC means National Capital Commission.

NCMA means National Concrete Masonry Association.

NEBB means National Environmental Balancing Bureau.

NEC means National Electrical Code.

NECA means National Electrical Contractors Association.

NEMA means National Electrical Manufacturer's Association.

NESC means National Electrical and Safety Code.

NETA means InterNational Electrical Testing Association.

NFC means National Fire Code.

NFCC means National Fire Code of Canada.

NFPA means National Fire Protection Association.

NFRC means National Fenestration Rating Council.

NGD means negative grounding device.

NHI means National Highway Institute.

NMS means Network Management System.

NPA means National Particleboard Association.

NPCC means National Plumbing Code of Canada.

NPS means nominal pipe size.

NRCA means National Roofing Contractors Association.

NRCan means National Resources Canada.

NSF means National Sanitation Foundation.

NVR means Network Video Recorder.

OBC means Ontario Building Code.

OBCN means On Board Communications Network.

OCDR means Overhead Coiling Door.

OCP means Ottawa Cycling Plan.

OCS means Overhead Catenary System.

ODE means Operating Design Earthquake.

OEC means Ontario Electrical Code.

OESC means Ontario Electrical Safety Code.

OFC means Ontario Fire Code.

OHSA means the *Occupational Health and Safety Act* (Ontario).

OLRT means Ottawa Light Rail Transit.

OM&R means Operation, Maintenance and Repair.

OMNR means Ontario Ministry of Natural Resources.

ONVIF means Open Network Video Interface Forum.

OP means Ottawa Official Plan.

OPCA means Ontario Painting Contractors Association.

OPP means Ontario Provincial Police.

OPS means Ontario Provincial Standard.

OPSD means Ontario Provincial Standard Drawings.

OPSS means Ontario Provincial Standard Specifications.

OR means Ottawa Road.

OSIM means Ontario Structure Inspection Manual.

OSIMS means Ontario Structure Inspection Management Systems.

OSTC means Ottawa Seniors Transportation Committee.

OTM means Ontario Traffic Manual.

OWS means Operation Work Station or oil water separator.

PA means Public Address.

PBX means Private Branch Exchange.

PC means personal computer.

PCB means polychlorinated biphenyl.

PCC means Precast Concrete.

PDI means Plumbing and Drainage Institute.

PEI means Passenger Emergency Intercom.

PEO means Professional Engineers of Ontario.

PERP means Ontario Provincial Emergency Response Plan.

PGFP means personal ground fault protection.

PHA means Preliminary Hazard Analysis.

PHL means Preliminary Hazard List.

PIDS means Passenger Information Display Systems.

PIN means Property Identification Number.

PIV means Peak Inverse Voltage.

PLC means Programmable Logic Controller.

PPHPD means passenger per hour per direction.

PPUDO means passenger pick up and drop off area.

PRP means Property Request Plan.

PSR means Public Safety Radio.

PTAC means Pedestrian and Transit Advisory Committee.

PTI means Post-Tensioning Institute.

PTTW means Permit to Take Water.

PTU means Portable Test Unit.

PTZ means Pan Tilt Zoom.

PVB means polyvinyl butyral.

PVC means polyvinyl chloride.

PVDF means polyvinylidene fluoride.

PVMS means Portable Variable Message Sign.

PWGSC means Public Works and Government Services Canada.

QC means Quality Control.

QMP means Quality Management Plan.

RAM means reliability, availability and maintainability.

RAMS means reliability, availability, maintainability and safety.

RCAC means Roads and Cycling Advisory Committee.

RETC means Rapid Excavation and Tunneling Conference.

RFID means Radio Frequency Identification.

RH means relative humidity.

RMS means root mean square.

ROW means right-of-way.

RP means Regional Priority.

RSA means Rideau Street Alignment.

RSS means Retained Soil System.

RTU means remote terminal units.

RVCA means Rideau Valley Conservation Authority.

RWIG means Retaining Wall Inspection Guidelines.

SAT means Site Acceptance Testing

SAE means Society of Automotive Engineers.

SB means southbound.

SCADA means Supervisory Control and Data Acquisition.

SCAT means Simple Catenary Auto Tension System.

SCFT means Simple Catenary Fixed Termination System.

SCIL means Safety Critical Items List.

SCR means Silicon Controlled Rectifier.

SEM means Sequential Excavation Method.

SHL means System Hazard List.

SIA means Security Industry Association.

SINAD means Signal to Noise and Distortion ratio.

SLS means Serviceability Limit State.

SMACNA means Sheet Metal and Air-conditioning Contractors' National Association.

SMP means Safety Management Plan.

SOP means standard operating practice.

SPCC means Spill Prevention Control and Countermeasures.

SRA means Safety Risk Assessment

SSCP means Safety and Security Certification Plan.

SSCRT means Safety and Security Certification Review Team.

SSD means Stopping Sight Distance.

SSHL means Subsystem Hazard List.

SSPC means Society for Protective Coatings.

STO means Société de transport de l'Outaouais.

SWGR means switch gear.

SWM means stormwater management.

SWMP means Stormwater Management Practice.

T&DI means Transportation and Development Institute.

TAC means Transportation Association of Canada.

TBM means Tunnel Boring Machine.

TC means Transport Canada.

TCD means Traffic Control Device.

TCP means Traffic Control Plan or Traffic Control Person or Transmission Control Protocol.

TCRP means Transit Cooperative Research Program.

TCU means Traction Control Unit.

TDS means Train Display Screen.

TFT means Trolley Fixed Termination System or thin-filmed transistor.

TIAC means Thermal Insulation Association of Canada.

TLV means Threshold Limit Value.

TOCC means Transit Operations Control Centre.

TOD means Ottawa Transit-Oriented Development Guidelines.

TOR means Top of Rail.

TPRU means Traction Power Rectifier Unit.

TPSS means Traction Power Substation.

TSS means total suspended solids.

TTMP means Traffic and Transit Management Plan.

TVA means Threat and Vulnerability Analysis.

UAD means Urban Arterial Divided.

UAU means Urban Arterial Undivided.

UCC means Utility Coordinating Committee

UCU means Urban Collector Undivided.

UHF means Ultra High Frequency.

UL means Underwriter's Laboratories, Inc.

ULC means Underwriter's Laboratories of Canada.

ULS means Ultimate Limit State

ULU means Urban Local Undivided.

UNESCO means United Nations Educational, Scientific and Cultural Organization.

UPS means uninterruptible power supply.

UTS means Ultimate Tensile Strength.

UVA means Ultraviolet Light Absorbers.

VAV means Variable Air Volume.

VCU means Vehicle Control Unit.

VFD means Variable-Frequency Drive.

VLS means Vehicle Location System.

VMIS means Vital Microprocessor Interlocking System.

VMS means Vehicle Monitoring System or variable message sign.

VMU means Vehicle Monitoring Unit.

VOC means volatile organic compound.

VoIP means Voice over Internet Protocol.

WAN means Wide Area Network.

WSD means Working Stress Design.

WTB means Wire Train Bus.

YCC means Yard Control Centre.

ARTICLE 3 REFERENCE DOCUMENTS

The Parties acknowledge that in so far as Schedule 15-3 – Maintenance Specification makes reference to standards or requirements within the Expanded Design and Construction Specifications in respect of the Stage 2 System and/or the Belfast MSF Expansion Works, any reference documents specified within such specifications shall be understood by reference to the reference documents referred to therein, notwithstanding that such reference documents may be different to the reference documents set out below.

Reference Documents in Schedule 15	Description of Reference Documents
14 CFR 25.853	Code of Federal Regulations, Title 14: Aeronautics and Space; Part 25.853 – Compartment Interiors
29 CFR 1910.19	Code of Federal Regulations, Title 29: Labor; Part 1910.19 – Special Provisions for Air Contaminants
40 CFR 82	Code of Federal Regulations, Title 40: Protection of Environment; Part 82 – Protection of Stratosphere Ozone
49 CFR 223	Code of Federal Regulations, Title 49: Transportation; Part 223 – Safety Glazing Standards - Locomotives, Passenger Cars and Cabooses
49 CFR Part 238	Code of Federal Regulations, Title 49: Transportation; Part 238 – Passenger Equipment Safety Standards
AAMA 611	AAMA 611 Voluntary Specification for Anodized Architectural Aluminum
AAMA 620	AAMA 620 Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Aluminum
AAMA Aluminum Curtain Wall Design Guide Manual (CW-DG-1-96)	American Architectural Manufacturers Association (AAMA)
AAR M-101	AAR M-101 Carbon Steel Axles
AAR Manual of Standards and Recommended Practices	Association of American Railroads (AAR)
AAR RP-585	AAR RP-585 Wiring and Cable Specification
AAR S-501	AAR S-501 Specification for Wire and Cables
AASHTO Guide for the Design of Pavement	American Association of State Highway and

Reference Documents in Schedule 15	Description of Reference Documents
Structures	Transportation Officials (AASHTO), 1993
AASHTO Guide Specifications for Design and Construction of Segmental Concrete Bridges	
AASHTO Guide Specifications for Horizontally Curved Highway Bridges	
AASHTO Guide Specifications for Strength Evaluation of Existing Steel and Concrete Bridges	
AASHTO Guide Specifications for Structural Design of Sound Barriers	
AASHTO Guide Specifications – Thermal Effects in Concrete Bridge Structures	
AASHTO Manual for Condition Evaluation of Bridges	
ACI 201.2R	ACI 201.2R Guide to Durable Concrete
ACI 358.1	ACI 358.1 Analysis and Design of Reinforced and Prestressed – Concrete Guideway Structures
ACI 360R	ACI 360R Design of Slabs on Grade
ACI 365	ACI 365 Service Life Prediction
ACI Publication 201.2R	ACI Publication 201.2R Guide to Durable Concrete
ACI Publication 222R	ACI Publication 222R Protection of Metals in Concrete Against Corrosion
ACI Publication 506.2	ACI Publication 506.2 Below Grade Shotcrete Used as Permanent Support
ACI Publication SP-77	ACI Publication SP-77 Sulphate Resistance of Concrete
Accessibility for Ontarians with Disabilities Act (AODA)	
AESS Supplement	Modern Steel Construction, May 2003
AISC Code of Standard Practice for Steel Buildings and Bridges	American Institute of Steel Construction (AISC), March 2005
AISC Design Guide Series 9	AISC Design Guide Series 9 – Torsional Analysis of Structural Steel Members
AISI/ASTM A167	AISI/ASTM A167 Stainless and Heat-Resisting

Reference Documents in Schedule 15	Description of Reference Documents
	Chromium-Nickel Steel Plate, Sheet, and Strip
Alberta Transportation Highway Geometric Design Guide	Alberta Transportation Highway Geometric Design Guide, January 2004
Americans with Disabilities Act (ADA)	
AMCA Standard 210	Air Movement and Control Association International (AMCA) Standard 210, "Laboratory Methods of Testing Fans for Rating Purposes"
AMCA Standard 300	AMCA Standard 300, "Test Code for Sound Rating Air Moving Devices"
AMCA Standard 301	AMCA Standard 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data"
AMCA Standard 500-L	AMCA Standard 500-L Laboratory Methods of Testing Louvers for Rating
AMS 5050 E	AMS 5050 E Steel Tubing, Seamless, 0.15 Carbon, Maximum, Annealed
ANSI/ALI ALCTV-2006	ANSI/ALI ALCTV-2006 Safety Requirements for the Installation and Service of Automotive Lifts
ANSI/ASCE/T&DI 21	ANSI/ASCE/T&DI 21 Automated People Mover Standards – Parts 1-4
ANSI/ASHRAE 135	ANSI/ASHRAE 135 BACnet A Data Communication Protocol for Building Automation and Control Networks
ANSI/AWWA C105	ANSI/AWWA C105 Polyethylene Encasement for Ductile-Iron Pipe Systems
ANSI/IEEE 515.1	ANSI/IEEE 515.1 Testing, Design, Installation, and Maintenance of Electrical Resistance Heat Tracing for Commercial Applications
ANSI/IESNA RP-22	ANSI/IESNA RP-22 Tunnel Lighting
ANSI/SIA A92	ANSI/SIA A92 Elevating and Vehicle Lift Devices
ANSI B1.20.1	ANSI B1.20.1 Pipe Threads, General Purpose (Inch)
ANSI C34.2	ANSI C34.2 Semiconductor Power Rectifiers
ANSI C37	ANSI C37 Low Voltage Power Circuit Breaker
ANSI C57	ANSI C57 Power Transformers

Reference Documents in Schedule 15	Description of Reference Documents
ANSI Z26.1	ANSI Z26.1 Safety Code for Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highways
ANSI Z97.1	ANSI Z97.1 Safety Glazing Materials Used in Buildings
ANSI Z358.1	ANSI Z358.1 Emergency Eyewash and Shower Equipment
An Urban Design Strategy for Sussex Dr., Rideau St. and Colonel By	
APTA Guidelines for the Design of Rapid Transit Facilities	American Public Transportation Association, 1981
APTA Heavy Duty Escalator Design Guideline	American Public Transportation Association (APTA)
APTA Manual for the Development of System Safety Program Plans for Commuter Railroads	American Public Transportation Association; Commuter Rail Safety Management Program, May 2006
APTA RP-E-002	APTA RP-E-002 Wiring of Passenger Equipment
APTA RP-E-004	APTA RP-E-004 Gap and Creepage Distance
APTA RP-E-007	APTA RP-E-007 Storage Batteries and Battery Compartments
APTA RP-E-009	APTA RP-E-009
APTA RP-M-001	APTA RP-M-001 Air Connections, Location and Configuration of, for Passenger Cars Equipped with AAR Long Shank Tight Lock or Similar Long Shank Type Couplers
APTA RP-M-009	APTA RP-M-009 New Truck Design
APTA SS-C&S-004	APTA SS-C&S-004 Austenitic Stainless Steel for Railroad Passenger Equipment
APTA SS-C&S-015	APTA SS-C&S-015 Aluminum and Aluminum Alloys for Passenger Equipment Car Body Construction
APTA SS-E-005	APTA SS-E-005 Grounding and Bonding
APTA SS-E-013	APTA SS-E-013 Emergency Lighting System Design for Passenger Cars
APTA SS-M-015-06	APTA SS-M-015-06 Wheel Flange Angle for Passenger Equipment

Reference Documents in Schedule 15	Description of Reference Documents
APTA SS-PS-004	APTA SS-PS-004 Low-Location Exit Path Marking
AREMA Communications and Signal Manual	AREMA
AREMA Manual For Railway Engineering, Volume 2, Chapter 28, Temporary Structure for Construction	AREMA
ASCE Guidelines for Tunnel Lining Design,	ASCE Technical Committee on Tunnel Lining Design, edited by T. O'Rourke, 1984
ASHRAE 52.2	ASHRAE 52.2 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
ASHRAE 55	ASHRAE 55 – Thermal Environmental Conditions for Human Occupancy, 2010 Edition.
ASHRAE 62.1	ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality
ASHRAE 90.1	ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings – permitted for construction after December 31, 2011
ASHRAE 189.1	ASHRAE 189.1 – Design of High-Performance, Green Buildings
ASHRAE Handbook	HVAC Applications, Division 13, "Enclosed Vehicular Facilities", 2007
ASME/ANSI B16.3	ASME/ANSI B16.3 Malleable Iron Threaded Fittings
ASME/ANSI B16.5	ASME/ANSI B16.5 Pipe Flanges and Flanged Fittings
ASME/ANSI B16.22	ASME/ANSI B16.22 Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME A17.1	ASME A17.1 Safety Code for Elevators and Escalators
ASME A112.19.2 / CSA B45.1	ASME A112.19.2 / CSA B45.1 Ceramic Plumbing Fixtures
ASME B30.2	ASME B30.2 Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)

Reference Documents in Schedule 15	Description of Reference Documents
ASME B30.10	ASME B30.10 Hooks
ASME 30.11	ASME 30.11 Monorails and Underhung Cranes
ASME B30.16	ASME B30.16 Overhead Joists (Underhung)
ASME B31.1	ASME B31.1 Power Piping
ASME B31.5	ASME B31.5 Refrigeration Piping and Heat Transfer Components
ASME RT-1	ASME RT-1 Safety Standard for Structural Requirements for Light Rail Vehicles
ASSE 1052	ASSE 1052 Performance Requirements for Hose Connection Backflow Preventers
ASTM A1	ASTM A1 Carbon Steel Tee Rails
ASTM A6	ASTM A6 General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Pilings
ASTM A53	ASTM A53 Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A82 / A82M	ASTM A82 / A82M Steel Wire, Plain for Concrete Reinforcement
ASTM A105	ASTM A105 Carbon Steel Forgings for Piping Applications
ASTM A106	ASTM A106 Seamless Carbon Steel Pipe for High-Temperature Service
ASTM A123	ASTM A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153M-03e	ASTM A153M-00 Zinc Coating (Hot Dip) on Iron and Steel Hardware
ASTM A167	ASTM A167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM A185	ASTM A185 Steel Welded Wire Reinforcement, Plain, for Concrete
ASTM A193	ASTM A193 Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
ASTM A197	ASTM A197 Cupola Malleable Iron
ASTM A234	ASTM A234 Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High

Reference Documents in Schedule 15	Description of Reference Documents
	Temperature Service
ASTM A240	ASTM A240 Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications
ASTM A269	ASTM A269 Seamless and Welded Austenitic Stainless steel Tubing for General Service
ASTM A276-04	ASTM A276-04 Stainless Steel Bars and Shapes
ASTM A307	ASTM A307 Carbon Steel Bolts and Studs
ASTM A325M	ASTM A325M Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A416/416M-06	ASTM A416/416M-06 Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
ASTM A421/421M-05	ASTM A421/421M-05 Uncoated Stress-Relieved Steel Wire for Prestressed Concrete
ASTM A496/A496M	ASTM A496/A496M Steel Wire, Deformed for Concrete Reinforcement
ASTM A497/A497M	ASTM A497/A497M Steel Welded Wire Reinforcement, Deformed, for Concrete
ASTM A515	ASTM A515 Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service
ASTM A516	ASTM A516 Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower Temperature Service
ASTM A563	ASTM A563 Carbon and Alloy Steel Nuts
ASTM A568	ASTM A568 General Requirements for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled
ASTM A588	ASTM A588 High-Strength Low-Alloy Structural Steel
ASTM A606	ASTM A606 Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
ASTM A653/A653M	ASTM A653/A653M Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

Reference Documents in Schedule 15	Description of Reference Documents
ASTM A666	ASTM A666 Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
ASTM A775/A775M	ASTM A775/A775M Epoxy Coated Reinforcing Steel Bars
ASTM B33	ASTM B33 Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM B209	ASTM B209 Aluminum and Aluminum Alloy Sheet and Plate
ASTM B221	ASTM B221 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wires, Profiles and Tubes
ASTM B280	ASTM B280 Seamless Copper Tube for Air Conditioning and Refrigeration Field Service
ASTM B584	ASTM B584 Copper Alloy Sand Castings for General Applications
ASTM C67	ASTM C67 Sampling and Testing Brick and Structural Clay Tile
ASTM C260	ASTM C260 Air-Entraining Admixtures for Concrete
ASTM C452-75	ASTM C452-75 Potential Expansion of Portland-Cement Mortars Exposed to Sulfate
ASTM C494/C494M	ASTM C494/C494M Standard Specification for Chemical Admixtures for Concrete
ASTM C507-95a	ASTM C507-95a Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
ASTM C534	ASTM C534 Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
ASTM C542	ASTM C542 Lock-Strip Gaskets
ASTM C547	ASTM C547 Mineral Fiber Pipe Insulation
ASTM C553	ASTM C553 Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
ASTM C568	ASTM C568 Limestone Dimension Stone
ASTM C612	ASTM C612 Mineral Fiber Block and Board Thermal Insulation
ASTM C615	ASTM C615 Granite Dimension Stone

Reference Documents in Schedule 15	Description of Reference Documents
ASTM C716	ASTM C716 Installing Lock-Strip Gaskets and Infill Glazing Materials
ASTM C864	ASTM C864 Dense Elastomeric Compression Seal Gaskets, Setting Blocks and Spacers
ASTM C881/C881M	ASTM C881/C881M Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C936	ASTM C936 Solid Concrete Interlocking Paving Units
ASTM C1017/C1017M	ASTM C1017/C1017M Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1026	ASTM C1026 Measuring the Resistance of Ceramic Tile to Freeze-Thaw Cycling
ASTM C1036	ASTM C1036 Flat Glass
ASTM C1048	ASTM C1048 Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass
ASTM C1059/C1059M	ASTM C1059/C1059M Latex Agents for Bonding Fresh to Hardened Concrete
ASTM C1166	ASTM C1166 Lock-Strip Gaskets
ASTM C1172	ASTM C1172 Laminated Architectural Flat Glass
ASTM C1184	ASTM C1184 Structural Silicone Sealants
ASTM C1242	ASTM C1242 Selection, Design and Installation of Dimension Stone Attachment Systems
ASTM D395	ASTM D395 Rubber Property – Compression Set
ASTM D422-63	ASTM D422-63 Particle-Size Analysis of Soils
ASTM D516	ASTM D516 Sulfate Ion in Water
ASTM D695	ASTM D695 Compressive Properties of Rigid Plastics
ASTM D790	ASTM D790 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D2240	ASTM D2240 Rubber Property – Durometer Hardness
ASTM D2850-95	ASTM D2850-95 Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils

Reference Documents in Schedule 15	Description of Reference Documents
ASTM D2922	ASTM D2922 Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D3222	ASTM D3222 Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials
ASTM D3675	ASTM D3675 Surface Flammability of Flexible Cellular Materials Using a Radiant Heat Energy Source
ASTM D4976	ASTM D4976 Polyethylene Plastics Molding and Extrusion Materials
ASTM D5856-95	ASTM D5856-95 Water in Petroleum Products and Bituminous Materials by Distillation
ASTM E84	ASTM E84 Surface Burning Characteristics of Building Materials
ASTM E90	ASTM E90 Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
ASTM E119	ASTM E119 Fire Tests of Building Construction and Materials
ASTM E162	ASTM E162 Surface Flammability of Materials Using a Radiant Heat Energy Source
ASTM E283-04	ASTM E283-04 Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E330	ASTM E330 Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls
ASTM E331	ASTM E331 Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E648	ASTM E648 Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
ASTM E662	ASTM E662 Specific Optical Density of Smoke Generated by Solid Material
ASTM E1332	ASTM E1332 Rating Outdoor-Indoor Sound Attenuation

Reference Documents in Schedule 15	Description of Reference Documents
ASTM F436	ASTM F436 Standard Specification for Hardened Steel Washers
ASTM F519	ASTM F519 Mechanical Hydrogen Embrittlement Evaluation of Plating/Coating Processes and Service Environments
ASTM F593	ASTM F593 Stainless Steel Bolts, Hex Cap Screws and Studs
ASTM F738M	ASTM F738M Stainless Steel Metric Bolts, Screws, and Studs
ASTM F836M	ASTM F836M Style 1 Stainless Steel Metric Nuts
ASTM G51	ASTM G51 Measuring pH of Soil for Use in Corrosion Testing
ASTM G57	ASTM G57 Field Measurement of Soil Resistivity Using the Wenner Four-Electrode Method
AWMAC	Quality Standards for Architectural Woodwork
AWS A5.0	AWS A5.0 Filter Metal Procurement Guidelines
AWS BRH	AWS BRH American Welding Society Brazing Handbook
AWS C1.1	AWS C1.1 Resistance Welding
AWS D1.1	AWS D1.1 Structural Welding Code – Steel
AWS D1.2	AWS D1.2 Structural Welding Code – Aluminum
AWS D1.3	AWS D1.3 Structural Welding Code – Sheet Steel
AWS D1.6	AWS D1.6 Structural Welding Code – Stainless Steel
AWS D14.1	AWS D14.1 Welding of Industrial and Mill Cranes and Other Material Handling Equipment
AWS D15.1	AWS D15.1 Railroad Welding Specification – Cars and Locomotives
AWS WHB	AWS WHB American Welding Society Welding Handbook
Bayview/Somerset Area Secondary Plan	
BSS-7239	BSS-7239 Test Method for Toxic Gas

Reference Documents in Schedule 15	Description of Reference Documents
	Generation by Materials on Combustion
Canada's Capital Core Area Sector Plan	
Canadian Transportation Agency	Code of Practice, Passenger Terminal Accessibility
Canadian Transportation Agency	Code of Practice, Passenger Rail Car Accessibility and Terms and Conditions of Carriage by Rail of Persons with Disabilities
Canadian Transportation Agency	Code of Practice, Removing Communication Barriers for Travelers with Disabilities
Canadian Transportation Agency	Code of Practice, Intercity Bus
CAN/CGSB 1.181	CAN/CGSB 1.181 Ready-Mixed Organic Zinc-Rich Coating
CAN/CGSB 12.1-M	CAN/CGSB 12.1-M, Tempered or Laminated Safety Glass
CAN/CGSB 12.11-M	CAN/CGSB 12.11-M Wired Safety Glass
CAN/CGSB 12.20-M	CAN/CGSB 12.20-M Structural Design of Glass for Buildings
CAN/CGSB 12.3-M	CAN/CGSB 12.3-M Flat, Clear Float Glass
CAN/CGSB 12.8-M	CAN/CGSB 12.8-M Insulating Glass Units
CAN/CGSB 75.1-M	CAN/CGSB 75.1-M Tile, Ceramic
CAN/CGSB 85.100	CAN/CGSB 85.100 Painting
CAN/CGSB-109.4	CAN/CGSB-109.4-2000, Passenger Information Symbols Standard
CAN/CSA A5	CAN/CSA A5 Portland Cement
CAN/CSA A16	CAN/CSA A16 Design of Steel Structures
CAN/CSA A23.1	CAN/CSA A23.1 Concrete Materials and Methods of Concrete Construction
CAN/CSA A23.2	CAN/CSA A23.2 Methods of Testing for Concrete
CAN/CSA A23.3	CAN/CSA A23.3 Design of Concrete Structures
CAN/CSA A23.4	CAN/CSA A23.4 Precast Concrete - Materials and Construction
CAN/CSA A23.5	CAN/CSA A23.5 Supplementary Cementing Materials

Reference Documents in Schedule 15	Description of Reference Documents
CAN/CSA A165	CAN/CSA A165 Concrete Masonry Units
CAN/CSA A179	CAN/CSA A179 Mortar and Grout for Unit Masonry
CAN/CSA A251	CAN/CSA A251 Qualification Code for Architectural and Structural Precast Concrete
CAN/CSA A370	CAN/CSA A370 Connectors for Masonry
CAN/CSA A371	CAN/CSA A371 Masonry Construction for Buildings
CAN/CSA A440	CAN/CSA A440 Window, Door, and Skylight Installation
CAN/CSA A3000	CAN/CSA A3000 Cementitious Materials Compendium
CAN/CSA B44	CAN/CSA B44 Safety Code for Elevators
CAN/CSA B45	CAN/CSA B45 Plumbing Fixtures
CAN/CSA B52	CAN/CSA B52 Mechanical Refrigeration Code
CAN/CSA B139	CAN/CSA B139 Installation Code for Oil Burning Equipment
CAN/CSA B167-96	CAN/CSA B167-96 Maintenance and Inspection of Overhead Cranes, Gantry Cranes, Monorails, Hoists and Trolleys
CAN/CSA B651-04	CAN/CSA B651-04 Accessible Design for the Built Environment
CAN/CSA C22.1-09	CAN/CSA C22.1-09 Canadian Electrical Code, Part I – Safety Standard for Electrical Installations
CAN/CSA C22.2-09	CAN/CSA C22.2-09 Canadian Electrical Code, Part II – General Requirements
CAN/CSA C22.2 No. 94	CAN/CSA C22.2 No. 94 Electrical Enclosures
CAN/CSA C22.3 No. 1 & 8	CAN/CSA C22.3 No. 1 & 8 Overhead Systems
CAN/CSA C22.3 No. 4	CAN/CSA C22.3 No. 4-1974(R1995) Control of Electromechanical Corrosion of Underground Metallic Structures
CAN/CSA C390-10	CAN/CSA C390-10 Energy Efficiency Test Methods for Three-Phase Induction Motors
CAN/CSA G30.5	CAN/CSA G30.5 Welded Steel Wire Fabric for Concrete Reinforcement

Reference Documents in Schedule 15	Description of Reference Documents
CAN/CSA G30.18	CAN/CSA G30.18 Grade 400W, Billet-steel Bars, Deformed
CAN/CSA G40.20	CAN/CSA G40.20 General Requirements for Rolled or Welded Structural Quality Steel
CAN/CSA G40.21	CAN/CSA G40.21 Structural Quality Steels
CAN/CSA-G164-M	CAN/CSA-G164-M Hot Dip Galvanizing of Irregularly Shaped Articles
CAN/CSA O86	CAN/CSA O86 Engineering Design in Wood
CAN/CSA Q396	CAN/CSA Q396 Software Quality Assurance Standards
CAN/CSA Q632-90	CAN/CSA Q632-90 Reliability and Maintainability Management Guidelines
CAN/CSA S6	CAN/CSA S6 Canadian Highway Bridge Design Code (CHBDC)
CAN/CSA S16	CAN/CSA S16 Limit States Design of Steel Structures
CAN/CSA S136-M	CAN/CSA S136-M Design of Cold-Formed Steel Structural Members
CAN/CSA S304.1	CAN/CSA S304.1 Design of Masonry Structures
CAN/CSA S413	CAN/CSA S413 Parking Structures
CAN/CSA S478	CAN/CSA S478 Guideline on Durability in Buildings
CAN/CSA S448.1	CAN/CSA S448.1 Repair of Reinforced Concrete in Buildings and Parking Structures
CAN/CSA W47.1	CAN/CSA W47.1 Certification for Companies for Fusion Welding of Steel Structures
CAN/CSA W59	CAN/CSA W59 Welded Steel Construction (Metal Arc Welding)
CAN/CSA W186-M	CAN/CSA W186-M Welding of Reinforcing Bars in Reinforced Concrete Construction
CAN/CSA Z259.1	CAN/CSA Z259.1 Fall-Arresting Safety Belts and Lanyards for the Construction and Mining Industries
CAN/CSA Z259.2-M	CAN/CSA Z259.2-M Fall-Arresting Devices, Personal Lowering Devices and Life Lines
CAN/CSA Z259.3-M	CAN/CSA Z259.3-M Lineman's Body Belt and

Reference Documents in Schedule 15	Description of Reference Documents
	Lineman's Safety Strap
CAN/CSA Z462	CAN/CSA Z462 Workplace Electrical Safety
CAN/ULC-S701	CAN/ULC-S701 Thermal Insulation, Polystyrene, Boards and Pipe Covering
CAN3 S157-M	CAN3 S157-M Strength Design in Aluminum
Canadian Electrical Code	Canadian Electrical Code (CEC), 21st Edition
Canadian Foundation Engineering Manual	Canadian Foundation Engineering Manual, 3rd & 4th Editions
Canadian Motor Vehicle Safety Regulations, Technical Standard 108	
Canadian Portland Cement Association's Simplified Design Procedure	
Canadian Standards for Nursery Stock	Most recent addition
CGC Steel Framed Drywall Systems, 09250-1 E	CGC Steel Framed Drywall Systems, 09250-1 E
CISC Guide for the Design of Crane-Supporting Steel Structures	Canadian Institute of Steel Construction (CISC)
City of Ottawa Area Traffic Management Principles and Guidelines	
City of Ottawa Data Handbook	
City of Ottawa Emergency Management Plan	
City of Ottawa Green Space Master Plan	
City of Ottawa Integrated Street Furniture Policy and Design Guidelines	City of Ottawa Integrated Street Furniture Policy and Design Guidelines, August 2009 (ISFP)
City of Ottawa Interior Planning Standards	City of Ottawa, Real Property and Assets Management, July 2002
City of Ottawa Municipal Accessibility Plan (COMAP) Accessibility and Design Guidelines for the Visually Impaired	City of Ottawa Municipal Accessibility Plan (COMAP) Accessibility and Design Guidelines for the Visually Impaired
City of Ottawa Operational Policy, Procedures and Guidelines	
City of Ottawa Right of Way Lighting Policy	
City of Ottawa Road Corridor Planning & Design Guidelines, Urban & Village Collectors / Rural Arterials & Collectors	City of Ottawa Road Corridor Planning & Design Guidelines, Urban & Village Collectors / Rural Arterials & Collectors, October 2008

Reference Documents in Schedule 15	Description of Reference Documents
City of Ottawa Sewer Design Guidelines	City of Ottawa Sewer Design Guidelines (November 2004)
City of Ottawa Sewer Use By-law No. 2003-514	
City of Ottawa Slope Stability Guidelines for Development Applications	
City of Ottawa Standard Tender Documents for Unit Price Contracts, Volume 1 and 2	
City of Ottawa Traffic and Parking By-Laws	
City of Ottawa Transit Technology Choice Report	
City of Ottawa Urban and Rural Truck Routes	
City of Ottawa Water Design Guidelines	
CMAA No. 70	CMAA No. 70 Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes
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CN Guidelines for Design of Railway Structures	CN, 2006
CPCI Design Manual Precast Prestressed Concrete	
CRCA Specifications Manual	Canadian Roofing Contractors Association (CRCA)
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EN 50126	EN 50126 Railway Applications – The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS)
EN 50128	EN 50128 Railway Applications – Communication, Signalling, and Processing Systems - Software for Railway Control and Protection Systems
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EN 50155	EN 50155 Railway Applications – Electronic Equipment Used on Rolling Stock

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IEC 1000-5-2	IEC 1000-5-2 EMC Cabling Guidelines
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IEEE 1477	IEEE 1477 Passenger Information System for Rail Transit Vehicles
IEEE 1482	IEEE 1482 Rail Transit Vehicle Event Recorders
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MTO Aesthetic Guidelines for Bridges	MTO, 2004
MTO Bailey Bridge Manual	MTO, 1990
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NFPA 101	NFPA 101 Life Safety Code
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SCHEDULE 15-2
DESIGN AND CONSTRUCTION

PART 1
GENERAL REQUIREMENTS

ARTICLE 1 PHYSICAL LAYOUT

1.1 Project Description

a) The OLRT Project shall consist of a surface Track and two below-grade Track sections – a Downtown Area underground section and a second underground section that provides the access to the MSF.

b) The OLRT Project shall include thirteen (13) Stations, with three (3) new Underground Stations located in the Downtown Area of the Project; four (4) Transfer Stations, two (2) of which are also Terminal Stations; four (4) BRT to LRT Station conversions; two (2) new At-Grade Stations, located along the surface Alignment

c) An MSF shall be provided for servicing and for storing the LRVs. This facility shall be located on Belfast Road, just west of St. Laurent Blvd in the City's east end. This facility shall contain every requirement for the Maintenance and storage of the Vehicles.

d) The Lands available for the Project are identified in the PRP drawings. The Lands includes existing City right-of-way, permanent property takings and temporary property takings. See Lands description below for expanded detail.

e) All Stations, facilities supporting the OLRT and where applicable, associated Bus facilities shall be designed and constructed in accordance with Transport Canada rules and regulations including but not limited to the Canadian Transportation Agency Code of Practice.

1.2 General Alignment Requirements

a) The Alignment falls within existing City rights-of-ways and the permanent takings as shown on the PRP drawings. Project Co shall Design the Alignment within the envelope as prescribed in the Lands description below.

b) The Design and Construction of the Project shall be comprised of the conversion of the existing BRT vehicle corridor into the proposed LRT Alignment.

c) The 12.5 km LRT corridor shall generally follow the established West – East BRT corridor from Tunney's Pasture Station in the west, which is located near the intersection of Scott Street and Tunney's Pasture Driveway, to Blair Station in the east, which is located close to the intersection of Regional Road 174 and Blair Road. Included shall be a 2.5 km OLRT Tunnel section through the Downtown Area between Commissioner Street at Wellington Street (west Tunnel portal) and Waller Street at Nicholas Street (east Tunnel portal).

d) The MSF and access Track shall be constructed east of Belfast Road, west of St. Laurent Boulevard, and south of the existing VIA Rail corridor. The MSF access Track connection shall branch off of the mainline Tracks, westbound and eastbound, near the Belfast Road and Tremblay Road intersection. The two Tracks shall stay on the east side of and within the Belfast Road right of way, avoiding the Belfast Road Bridge and cross under the VIA Rail tracks to connect to the yard Tracks in the MSF.

e) Four Transfer Stations shall be constructed – one at each end of the Alignment, Terminal Stations – Blair Station and Tunney's Pasture Station – and two intermediate Stations at Bayview Station and Hurdman Station. Provisions for fare paid bus transfer Platforms, bus layby berths and circulation shall be designed and constructed at these locations with the exception of Bayview Station which requires the construction of a new Platform and fare paid zone to support the transfer of passengers from the City's O-Train service in lieu of a bus transfer.

f) The vertical alignment of the Tunnel in the vicinity of the Rideau Canal shall be located below the Rideau Canal Interceptor and the Department of Public Works Sewer Tunnel on the west and east sides of the Rideau Canal. The vertical alignment of the Tunnel under the Rideau Canal shall preclude the `thread the needle` and syphon alignment options.

g) Guideway Requirements

(i) Project Co shall be responsible for the complete Design, Construction, testing and commissioning plus Maintenance for the conversion of the existing BRT to the LRT System requirements.

(ii) The Guideway shall be completely fenced and segregated from any pedestrian and vehicular traffic. Fencing location, type and height shall be as shown on the Fencing Drawings.

(iii) Secure maintenance access gates shall be provided as required to allow access to the Track corridor.

1.3 Tunnel Requirements

a) Project Co shall be responsible for the complete Design and Construction of the LRT Tunnels, including, but not limited to, cut-and-cover, sequentially mined or bored Tunnels; the access and ventilation shafts; Stations; any required underground facilities; mechanical and electrical facilities; and any other requirements for design, Construction and Maintenance of the Tunnels.

1.4 Systems and Vehicle Requirements

a) Project Co shall be responsible for the complete design, Construction, testing and commissioning and Maintenance of the complete Systems required for the safe and efficient operation of the LRT.

(i) Systems includes

A. Traction Power

B. Revenue Vehicles

C. Non-Revenue Vehicles

D. Train Control System

E. Communications

F. Overhead Catenary System and Pantograph

G. Electromagnetic Interference and Compatibility

H. Corrosion Control

b) Project Co shall be responsible for the planning, design, manufacturing, procurement and delivery of the LRVs. Included in this responsibility is the required coordination and integration between all System elements and key interfacing disciplines.

c) Project Co shall supply all non-revenue vehicles required for the continued Maintenance and operation of the LRT System.

d) Systems and vehicles shall be designed and constructed in accordance with Transport Canada rules and regulations including but not limited to the Canadian Transportation Agency Codes of Practice.

1.5 Facilities Requirements

a) MSF Requirements

(i) Project Co shall be responsible for obtaining all required approvals for the MSF.

(ii) Project Co shall be responsible for the complete planning, design, Construction, operation and Maintenance of the MSF, including the supply of all equipment and facilities to maintain the Vehicles to meet the requirements of this Schedule 15 Output Specifications.

(iii) The MSF shall be constructed within the Lands.

(iv) The administration building and the maintenance building at the MSF shall be "LEED Certified".

(v) The MSF shall be planned and designed to protect for future expansion.

(vi) The MSF maintenance yard shall be secured by fencing that is continuous with the fencing protecting the LRT Alignment.

A. A motor operated gate(s), commercial grade, with all related posts, hardware, electrical and IT to provide controlled access to the MSF shall be integrated into the front entry.

b) Station Requirements

(i) Project Co shall be responsible for the complete design, Construction and Maintenance of the Stations. The Stations shall be designed to meet the functional, accessibility, aesthetics, environmental, safety, operational and technical requirements of the City as contained and described in the Project Agreement.

(ii) The Stations shall be designed for a fare control system to be supplied and installed by the City.

(iii) All Stations shall be designed to accommodate the Design requirements of the selected LRV.

(iv) All Underground and at-grade Stations shall be designed in accordance with any and all applicable standards regarding accessibility and fire/life safety, including but not limited to, emergency egress, lighting and ventilation.

(v) The Stations shall be located along the corridor as described below from west to east:

A. Tunney's Pasture Station shall be located at the site of the existing BRT station, in the depressed roadway section, at the intersection of Tunney's Pasture Driveway and Scott Street. For the purposes of this design, it shall be considered the western terminus Station and will operate both as a Terminal Station and a Transfer Station that connects with the existing BRT to the west and local surface street bus service;

B. The new Bayview Station shall be located west of the existing BRT Station near Albert Street and directly over the O-Train station. The construction of the Transfer Station shall be coordinated with the replacement of the West Transitway CPR Overpass "O-Train" Bridge It shall accommodate vertical connections for the fare paid passenger transfer to the relocated O-Train station platform. The Station Design at the O-Train level shall not preclude a possible future extension of the OLRT to the west or a possible future connection of the O-Train to the OLRT System to and from the east or an interprovincial connection to the north. The new Station design and construction shall include the extension of the existing O-Train spur rail, including buffer stops, to accommodate the relocated O-Train platform and ensure sufficient space and clearance is provided to allow for a future double-tracked electrified light rail line and platform which would replace the existing O-Train spur line;

C. Lebreton Station shall be located south of the existing BRT roadway at the intersection of the existing BRT and Booth Street. The Station shall be constructed below and integrated with the proposed Booth Street Bridge grade separated Structure with the Platforms east and west of Booth Street. Connections shall be provided to Booth Street and local bus service;

D. Downtown West Station shall be an Underground Station located in the Queen Street right of way with the westerly end of the Station near Lyon Street;

E. Downtown East Station shall be an Underground Station located in the Queen Street right of way. The Platform can be located anywhere between sixty-five (65) metres east of the east limits of Bank Street and thirty (30) metres east of the east limits of Metcalfe Street. There shall be a minimum of 300 metres between leading and trailing edges of adjacent Station Platforms;

F. Rideau Station shall be an Underground Station located within the Tunnel section. Rideau Station shall be located completely within the Alignment Envelope and in accordance with the following:

i. The west end of the platform at Rideau Station shall be a minimum of 300m from the east end of the platform at Downtown East; and

ii. The west end of the station structure shall be located no further west than the eastern sideline of the intersection of Colonel By/Sussex and Rideau Street.

G. Campus Station shall be located at the site of the existing BRT station at the University of Ottawa between the intersection of Waller Street with Nicolas Street and Mann Avenue. An existing pedestrian underpass from Colonel By Drive to the University is to remain and shall also provide access to this Station;

H. Lees Station shall be located at the site of the existing BRT station at Lees Avenue and the BRT;

I. Hurdman Station shall be located to the north of the existing BRT station east of the Rideau River and west of Riverside Drive. This Station shall be a Transfer Station with fare paid connections to the existing BRT Southeast Transitway and local bus service. The LRT Station shall be elevated and the existing bus transfer station and bus layby shall be reconstructed;

J. Train Station shall be located west of the existing BRT station that is presently located within the access loop roadway of the VIA Rail station.

The proposed Station shall be located outside of the VIA Rail access loop on the existing BRT roadway east of Riverside Drive;

K. St. Laurent Station shall be located at the existing dual level BRT station north of Highway 417 and west of St Laurent Boulevard. The upper level shall remain a BRT station and the lower level shall be converted to LRT only. It shall provide connections to local bus service at the surface level of the St. Laurent Shopping Centre;

L. Cyrville Station shall be located at the site of the existing BRT station near Cyrville Road and Highway 417 with the westerly end of the Platform on the west side of Cyrville Road; and

M. Blair Station shall be located at the site of the existing BRT station. The LRT portion of this Terminal/Transfer Station shall be located on the existing BRT roadway corridor north of Regional Road 174 and west of Blair Road. The Station shall be designed to allow the passenger transfer to bus platforms within a fare paid zone. The reconstructed BRT station shall be located north of the proposed LRT Station and provide a connection to the BRT roadway to the east and to the local bus service.

1.6 Structure Requirements

a) New Structures

(i) Project Co shall be responsible for the complete planning, Design and Construction of the new OLRT Structures.

(ii) The new Structures shall be located along the corridor as described below from west to east.

A. The Booth Street Bridge shall be a grade separated Structure to be constructed where the existing BRT crosses Booth Street as an at-grade signalized crossing. The Bridge approaches shall be reconstructed on the existing Booth Street right of way between Albert Street and the Ottawa River Parkway. The Bridge Structure shall provide connections to Lebreton Station located below the Structure on the OLRT Alignment.

B. The Booth Street Bridge shall have retaining walls constructed at the north and south approaches. The north approach shall be coordinated with the adjacent future development proposed centerline elevation at the Fleet Street intersection of 56.3. The south approach shall be coordinated with the LeBreton Station Structure and retaining walls. The retaining walls structures shall be constructed within the Lands.

C. The Commissioner Street/Wellington Street intersection crossing of the OLRT shall be located in the footprint of the existing Commissioner Street/Wellington Street intersection and include the following:

i. provide continuity of access for pedestrians and cyclists across the OLRT Alignment in the final condition;

ii. maintain full access during construction 24/7 to adjacent properties, including but not limited to Fleet Street Pumping Station, Cliff Street Heating Plant, and National Archives parking lot;

iii. The OLRT Track Alignment between Lebreton Station and Commissioner Street shall stay within the existing Wellington Street right-of-way, including retaining walls and slopes allowing for minor encroachments on adjacent City property, if necessary, except that no construction or disturbance shall be allowed on the Fleet Street Pumping Station property;

iv. The elevation of the roadway over the OLRT Track Alignment shall be approximately the same as the existing roadway elevation;

v. The crossing shall be over a Tunnel section of the OLRT alignment;

vi. The Tunnel structure profile shall be designed to allow utilities to cross over the roof of the structure. Note the presence of a 1500mm water main in Commissioner Street whose relocation or protection requires coordination with the Tunnel structure design. Project Co shall coordinate with HOL for a proposed high voltage duct bank connecting to the Cliff Street Heating Plant by way of Commissioner Street;

vii. The Tunnel box structure shall be designed to the requirements of Schedule 15-2 Part 3; and

viii. The excavated area shall be restored to original condition after completion of construction.

D. The West Portal (Commissioner's Street) Tunnel structure profile shall be designed such that the top of the structure meets the requirements of the Vertical Alignment Envelope and is below 60.5m elevation at the escarpment face;

i. No work shall be performed above 60.5m elevation at the escarpment face with the exception of the toe of the escarpment within the limits of cut and cover construction;

E. The East Portal (Waller Street) U-section retaining walls shall be constructed along the Guideway between Nicholas Street to the south and the University of Ottawa Campus to the north.

F. The Hurdman Station elevated Guideway shall be constructed and shall carry the OLRT Track Guideway from the existing BRT roadway at-grade east of the Rideau River rising to the new elevated Hurdman Station, ending at an embankment Structure at the east end of the Station. West of the Station, the Structure shall be designed to provide a minimum 20m wide right-of-way with a minimum clearance of 5.0m from existing grade to allow for a future two-way local road to access the lands north of the Station as indicated on the Federally Mandated Station Drawings.

G. A new access Structure shall be provided east of Hurdman Station to provide a minimum 20m wide right-of-way with a minimum clearance of 5.0m from existing grade to allow for a future two-way local road to access the lands north of the Station as indicated on the Federally Mandated Station Drawings.

H. The Alignment of the OLRT at VIA Rail station shall deviate from the existing BRT and cross under the existing access roadway loop to the north of the existing access roadway Bridge Structure on the east side of the loop. A new Structure shall be constructed where the OLRT Track Guideway crosses under the existing VIA Rail station access roadway.

I. The Yard Track Connections that branch off of the mainline on the East and West side of Belfast Road at the BRT shall have retaining walls or U-section constructed on the approaches to the Tremblay Road underpass.

J. The Yard Track Connection shall have retaining walls or U-section constructed at the southeast approach to the MSF Yard tracks after crossing the VIA Rail Line.

b) Existing Structures to be Converted

(i) Project Co shall perform such Design checks as may be required to ensure that the existing BRT Bridge Structures on the BRT System can be converted to LRT for the chosen LRV. The Design check shall be completed in accordance with all applicable codes and standards.

(ii) Project Co shall perform Design checks and investigations on all existing Structures to ascertain the BCI number of each Structure. Should the BCI number be below 80, Project Co shall Design and Construct such modifications as are necessary to bring each Structure to a minimum BCI 80 during the construction period.

(iii) Should such Design checks demonstrate that modification is required to any portion of the Structure or foundation, Project Co shall Design and construct such modifications and to ensure that all applicable codes are met.

(iv) Existing Structures located along the corridor:

A. The Bayview Road Bridge is an existing Structure carrying the BRT over Bayview Road.

B. The Mann Avenue Bridge is an existing Structure carrying the BRT over Mann Avenue. It is located east of Campus Station and west of Lees Station.

C. The Rideau River Bridge is an existing Structure carrying the BRT over the Rideau River.

D. The Riverside Drive Bridge is an existing Structure carrying the BRT over Riverside Drive.

E. The Cyrville Road Culvert is an existing Structure that the BRT crosses over.

c) Existing Structures to be Removed and Replaced

(i) Project Co shall be responsible for the complete planning, Demolition, Removal, Design and Construction of the existing BRT Structures and reinstatement of any adjacent re-useable infrastructure such as MSE walls.

(ii) Project Co shall be responsible for the complete coordination with OC Transpo, external agencies and stakeholders during demolition staging.

(iii) Project Co shall be responsible for the complete coordination with OC Transpo, external agencies and stakeholder during construction staging.

(iv) A new replacement Structure shall be located along the corridor as described below:

A. The replacement West Transitway Bridge over the O-Train near Albert Street shall be a grade separated Structure to be constructed along the same Transitway alignment. The Bridge approaches shall be reconstructed or redefined as required on the existing Transitway right-of-way between Bayview Road and the existing Bayview Station as required.

i. Project Co shall be responsible for the complete planning, Design and Construction of the new OLRT Structures such that it meets the OC Transpo North-South line requirements and allows for functional connections to the Transitway and Bayview Station.

ii. Project Co shall be responsible for the complete coordination with OC Transpo, external agencies and stakeholder during construction staging.

iii. Project Co shall be responsible for the maintenance and protection of existing or planned BRT and/or O–Train operations during the demolition and construction period unless such operations are maintained through other means and methods permitted by OC Transpo, the City of Ottawa and external agencies.

iv. Project Co shall be responsible for the transitions to and interfaces with such removed and replaced structures in concert with the functionality of existing or planned BRT and/or O–Train operations.

1.7 The Lands Requirements

a) Property Request Plans

(i) Project Co shall utilize the Property Request Plans (PRP) and ensure that the Project remains within the boundaries shown in these plans.

(ii) Should the approved Final Design require a change to any property boundaries, new PRP's shall be created by the City.

(iii) Limits of Construction, occupation and all works, except for site access construction of detours and associated works, on existing City/public rights-of-way/property and Cash Allowance Work constructed by Project Co within existing City rights-of-way/property, shall be within the Lands, Temporary Easements and Permanent Easements as shown hatched on the PRP's.

(iv) For Cash Allowance Work and/or site access, detours and associated works on existing City/public rights-of-way/property that are outside of the Lands, Temporary Easements and Permanent Easements shown on the PRPs, the necessary City/public Authority to construct and implement such detours and Cash Allowance Work (as outlined in PA Schedule 15-2, Part 7), shall be considered by Project Co to be provided upon approval of the TTMP.

(v) Construction access for vehicles to 300 Queen St (for further clarity the Lands known as the mobilization site and as described in PIN 04114-0364) shall be restricted to entry from Kent St and exit onto Queen St only.

b) Property Identification Package

(i) The Property Identification Package consists of a binder containing the following sections:

A. Master Spreadsheet;

i. A Master Spreadsheet lists all of the properties anticipated to be affected to any degree at the Preliminary Design stage. Project Co shall utilize the data provided in the Master Spreadsheet when performing the Final Design.

B. Property Request Plans (PRP);

i. The PRP's depict the property takings and the affected Parent Parcel of land.

C. Route Plans with Property Identification Number (PIN); and

i. The Route Plans show the relationship between the route of the Project and the PINs.

D. OLRT Property PRP Schedule Index Plan showing all PRP's.

i. Schedule Plan provides the physical relationship between the route and the layout of the PRP's.

(ii) The Property Identification Package shall become a final document when the Final Design is presented to the City and approved.

c) Alignment Envelope

(i) The Horizontal Alignment Envelope within which Project Co shall Design the OLRT Alignment between Bank Street and Laurier Avenue is described on a drawing titled "Project Horizontal Alignment Envelope" in the Data Room. The "Project Alignment Envelope" is a reliant document.

(ii) The Vertical Alignment Envelope within which Project Co shall Design the OLRT Alignment, between Commissioner Street and Laurier Avenue, is described on a drawing titled "Project Vertical Alignment Envelope" located in the Data Room. The "Project Vertical Alignment Envelope" is a reliant document.

(iii) The Alignment Envelope upper vertical limit is defined as the ground surface when under roadways and as shown on the Project Vertical Alignment Drawing when under buildings. However, the roadway surface is considered part of the Alignment Envelope for access and temporary construction uses;

(iv) The Alignment Envelope lower vertical limit is defined in the "Project Vertical Alignment Envelope" drawing.

(v) The Alignment Envelope shall be within the property takings depicted in the PRP's as permanent takings and shall encompass all elements of the Alignment.

(vi) The criteria for locating Structures within the Alignment Envelope are as follows:

A. The dimensions presented in this section are a guide to establish the final Alignment within the envelope early in the Design and are subject to change by the City as individual site circumstances require. The use of the PRP parcels as Temporary Construction areas to construct the Structures described herein is not restricted by the criteria presented below;

B. Cut and Cover Tunnels and Stations;

i. Laterally the outside limits of the Tunnel Structure shall be at least 1 meter from envelope limit and laterally at stations the outside limits of the station structure shall be determined by Project Co on a case by case basis but not outside of the envelope limits.

ii. The Upper Limit of the Tunnel Structure shall be at least 4 meters below the upper envelope limit under roadway (ground surface) to provide space for Utilities in public right-of-ways and for support of excavation. Where the Tunnel is coming to daylight at the surface, the Tunnel structure shall be allowed as near to the surface as is required to construct the Tunnel portal.

iii. The Upper Limit of the Station roof Structure shall be at least 4 meters below the upper envelope limit under roadway (ground surface) to provide space for utilities in public ways and for support of excavation.

iv. The limits of rock bolts and/or tie-backs shall be within the lateral and upper limits and be within the Lands and permanent or temporary easements described in the Lands Schedule, except that additional Temporary Construction Easements relating to support of excavation elements, rock bolts and tie-backs that are not forming part of the permanent structure of the System and that are outside of the boundaries of the Lands may be acquired by Project Co.

v. At Rideau Station the Platform shall be no lower than elevation 37.0m.

vi. At Downtown East Station the Platform shall be no lower than elevation 52.0m.

vii. At Downtown West Station the Platform shall be no lower than elevation 54.0m.

C. Sequential Excavation and Bored Tunnels and Stations;

i. Laterally the outside limits of the Tunnel Structure shall be at least 2 meters from the envelope limits and laterally at Stations, the

outside limits of the Station Structure shall be determined by Project Co on a case-by-case basis but not outside the Alignment Envelope limits.

ii. The Upper Limit of the Tunnel Structure shall be at least 4 meters below the upper envelope limit under roadway (ground surface) to provide space for Utilities and support of excavation. Where the Tunnel is coming to daylight at the surface, the Tunnel structure shall be allowed as near to the surface as is required to construct the Tunnel portal.

iii. The Upper Limit of the Station roof Structure shall be at least 4 meters below the upper envelope limit under roadway (ground surface) to provide space for utilities and support of excavation.

iv. The limits of rock bolts and/or tie-backs shall be within the lateral and upper limits and within the Lands and Permanent or Temporary easements described in the Lands Schedule, except that additional Temporary Construction Easements relating to support of excavation elements, rock bolts and tie-backs that are not forming part of the permanent structure of the System and that are outside of the boundaries of the Lands may be acquired by Project Co.

v. At Rideau Station the Platform shall be no lower than elevation 37.0m.

vi. At Downtown East Station the Platform shall be no lower than elevation 52.0m.

vii. At Downtown West Station the Platform shall be no lower than elevation 54.0m.

D.

E. Vents and Shafts;

i. Vent and fan shafts shall be located in right of ways only.

ii. Vent and fan shafts shall not be permitted to be located within the curb to curb dimension.

1.8 Design and Construction Requirements to Accommodate Future Works

a) Project Co shall protect for, by not precluding, future works in the Design and Construction of certain elements of the Project.

b) These future works are described below:

(i) Future Western extension of the LRT System either from Tunney's Pasture Station or Bayview Station;

(ii) A pocket Track east of Hurdman Station to protect for western extension service patterns.

(iii) Future Eastern extension from Blair Station;

(iv) Future OLRT Station Platform extensions if necessary to achieve 24,000 pphpd;

(v) The future connection of the O-Train Track Alignment at Bayview Station to the OLRT Project Alignment connecting to eastbound and westbound Tracks between Bayview Station and Lebreton Station;

(vi) The future northerly interprovincial extension of the O-Train Alignment at Bayview Station to the existing Prince of Wales Bridge over the Ottawa River;

(vii) Future expansion of the MSF;

(viii) The track elevation in the vicinity of Preston Street shall be no higher than elevation 55.63 between Reference Concept baseline Station 99+980 and Station 100+015 in order to protect for the proposed Preston Street Bridge over the LRT tracks;

(ix) The track elevation in the vicinity of LeBreton Station shall be no higher than 56.8m between Reference Concept baseline Station 99+800 and Station 100+400, in order to protect for future development in the Lebreton Flats area that may be constructed over the LRT Guideway. Future development in the Lebreton Flats area will be located 7.0 meters above the Track elevation through this area and no OLRT System Infrastructure shall be located in excess of 7 .0 metres above Track elevation ; and

(x) The lower vertical envelope limit above the proposed 3000mm CSO tunnel at Kent Street shall be at elevation 50.0 unless Project Co can demonstrate through detailed technical and economic analysis that a lower elevation is technically feasible and will not impact construction, operation or maintenance of the proposed CSO tunnel.

1.9 Maintenance Responsibilities during the Design and Construction Work

Project Co shall submit, as outlined in the Project Agreement, the Works Schedule including but not limited to the phases of construction works, the critical path schedule associated with the respective phase of construction works, the geographical boundaries identifying the phase of construction works, and construction means and methods to perform the phase of construction works.

The phases of construction works outlined in the Works Schedule shall be the basis for determining the commencement of Project Co's Maintenance responsibilities during construction. Notwithstanding Schedule 15-3 Maintenance and Rehabilitation, the City shall be responsible for the existing Infrastructure within the Lands from Financial Close until he identified commencement date for the respective phase of construction works specified by Project Co . For further certainty, the City shall be responsible for the maintenance of including but not limited to the existing BRT, stations, structures, retaining walls, highways, and pathways. Upon the commencement of the phase of construction works and notwithstanding City Specific Responsibilities identified in Schedule 15-3 Maintenance and Rehabilitation, Project Co shall be responsible the Maintenance of the Infrastructure during the respective phase of construction works and until such time as the Infrastructure is either returned and accepted by the Owner of the Infrastructure or termination of the Maintenance Term.

ARTICLE 2 OPERATIONAL PERFORMANCE REQUIREMENTS

2.1 Introduction

a) Project Co shall provide an integrated LRT System capable of delivering public transit service in a safe, reliable and efficient manner, and in accordance with the following operational performance parameters.

2.2 General

a) Although operation of rail service will be the responsibility of the City, Project Co shall thoroughly consider the operational needs and the functionality of the System during Design and Construction Work and shall validate the operational capabilities through performance simulation.

b) Meeting the high capacity operational needs of the City shall require Project Co to design and construct a light rail System that is highly integrated and highly reliable across all major rail Systems including; Vehicle, Train Control and signalling, Traction Power, Stations, Tunnel ventilation, Track and special trackwork.

c) Project Co shall assist the City in preparing an Operations Service Plan. Project Co will prepare operating procedures, records, training, and related manuals, in consultation with the City, required to operate the System based on the final System Design and results of performance simulations. Project Co shall submit the referenced documents in accordance with Schedule 10 – Review Procedure. Project Co and City shall work cooperatively, each acting reasonably, to achieve an integrated Operations Service Plan.

2.3 Operational Headways

a) The System shall be designed to reliably support a sustained operational Headway of 2 minutes or less under typical operating conditions.

b) The System shall be designed to reliably support a sustained operational Headway of 15 minutes during a single Track outage at any location throughout the System to support Maintenance activities and/or continued operation during unplanned outages. Terminal to terminal trip time shall not significantly increase during single tracking operations, other than as a result of speed reductions applied through Maintenance work zones.

2.4 Hours of Operation

a) System Design and ongoing Maintenance and rehabilitation shall support the following hours of Train operation:

(i) Weekday (Monday through Thursday): 05:00-01:00

(ii) Friday: 05:00-02:00

(iii) Saturday & select Holidays: 06:00-02:00

(iv) Sunday & select Holidays: 08:00-23:00

(v) Operations are anticipated such that a Passenger entering the System at any Station during these hours is able to travel to any other Station on the System such that the actual period that Trains are in operation shall extend outside of the above hours of operation.

b) Passenger facilities in a Station shall be available for use by Passengers from 15 minutes prior to the departure of the first scheduled Train from that Station until 15 minutes after the departure of the last scheduled Train from that Station.

2.5 Operational Design and Construction Requirements

a) Based upon the City's Ridership Forecast as shown in Table 1-2.1 and Table 1-2.2 below, the City has established the following service scenarios:

(i) Operating Scenario 1: Year 2021 operation with peak period Headways of approximately 3.25 minutes or greater based on peak link load standees not in excess of 3.33 Passengers/m^2.

(ii) Operating Scenario 2: Year 2031 operation with peak period Headways of approximately 2.1 minutes or greater based on peak link load standees not in excess of 3.33 Passengers/m^2.

b) Project Co is responsible for designing and constructing the System to support Operating Scenario 1 and Operating Scenario 2 under this Project.

c) Project Co shall further Design the System such that Passenger carrying capacities can be increased to an ultimate capacity of 24,000 pphpd (Operating Scenario 3) in accordance with the requirements of Section 2.6 (f). Such future expansion shall be by future capital projects without undue modification or loss of investment of the initial System. For further clarity, the Underground Stations shall be designed and constructed for Operating Scenario 3 in accordance with Schedule 15-2 Part 5 2.3.

d) Notwithstanding the requirements related to the above service scenarios, the proposed System and rolling stock shall further comply with the requirements of Section 2.3 – Operational Headways and Section 2.6 - System Capacity.

Table 1-2.1: 2021 AM Peak Hour Ridership Forecast

	Eastbound			**Westbound**		
LRT Station	Boardings	Alightings	**EB Load**	Boardings	Alightings	**WB Load**
Tunney's Pasture	9,930	0	**9,930**	0	2,950	**0**
Bayview	220	390	**9,760**	140	570	**2,950**
LeBreton	130	440	**9,450**	60	380	**3,380**
Downtown West	440	2,550	**7,340**	680	2,860	**3,700**
Downtown East	480	3,850	**3,970**	700	4,320	**5,880**

	Eastbound			Westbound		
LRT Station	Boardings	Alightings	**EB Load**	Boardings	Alightings	**WB Load**
Rideau Centre	1,730	2,090	**3,610**	1,420	2,300	**9,500**
Campus	330	1,770	**2,170**	430	1,410	**10,380**
Lees	210	280	**2,100**	460	150	**11,360**
Hurdman	950	1,140	**1,910**	3,200	540	**11,050**
Train Station	20	170	**1,760**	20	80	**8,390**
St. Laurent	560	580	**1,740**	910	330	**8,450**
Cyrville	20	290	**1,470**	220	100	**7,870**
Blair	0	1,470	**0**	7,750	0	**7,750**
Total	**15,020**	**15,020**		**15,990**	**15,990**	

Table 1-2.2: 2031 AM Peak Hour Ridership Forecast

	Eastbound			Westbound		
LRT Station	Boardings	Alightings	**EB Load**	Boardings	Alightings	**WB Load**
Baseline	5,980	0	**5,980**	0	2,260	**0**
Iris	610	40	**6,550**	20	150	**2,260**
Queensway	70	200	**6,420**	310	60	**2,390**
Lincoln Fields	6,650	840	**12,230**	190	1,260	**2,140**
New Orchard	220	40	**12,410**	70	30	**3,210**
Cleary	180	110	**12,480**	30	60	**3,170**
Dominion	190	30	**12,640**	40	30	**3,200**
Westboro	550	100	**13,090**	90	200	**3,190**
Tunney's Pasture	1,080	690	**13,480**	170	1,240	**3,300**
Bayview	4,870	310	**18,040**	140	730	**4,370**
LeBreton	150	940	**17,250**	230	490	**4,960**
Downtown West	300	4,380	**13,170**	1,710	3,680	**5,220**
Downtown East	380	5,990	**7,560**	850	5,260	**7,190**
Rideau Centre	160	3,510	**4,210**	2,060	3,220	**11,600**
Campus	400	2,160	**2,450**	520	1,620	**12,760**
Lees	260	340	**2,370**	560	180	**13,860**
Hurdman	1,830	1,610	**2,590**	3,900	1,380	**13,480**
Train Station	50	150	**2,490**	50	50	**10,960**
St. Laurent	680	950	**2,220**	1,200	600	**10,960**
Cyrville	50	350	**1,920**	170	50	**10,360**
Blair		1,920	**0**	10,240		**10,240**
Total	**24,660**	**24,660**		**22,550**	**22,550**	

2.6 System Capacity

a) The Design and Construction of the System and proposed rolling stock shall support the following peak hour capacities:

(i) Operating Scenario 1 (Year 2021): minimum of 11,360 PPHPD

(ii) Operating Scenario 2 (Year 2031): minimum of 18,040 PPHPD

b) The required System capacity for Operating Scenario 1 and Operating Scenario 2shall be provided subject to the following passenger comfort load standards, maximum consist lengths, and appropriate operating Headways.

c) Passenger Comfort Load Standards:

(i) The City of Ottawa has adopted the following passenger comfort criteria as it relates to passenger loading densities. Project Co shall use the following passenger comfort criteria for determining fleet size and for service planning purposes over the Project Term.

(ii) The average standee density during the peak hour on the peak link load segment shall not exceed 3.33 standees per square meter of available standee space.

(iii) At least 40 percent of the required peak hour service capacity must be provided by seats to maintain a high level of comfort and minimize the duration that passengers have to stand. Flip-up seats count toward the 40 percent requirement.

(iv) The average standee density during Off-Peak periods on the peak link load segment shall not exceed 0.80 standees per square meter of available standee space.

(v) Available standee space shall exclude the area under seats (including flip-up seats), area occupied by feet of seated passengers, any area within 50mm of closed doors, area within 100mm on either side of the moving edge of the articulation pie plate, and any area with dimensions that will not accommodate a standee (e.g. sliver areas between fixed objects), or is otherwise unsuitable or uncomfortable for standees. A minimum floor area of 0.14 square meters shall be allocated for the feet of each seated passenger that protrudes into the standee area.

d) Train Consist and Platform Lengths:

(i) The maximum Train consist length and Platform length shall be determined by Project Co in compliance with all existing codes, regulations and to meet the required service capacities identified in this Article.

(ii) The rolling stock shall be configured to maximize Train capacity, and to be generally compatible with long term plans to expand system capacity to 24,000 pphpd in accordance with 2.5(c), which may or may not involve Platform extensions. Project Co shall identify the approach for capacity expansion to 24,000 pphpd and describe how the rolling stock solution supports such expansion.

(iii) Project Co is responsible to ensure that the first and last door locations of their selected Train consist, Station Platform lengths and Train control system are fully integrated in a manner that provides reliable Train berthing under all operating conditions for safe detraining and entraining of passengers without undue performance degradation.

e) Operating Headway:

(i) The City seeks to minimize operating costs by maximizing Train capacity and peak operating Headway to achieve the required capacity and has identified the Headways stated in Section 2.5 (a). Project Co should establish if required, alternate operating Headways for each Operating Scenario based upon the actual supplied vehicle, provided the other System capacity criteria and Operational Performance Requirements are met.

f) Operating Scenario 3 - Ultimate Capacity:

(i) Compliance with Section 2.5(c), allowing for an ultimate Passenger capacity of 24,000 PPHPD, shall be in demonstrated in accordance with the following comfort and operating requirements:

A. Standee density shall not exceed 4 standees per square meter of available standee space;

B. At least 35 percent of the required peak hour service capacity shall be provided by seats to maintain a high level of comfort and minimize the duration that Passengers have to stand; and

C. A minimum operational headway of the greater of 105 seconds or the minimum sustainable headway of the core system. The minimum terminal headways of the initial OLRT system can be disregarded for the purpose of determining the minimum sustainable headway for Operating Scenario 3.

2.7 Maximum Trip Times

a) To ensure an efficient and effective service, the System and rolling stock shall support a maximum terminal to terminal (start to stop) travel time during the peak period. Terminal to terminal travel times shall be determined using stochastic operations simulation analysis of the proposed System under manual and ATO operations.

b) The maximum terminal to terminal travel time during the peak period shall be as follows:

(i) Manual mode: 24 minutes including Dwell Time and accounting for typical underperformance resulting from Driver-controlled Vehicle movement

(ii) ATO mode: 23 minutes including Dwell Time.

c) Manual Operating Mode

(i) Trip times for manual operations shall be determined through simulation with stochastic variations in Driver performance and Dwell Times.

(ii) Dwell Time variation shall consider the effect of late Trains based on Project Co or industry experience as documented in the simulation report. In the absence of delay-based Dwell Time simulation a randomized uniform distribution around the nominal calculated Dwell Times of not less than plus and minus 5 seconds shall be applied.

(iii) Driver performance variations shall be set such that the average terminal to terminal running time shall be at least 6% greater than the ideal trip time under full performance.

d) ATO Operating Mode

(i) Trip times for ATO operations shall be determined through simulation with stochastic variations of Dwell Times, and appropriate variations in Vehicle performance based on performance tolerances of the Vehicle and ATO equipment as determined by Project Co.

(ii) For analysis purposes, Dwell Time variation for ATO shall follow a uniform distribution around the nominal, calculated Dwell Times based on Project Co experience and recommendations, but no less than plus and minus 5 seconds.

e) Dwell Time

(i) Dwell Times shall be included in the calculation of the maximum terminal to terminal travel time.

(ii) Passenger loading and unloading time at terminal Stations is considered part of the terminal layover time, and is not included in the calculation of maximum travel time.

(iii) Nominal Dwell Times at each Station shall be based on the directional peak hour Passenger boardings and alightings provided in Tables 1-2.1 and 1-2.2 above, industry experience on Passenger flow rates under similar operating conditions, and on the proposed rolling stock solution.

(iv) An absolute minimum Dwell Time of 20 seconds shall be assumed at all Stations.

f) Terminal Time

(i) Terminal time shall be defined based on the proposed operating Headway.

(ii) A minimum terminal time shall be no less than three minutes or one operating Headway.

(iii) The absolute minimum terminal time shall not exceed the calculated time required for Passenger loading and unloading at the terminals during the peak hour including an appropriate allowance for variations in Passenger flow.

(iv) The operational simulation validating compliance with this Article shall report the distribution of terminal time at each terminal and discuss the ability of the System to reliably meet the terminal time requirements.

2.8 Fleet Requirements

a) Project Co shall provide a sufficient fleet of LRVs to support the needs of the System over the Maintenance Term based on:

(i) The planned service capacity as documented in the Operations Service Plan;

(ii) To effectively execute the rail fleet Maintenance program proposed by Project Co in accordance with Schedule 15-3 with an appropriate Maintenance spare percentage; and

(iii) For further certainty, fleet requirements beyond the initial fleet required for Opening Year operations as documented in the Operations Service Plan shall be procured and provided at the direction of the City in accordance with Schedule 35 – Vehicle Option and Schedule 22 – Variation Procedure.

b) Project Co shall design and construct the MSF facility to accommodate the LRVs required to meet the Operational Performance Requirements identified in this Article for Operating Scenarios 1 and 2, as well as any non-revenue and specialty vehicles required to fulfill Project Co's Maintenance Requirements and obligations.

2.9 City Branding Integration

a) Project Co shall be responsible for the integration of the City branding requirements with their Design solutions for the OLRT project.

b) Project Co shall provide access and reasonable assistance to City staff (including any firms, organizations or individuals affiliated with the development or implementation of the branding strategy) for the purposes of integrating design and coordinating the Design and implementation of Project Deliverables. Project Co will make available any relevant reference materials for Station environments and vehicles (i.e. engineering drawings, prototype samples, and other design development materials) during the design process.

c) Project Co shall, through the design and implementation of the Project, consult with the City to ensure the most efficient and cost effective means of incorporating the City's brand in the design of the OLRT.

d) Project Co shall ensure that any branding requirements do not conflict with the safety of public or operating staff.

ARTICLE 3 REFERENCE DOCUMENTS

3.1 Application of the Reference Documents, City Standards and Procedures, Ontario Provincial Standards for Roads and Public Works and Other Manuals, Codes and Standards

a) The Design and Construction Works, shall be carried out in accordance with the applicable Reference Documents, and with the following amendments:

(i) Requirements related to design and submission requirements and Quality Assurance in the Reference Documents do not apply; rather, the Design and Construction Specifications and Schedule 11 – Quality Management Plan, respectively shall apply;

(ii) Requirements and specifications in the Reference Documents related to equipment for performing the Design and Construction Works do not apply;

(iii) Sections within the Reference Documents that are not applicable to this form of agreement, such as payment terms, do not apply;

(iv) Any and all references to "approval by the Contract Administrator" or other such reference in the Reference Documents, in terms of acceptance of materials, permission to proceed, work methodology or end product, shall be construed as being the responsibility of Project Co, but each such instance shall be in consultation with the City;

(v) Project Co shall consult with the City to determine which Reference Documents submissions are to be submitted under Schedule 10 – Review Procedure;

(vi) Any and all references within the Reference Documents related to submission of documentation to the Contract Administrator "for approval", "for acceptance", or other qualifying phrase with similar connotation, is to be construed as the City retaining the right to object to the submission as set out in the Review Procedure, if the submission is required to undergo the Review Procedure upon consultation with the City; and

(vii) Project Co shall, when required in the Reference Documents to submit for approval by the City samples of any products proposed by Project Co, submit such samples with supporting documentation to the City in accordance with the Review Procedure.

3.2 Reference Documents

a) Without limiting any other provision in this Project Agreement, the Reference Documents shall apply to the Design and Construction Works as described in this Schedule.

3.3 Order of Precedence

a) Unless otherwise expressly provided in this Schedule 15-2, if there is any conflict between any of the provisions of this Project Agreement and any of the Reference Documents, the following shall apply in descending order of precedence:

(i) the provisions of this Project Agreement;

(ii) City Standards and Procedures;

(iii) OPS;

(iv) AREMA; and

(v) any other applicable Reference Documents.

3.4 Reference Concept

a) Any use by Project Co of any or all aspects of the Reference Concept in performing the Design and Construction Works shall be entirely at Project Co's own risk. Use of the Reference Concept as a basis for Project Co's Design for any part of the Project does not guarantee the City approval of Project Co's Design.

ARTICLE 4 DESIGN AND CONSTRUCTION

4.1 Responsibility for Design and Construction

a) Project Co shall be responsible for the Design and Construction of the OLRT Project and all other Construction activities, including completion, commissioning and testing of the OLRT, which shall be carried out in strict accordance with the Design and Construction Specifications and in such a manner as to comply with all applicable Project Agreement requirements.

4.2 Control Surveys, Legal Surveys and Digital Mapping

a) Control Survey

(i) A control survey of the Alignment has been completed by the City for this Project. Existing and new monuments were used in establishing the Project control survey.

(ii) The Project survey control coordinate system shall be:

A. Modified Transverse Mercator, MTM 3 degree, zone 9; and

B. The control stations coordinate values shall be delivered in NAD83 original as well as in NAD 83 CSRS format.

(iii) Project Co shall evaluate its requirements for a control survey in order to carry out the Design and Construction Work and determine if additional monuments are required. Any such additional monuments shall be installed by Project Co and shall be surveyed to tie into the Project survey control coordinate system. Project Co shall prepare a drawing of each additional survey monument installed and provide a record to the City.

(iv) Project Co shall be solely responsible for protecting and maintaining all existing survey control monuments.

b) Horizontal Control

(i) The Project control survey shall be used as the basis for all Design and Construction Works.

(ii) The Project control survey shall have a second order standard of accuracy.

(iii) All surveys made for the Project shall be tied into monuments in the Project control network and shall be adjusted by holding these monuments fixed. The accuracy of these surveys shall be second order.

c) Vertical Control

(i) The vertical control shall be based on the Canadian Geodetic Vertical Datum of 1928 (CGVD 28)

d) Legal Surveys

(i) Legal Surveys intended for fee simple, permanent or temporary easement acquisition to support the Project shall be carried out by the City.

(ii) Project Co shall provide requests for Legal Surveys to the City within thirty (30) calendar days from Financial Close, submitted in accordance with Schedule 10 – Review Procedure, to allow sufficient time for preparation of the Legal Surveys by the City, taking into account both the resources necessary to conduct such surveys and whether delay in the delivery of the Survey shall have a material impact on Project Co's ability to complete the Design and Construction Work.

(iii) Project Co shall provide an electronic file, in MicroStation format, of the entire Alignment in Project Coordinate System in 3 dimensions – x, y, z. This shall include integrated Station elements located within existing structures on private property. The 3 dimensional coordinates will be set out in sufficient detail to allow the City to create Reference Plans that accurately depict the extent of ownership of the features and any other requisite property rights, to be included within the Project.

(iv) Project Co shall ensure that, in those areas where the proposed Construction is to take place immediately adjacent to a property limit, that an Ontario Land Surveyor is engaged to lay out the property limit in the field.

4.3 Miscellaneous Surveys

a) Project Co shall be responsible to provide all additional surveys required for the Design and Construction Work including:

(i) Preconstruction utility, Structures and Pavement condition surveys and a CCTV survey of sewer systems to be affected by, or which have the potential to be impacted by, the Design and Construction Work; and

(ii) Clearance field surveys to check areas of tight clearance in the horizontal and vertical plane.

b) Right of Access for Surveys

(i) Except as otherwise provided in the Project Agreement, Project Co shall prepare all necessary applications, including any necessary attachments, to secure all Permits, access rights, permissions and approvals, to carry out field surveys on the Project.

4.4 Design Components and Their Life Expectancies

a) Project Co shall Design the components of the Project to reflect the requirements outlined in Table 1-4.1.

Table 1-4.1: Design Components and Their Life Expectancies

	Design Life Required (years)
New Bridge Structures	75
New Retaining Walls	50
Elevated Guideway	75
Stations – Finishes	40
Stations – At-Grade Station Structures	50
Stations – Underground Station Structures	100
Tunnel – Structure	100
Tunnel – Fit Out	20
Track – Ballast	20
Track – Fixed	20
Ties	20
Switches & Cross-overs	20
Maintenance Building	40
Maintenance Building – Shop Equipment	30
Signalling	30
Communications	20
Vehicles	30
Catenary	40
Traction Power Equipment	40

4.5 Climate Data for Design

a) Project Co shall use the following climate data where required for design, unless otherwise specified:

Extreme Maximum Temperature	38°C
Extreme Minimum Temperature	-38°C
Extreme Daily Rainfall	95mm
Extreme Daily Snowfall	56cm
Extreme Daily Precipitation	80mm
Extreme Snow Depth	135cm
Maximum Hourly Wind Speed	80km/h
Maximum Wind Gust Speed	135km/h

4.6 Conduit Drainage

a) Underground

(i) All underground conduit, ductbanks, and maintenance holes for electrical, communication, and systems shall be designed and constructed to prevent the accumulation of water and formation of ice in any component within the system

b) Non-Underground

(i) All conduit and raceways for electrical, communication, and systems shall be designed and constructed to prevent the accumulation of water to prevent moisture from entering any equipment within the system

ARTICLE 5 ROADWAYS, BUS TERMINALS AND LAYBYS

5.1 Order of Precedence

a) The Design and Construction of the proposed roadways, bus terminals and laybys within the OLRT Project shall comply with the criteria contained within this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to the following Reference Documents. In the event of a conflict between the criteria, commitments or requirements contained in this Article and any of the Reference Documents, the more stringent shall apply:

(i) The criteria in this Article;

(ii) Design Manual 1993 (Draft – the Regional Municipality of Ottawa-Carleton Transportation Department TWY-FUN-03(2) – Revision October 1993);

(iii) City of Ottawa Road Corridor Planning & Design Guidelines, Urban & Village Collectors / Rural Arterials & Collectors- October 2008;

(iv) Region of Ottawa-Carleton Regional Road Corridor Design Guidelines, July 2000, Region of Ottawa-Carleton;

(v) City of Ottawa's Lighting Criteria including the Right of Way Lighting Policy, Draft August 2009;

(vi) City of Ottawa's Pedestrian Plan, Draft January 2009;

(vii) Ontario Traffic Manuals (Books 1 through to 12);

(viii) The City of Ottawa's Current Version of Standard Tender Documents and Specifications

(ix) City of Ottawa's speed zoning policy (Ref N°: ACS2009-COS-PWS-0021 – 24 September 2009)

(x) Geometric Design Guide for Canadian Roads (TAC-1999);

(xi) Ontario Provincial Standard Specifications and Drawings (OPSS);

(xii) Ontario Provincial Standard Drawings (OPSD);

(xiii) Geometric Design Standard of Ontario Highways-MTO (1985);

(xiv) City of Ottawa CADD Standards;

(xv) Highway Drainage Design Standards, 2008 (MTO);

(xvi) MOE Stormwater Management Planning and Design Guidelines, 2003;

(xvii) Drainage Act (Ontario);

(xviii) MTO Gravity Pipe Design Guidelines for Circular Culverts and Storm Sewers, 2007;

(xix) Ontario Traffic Manual, MTO;

(xx) Sign Sheeting Memorandum, February 21, 2008, MTO;

(xxi) King's Highway Guide Signing Policy Manual;

(xxii) Geometric Design Standards for Ontario Highways Manual;

(xxiii) Other relevant "City Operation Policy, Procedures and Guidelines; and

(xxiv) Road Safety Manual, Ministry of Transportation Ontario;

5.2 General Requirements

a) The overall requirements of typical cross-section and geometric design criteria for the Design and Construction of the Works are predominantly based on the TAC Manual and the City of Ottawa's Design guidelines. The following criteria apply to all sections of the municipal and regional roadway Infrastructure included in this Project.

b) Design Domain, Road Classifications and Design Speed Considerations

(i) The majority of road Infrastructures impacted as the result of the OLRT Project are categorized as low-speed urban collectors or arterial roads/streets that will be subject to retrofit conditions for low-speed urban roads with Design speed of 30 and 60 km/hr. The designation of Design speed has been assumed with reference to the speed limits currently posted on these existing roadways. The existing posted speed limits deemed to be established according to and/or consistent with the requirements of the City of Ottawa's speed zoning policy (Ref N°: ACS2009-COS-PWS-0021 – 24 September 2009).

(ii) The selection of the Design criteria parameters shall be based on the road classifications that can be referenced from the TAC Geometric Design Guide, 1999. Each road or street current designation shall be referenced from the City of Ottawa's 2008 Transportation Master Plan.

5.3 Horizontal Alignment

a) The geometric characteristics of horizontal Alignment shall meet the requirements of the TAC Geometric Design Guide, 1999. In particular, the following requirements apply:

(i) Minimum radius and maximum super elevation requirements shall correspond to the characteristics of lower speed urban (Design speed of 30-60 km/hr, Maximum super elevation e_{max}= 0.04 m/m);

(ii) Minimum length of curve between 30m to 60m is acceptable for urban conditions; and

(iii) In case of low-speed urban roads and retrofit conditions, application of spiral curves is not a Design requirement.

5.4 Vertical Alignment

a) Vertical Alignment shall meet the requirements of the TAC Geometric Design Guide, 1999. The following main geometric parameters pertinent to the vertical Alignment apply:

(i) Minimum gradient: Minimum grades shall satisfy the requirements of *Minimum Grades: Design Domain Application Heuristics-Urban Areas*.

(ii) Equivalent minimum "K" Values: The vertical curve geometry shall be consistent with the requirements of the TAC Geometric Design Guide, 1999:

A. "K" value for crest curves shall satisfy the upper limit of the Stopping Site Distance requirements;

B. "K" value for sag curves shall satisfy the upper limit of the requirements of Headlight Control and Comfort Control; and

C. DSDs, where applicable, shall be calculated and compared to the requirements of TAC Geometric Design Guide, 1999. For Design Speeds less than 60 km/hr calculate the required DSD using Alberta Transportation Highway Geometric Design Guide, January 2004.

5.5 Access and Intersection Layout

a) Design and implementation of pavement markings, traffic signs, street lighting, traffic control signals and underground traffic plants shall be in accordance with the requirements of the City of Ottawa's Electrical, Signals, and Lighting Criteria, relevant by-laws and Ontario's Traffic Manuals and OPSS Standards.

b) ISD: ISD requirements, including approach, departure, and crossing ISDs, and visibility triangles shall be controlled using the appropriate Design vehicle(s) at all intersections according to the criteria specified in the TAC Geometric Design Guide, 1999.

c) Intersection layouts and lane configurations shall be designed to address all users' requirements including pedestrian, cyclist, transit and vehicular traffic. Intersection Design characteristics that preserve and enhance the public safety, minimize the area impacts, and respond to the traffic demand shall be given precedence.

5.6 Cross-Section Elements

a) The typical cross-sections of a variety of roadways shall be in accordance with the TAC Geometric Design Guide, 1999. The following specific criteria apply:

(i) Auxiliary lane width where applicable shall satisfy the requirements of Special Purpose Lanes;

(ii) Bicycle lane width shall be 2.0m as noted in Table 1-5.1;

(iii) Cross slope shall be set to 2% m/m toward the curbs in order to provide improved surface drainage runoff on paved tangent roadways; and

(iv) Superelevations shall satisfy the requirements of lower speed urban roads (Design speed of 30-60 km/hr, maximum superelevation e_{max}= 0.04 m/m).

5.7 Design Vehicles

a) The controlling Design vehicles shall be used to control the intersection layout geometry, applicable site distances and roadway horizontal and vertical clearance requirements. Considerations to the largest Design vehicle for each roadway, BRT, ramp, etc. shall be based on the following criteria:

(i) Truck Route consideration; The City of Ottawa's Urban and Rural Truck Routes (Revision 01-Jan-2011) shall be referenced to identify the "Restricted Load" and "Unrestricted Load" truck routes corridors throughout the road networks of the City;

(ii) Commercial Trucks including WB-19 and WB-20 for truck routes, and HSU for non-truck routes;

(iii) Bus vehicles including The City's articulated bus, The City's B-12 standard bus, The City's double decker bus, Inter-City bus, Para Transpo vehicles, and school bus;

(iv) Emergency vehicles including fire truck and paramedic truck;

(v) Maintenance vehicles including snow removal vehicles and garbage trucks; and

(vi) Clearance requirements for opposing left-turn design; In Design of intersections with multiple left-turn lanes, especially where simultaneous opposing left turns exist, attention shall be paid to the appropriate selection of Design vehicles.

5.8 BRT Facilities

a) The primary Design criteria for the geometric requirements of BRT and Stations shall be the Transitway Design Manual 1993 (Draft – the Regional Municipality of Ottawa – Carleton Transportation Department TWY-FUN-03(2) – Revision October 1993).

b) The number of berths required at Tunney's Pasture, Hurdman, and Blair Bus stations shall be in accordance in accordance with Part 5 Article 2 – Architectural Design Criteria.

c) Horizontal and vertical geometry, auxiliary lanes, intersection geometry, Cross-Section components, drainage requirements, and other roadway and structural details shall be in accordance with the *Regional Municipality of Ottawa-Carleton Transitway Design Manual*, 1993.

d) The Design speeds for various components of the BRT facilities shall be as following in accordance with the *Regional Municipality of Ottawa-Carleton Transitway Design Manual*, 1993:

(i) Transitway main bus: 90 km/hr (minimum radius 340m)

(ii) Station areas: 60 km/hr (minimum radius 130m)

(iii) Ramps & access routes 40 km/hr (minimum radius 55m)

e) Minimum radii of turning bus vehicles for at-grade intersections shall be the following in accordance with the *Regional Municipality of Ottawa-Carleton Transitway Design Manual*, 1993:

Turning speed	Minimum inside radii
0-15 km/hr	12.5m
15-25 km/hr	20m
25-35 km/hr	23m

f) Bus station layouts and turnaround circulation geometry shall:

(i) Accommodate the typical bus Design vehicle utilizing a given berth fully independently of the concurrent activity in the adjacent berth (in-line Platform, independent arrivals, normal berth, etc.).

(ii) Accommodate passing lanes (width: 4.0 m.) throughout the Station area.

(iii) Satisfy the turning paths, sight distance and clearance envelope requirements for all City bus Design vehicles including articulated bus, B-12 standard bus, and double decker buses, as well as the Emergency vehicles.

g) At the location of bus platforms in order to drain the surface run-off away from the platform curbs cross-falls shall be -2% away from the platform curb side. The basic cross-section components shall conform to the requirements of the *Transitway Design Manual* 1993 (Draft – the Regional Municipality of Ottawa – Carleton Transportation Department TWY-FUN-03(2) – Revision October 1993). Vertical gradients adopted for bus platforms shall address the drainage run-off and satisfy the requirements of

pedestrians accessibility noted in the City of Ottawa's Pedestrian Plan (Draft January 2009). Sidewalks associated with the Platform area shall have a minimum grade of 0.5% and a maximum grade of 5%.

h) Bus stop pad, shelters with sidewalk and boulevard shall satisfy the requirements of the City's standard drawings (Ref. 2009ISB Standard Tender Documents, Vol.2 – Standard Detail Drawings).

i) The Design Criteria for the Roadway Improvements in OLRT Project shall meet the requirements of the following Table 1-5.1.

1-5.1 Design Criteria for the Roadway Improvements in OLRT Project

Geometric Design Criteria – Municipal Roadways						
Criteria Description	**Booth St.** (Between Albert Street and Ottawa River Pkwy)	**Albert St.** (Between Commissioner Street and Preston Street)	**Rideau St.** (Between Sussex Street and Nicholas Street)[1]	**Belfast Rd.** (Between Tremblay Road and Trainyards Dr.)	**Preston Street Detour** (Between Albert Street and Ottawa River Pkwy)	**Bus Ramps at Tunney's Pasture Station** (Including Bus Link from Transitway to Tunney's Turnaround and the Goldenrod link to Scott St.)
Road Classification	UAD[2]	UAD	UAU	UCU	UAU	N/A
Posted Speed (km/hr)	50	50	50	50	50	N/A[3]
Design Speed (km/hr)	60	60	60	60	60	40-60
Basic Lanes	6 or 4[4]	See Note 5	2EB + 2WB See Note 1	2	6[18]	2
Minimum Radius (m)	130	130	130	130	130	55-130
Min. K Factor Sag	15-18	15-18	15-18	15-18	15-18	10-20
Min. K Factor Crest	10-13	10-13	10-13	10-13	10-13	5-15
Max. Grade	3%	3%	3%	6%	3%	3.5% – Where possible 6.0%- Absolute
Max. Superelevation	4%	4%	4%	4%	4%	6%
Minimum SSD (m)	85	85	85	85	85	45-85

Geometric Design Criteria – Municipal Roadways						
Criteria Description	**Booth St.** (Between Albert Street and Ottawa River Pkwy)	**Albert St.** (Between Commissioner Street and Preston Street)	**Rideau St.** (Between Sussex Street and Nicholas Street)[1]	**Belfast Rd.** (Between Tremblay Road and Trainyards Dr.)	**Preston Street Detour** (Between Albert Street and Ottawa River Pkwy)	**Bus Ramps at Tunney's Pasture Station** (Including Bus Link from Transitway to Tunney's Turnaround and the Goldenrod link to Scott St.)
Minimum DSD (m)	205	205	205	205	205	135-205[6]
Lane Width (m)	3.5-3.7[7]	3.5-3.7	3.5-4.0	4[8]	3.5-3.7	3.5[9]
Sidewalk Width (m)	3.0	2.0-2.5	Varies 2.5-6.5 See Note 1	2.0-2.5 (SB)	2.0-2.5 (SB)	N/A
Shoulder (m)	N/A	N/A	N/A	2.2m (NB)[10]	1.0m (NB)	N/A
Bike Lane(m)	2.0 [11]	2.0 [12]	N/A	N/A	N/A	N/A
Median Width (m)	1.5-5.0	1.5-5.0	N/A	N/A	N/A	N/A
Design Vehicle(s)	WB20 and A-Bus	WB20 and A-Bus	WB20, A-Bus, and Emergency vehicles	WB20 and Emergency vehicles	WB20 and A-Bus	The City's A-Bus, B-12 standard bus, and double decker bus
Traffic Background Information[13]						
AADT (Average Annual Daily Traffic) (veh./day)	• North of Transitway (26-Jul-2010): 20,000 • South of Transitway (12-Aug-2009): 20,500	The section between Booth and Preston (13-Aug-07): 15,700	(25-May-2006) 9,700	(06-May-2009) 12,200	As per Booth Street [16]	As per Transitway Manual [17]

Geometric Design Criteria – Municipal Roadways						
Criteria Description	**Booth St.** (Between Albert Street and Ottawa River Pkwy)	**Albert St.** (Between Commissioner Street and Preston Street)	**Rideau St.** (Between Sussex Street and Nicholas Street)[1]	**Belfast Rd.** (Between Tremblay Road and Trainyards Dr.)	**Preston Street Detour** (Between Albert Street and Ottawa River Pkwy)	**Bus Ramps at Tunney's Pasture Station** (Including Bus Link from Transitway to Tunney's Turnaround and the Goldenrod link to Scott St.)
Heavy Vehicle (%) [14]	• North of Transitway (26-Jul-2010): 6% • South of Transitway (12-Aug-2009): 5%	7%	(25-May-2006) 25%	4%	As per Booth Street [16]	As per Transitway Manual [17]
Traffic Growth Rate Assumption [15]	• North of Transitway (26-Jul-2010): <1% • South of Transitway (12-Aug-2009): <1%	<1%	(25-May-2006) <1%	<1%	As per Booth Street [16]	As per Transitway Manual [17]

1. The Design Criteria for Rideau Street between Sussex Ave and Nicholas Street (including road classification, posted speed, lane arrangements, and basic cross-section components such as lane width, sidewalk width, provision for bus lane, bike lane, etc.) shall be developed by Project Co from a detailed traffic and transit study in consultation with the City as a component of the Rideau Station design. The proposed lane configuration, with the Station design, shall include separate bus stops for OC Transpo and STO buses, dedicated bus lanes in each direction and the number of general traffic lanes determined from the analysis. Sidewalk widths shall be adequate for the proposed pedestrian flows. The number of lanes on Rideau Street shall not be reduced by Project Co without a traffic and transit study that demonstrates that general traffic, transit services and local drop offs for deliveries and taxis can be maintained to a level of service acceptable to the City of Ottawa.
2. The City of Ottawa's 2008 Transportation Master Plan (Map-7) identifies Booth Street as a major collector for the portion south of Albert, and as an arterial road north of Albert. Booth Street shall be illuminated along the entire section north of Albert. All Road Classifications to be confirmed by Project Co with the City.

3. Where applicable, all posted speed limits and advisory speed signs shall be adopted and applied for BRT bus ramps by The City authority.
4. The Pavement width varies in different sections of the proposed Booth Street between Albert Street and the Ottawa River Parkway. The new Booth Street Bridge structure cross-section shall consist of two 3.5m through lanes, one 2.0m dedicated bike lane, that is segregated from the adjacent through and bus lanes by a 0.5m offset, one 3.5m bus lane, and one 3.9m wide bus platform in each NB and SB direction. North of the Booth Bridge Structure, the cross-section shall consist of one 3.5m through lane, one 4.4m through lane, considered as shared bike lane facility, and one 3.0m sidewalk in each NB and SB directions. South of the Booth Street Bridge Structure is the Booth/Albert Intersection.
5. The Reference Concept depicts a Design that provides for a basic 6-lane divided urban cross-section for Albert Street west of Booth. Project Co shall be responsible for completing a traffic analysis to City requirements to confirm the recommended lane configuration of the Booth/Albert Intersection as well as the widening requirements on Albert Street corridor between Commissioner and Preston.
6. Requirements of DSD are referenced from Table B.2.6 of Alberta Transportation Highway Geometric Design Guide, January 2004. The average DSD is calculated for 40 and 60 km/hr Design speeds.
7. General purpose lanes shall be as wide as 3.50 to 3.70 m and north of the Booth Street Bridge Structure where general purpose lanes are shared with bike lane the lane width shall be between 4.0 to 4.5m. in accordance with Section 7.3.1 of the City of Ottawa Road Corridor Planning & Design Guidelines, Urban & Village Collectors / Rural Arterials & Collectors- October 2008).
8. 4.0m. wide shared cycling lane has been considered for Belfast Road north of Trainyards Dr. The shared cycling lanes shall be between 4.0m and 4.5m wide in accordance with section 7.3.1 of the City of Ottawa Road Corridor Planning & Design Guidelines, Urban & Village Collectors / Rural Arterials & Collectors- October 2008.
9. Transitway Design Manual 1993 (Draft – the Regional Municipality of Ottawa – Carleton Transportation Department TWY-FUN-03(2) – Revision October 1993) sections B.2.2.2, B.2.2.3, B.2.2.4, and B.2.2.5 requirement:
    - B.2.2.2- Along rural sections, lane widths are 3.5m, shoulder widths are 2.5m with paved offsets of 0.25m and roundings are 1.0m; Standard side slopes for both cut and fill sections are 3:1 and maximum slopes are 2:1.
    - B.2.2.3- Along urban sections, lane widths are 3.5m plus a curb offset of 0.5m; an asphalt maintenance strip of minimum width of 2.5m is provided adjacent to the curbs for maintenance vehicles, disabled buses and snow storage.
    - B.2.2.4- Along Station sections, Station stopping lane widths are 3.5m; through lanes are 4.0m plus a 1.0 m offset to the face of the median barrier.
    - B.2.2.5- Along ramp sections, single lane ramps are 4.75m wide; multiple lane ramps have 3.75m wide lanes; In the case of an urban section ramp a curb offset of 0.25m shall be added; maintenance vehicle access as well as Transitway access shall be maintained.
10. The 2.2 m. wide paved shoulder shall accommodate the space required for 0.8m pre-cast permanent concrete barrier (OPSD 911.143) and 1.4m shy line offset in the NB direction
11. Where applicable, shared bike and through lanes shall be between 4.0m and 4.5m wide, according to section 7.3.1 of the City of Ottawa Road Corridor Planning & Design Guidelines, Urban & Village Collectors / Rural Arterials & Collectors- October 2008. For Booth Street, between Albert Street and the Ottawa River Parkway with the exception of the bridge, a shared 4.4 m. lane is required.. On the new Booth Street Bridge Structure a 2.0 m. dedicated bike lane segregated from the adjacent through and bus lanes by 0.5 m. offset is required in both northbound and southbound directions.
12. On Albert Street, from Commissioner Street to Preston Street, segregated bike lane requirements will be determined in coordination with the appropriate City departments.
13. The traffic background information has been developed from vehicle turning movement data sheets provided by the City of Ottawa.
14. Heavy vehicles are vehicles having one rear axle with four or more wheels, or having two or more rear axles. These vehicles include OC Transpo, school and inter-city buses. These vehicles types are included in the turning movement count summary provided by the City of Ottawa, and have been referenced in this table under heavy vehicle.
15. Traffic growth rates are based on 'EMME' model outputs (for 2021 and 2031) provided by the City of Ottawa.
16. Traffic information (AADT, Heavy Truck%, and Growth Rate) for Preston Street are based on Booth Street being detoured to the Preston Street corridor during the new Booth Street construction period. The section of Preston Street between Transitway and Albert St may also be utilized to detour BRT traffic (eastbound and westbound) in addition to the Booth Street traffic diversion during the construction.
17. The Design Criteria for BRT and Stations shall be the Transitway Design Manual 1993 (Draft – the Regional Municipality of Ottawa – Carleton Transportation Department TWY-FUN-03(2) – Revision October 1993).
18. The number of lanes may vary in different sections of the proposed Preston Street Detour between the Ottawa River Parkway and Albert Street. The section of Preston Street Detour between Albert Street and south of the (BRT) Transitway requires 2 additional lanes for BRT traffic detoured to/from Albert Street. The section north of and between

the (BRT) Transitway and Ottawa River Parkway does not require additional lanes for BRT detour traffic as the STO buses are not in dedicated lanes on Booth Street presently. Project Co shall be responsible for completing a traffic analysis to City requirements to confirm the recommended lane configuration.

5.9 Pavement

a) Order of Precedence

(i) The Design and Construction of Pavements shall comply with the criteria contained in this Article and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between the criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

A. The criteria contained within this Section of this Article;

B. The criteria contained within this Article;

C. Ontario Pavement and Rehabilitation Manual; 1990;

D. Design Manual 1993 (Draft – the Regional Municipality of Ottawa – Carleton Transportation Department TWY-FUN-03(2) – Revision October 1993);

E. AASHTO Guide for Design of Pavement Structures, 1993;

F. City of Ottawa Technical Information Bulletin – *Superpave Asphalt Mix Selection*, July 2006;

G. The City's Current Version of Standard Tender Documents and Specifications

b) General Requirements

(i) Project Co shall be responsible for Design of all Pavements. Factors such as traffic volumes, subgrade conditions, environmental effects, Construction traffic, Construction materials and performance of similarly loaded Pavements in the area shall be considered when determining a suitable Pavement Design.

(ii) Project Co shall identify and acquire any additional geotechnical information that will be required to identify soil conditions/profile of subgrade soils including supplementing and/or confirming existing data.

(iii) Project Co shall prepare and submit comprehensive Pavement Design Report(s) for the Project as part of the Design Development Submittals according to Schedule 10 – Review Procedure.

(iv) Design of all new Pavement structures shall be in accordance with the *Ontario Pavement and Rehabilitation Manual* 1993, Design Manual 1993 (Draft – the Regional Municipality of Ottawa – Carleton Transportation Department TWY-FUN-03(2) – Revision October 1993) and AASHTO *Guide for the Design*

of Pavement Structures. For concrete Pavements, both MTO's Routine Method as described in the SDO-90-01 *Pavement Design and Rehabilitation Manual* and the *Canadian Portland Cement Association's Simplified Design Procedure* shall be used in addition to the foregoing AASHTO guide.

(v) If any Roads will be opened to public traffic prior to completing the surface course paving, the Pavement Design shall ensure that the unfinished Pavement is designed to carry public traffic until the surface course is placed.

(vi) Design of Pavement structures for BRT paved facilities such as lanes, ramps, laybys, and paved storage areas, shall be consistent with the requirements of Section B.5 of the Transitway Design Manual 1993 (Draft – the Regional Municipality of Ottawa – Carleton Transportation Department TWY-FUN-03(2) – Revision October 1993) and the following:

A. Outside BRT station platform areas, the Transitway Pavement structure shall be of a flexible (asphalt) Pavement design unless otherwise approved by OC Transpo.

B. Within BRT station areas a concrete Pavement structure shall be incorporated within, at a minimum, the limits of the concrete platforms. The following Figure illustrates the approximate limits for concrete Pavement for a typical side loading station. For major stations with center loading platforms, Project Co will review the concrete pavement limits based on the station layout, bus access and operational requirements.

C. The pavement structure(s) shall be based on Project Co's Pavement Design Report for the Project as part of the Design Development Submittals according to Schedule 10 – Review Procedure. Within access ramps and lay-by locations, which are subject to repeated bus turning movements, Project Co's Pavement Design Report shall provide localized Pavement designs that will mitigate potential Pavement sliding or rutting.

D. Factors such as bus volume projections, design vehicles, subgrade conditions, environmental effects, availability of acceptable construction materials, performance of similarly loaded pavements in the area, and economics shall be considered in determining a suitable Pavement design.

E. The influence of heavy equipment and delivery vehicles during construction should also be a consideration during the design process, particularly with respect to the thickness of sub-base material and the native subgrade conditions.

c) Design and Performance Requirements

(i) The roadway Pavement structure shall conform to the latest standards established by the City.

(ii) Design the Pavement structure to have a Pavement life cycle of 25 years.

(iii) Project Co shall comply with the following specific OPSS requirements related to the Pavement works, where applicable:

A. OPSS 510 for Removals;

B. OPSS 206, and 514 for excavation;

C. OPSS 212 for Filling;

D. OPSS 501 for Granular Material. Thickness shall be suitable for the roadway's intended use;

E. OPSS 310, 311, 312 for hot mix asphalt paving. Thicknesses shall be suitable for the roadway's intended use;

F. OPSS 350 for concrete Pavement and concrete base. Thickness shall be suitable for its intended use;

G. OPSS 353 and 312 for concrete/asphalt, curb and gutter, and medians, where applicable;

H. OPSS 405 for Pipe Subdrains; and

I. OPSS 355 for Interlocking concrete pavers suitable for its intended use.

5.10 Grading

a) Project Co shall provide the design, approvals, supply of materials, labour, equipment, inspection and testing associated with the requirements for grading, including earth and rock excavation and embankment Construction, and management of excavated material.

b) Grading requirements shall conform to the relevant City Standards and Specifications or in absence of such standards to the following:

(i) Earth and rock excavation OPSS 206

(ii) Borrow, OPSS 212

(iii) Compacting OPSS 501

(iv) Rip-Rap, Rock Protection and Gravel Sheeting OPSS 511

(v) Topsoil, OPSS 570

(vi) Seeding and Mulching, OPSS 572

c) Grading includes excavation of native material and fill of approved materials as required for Construction in accordance with the recommendations resulting from detailed Geotechnical Investigations.

5.11 Drainage

a) General

(i) Drainage Design and Construction shall be in accordance with the criteria contained in this Article and in Part 1 Article 18 – Drainage and Stormwater Management and the applicable Reference Documents.

(ii) Project Co shall provide the design, approvals, and supply of materials, labour, equipment, inspection and testing associated with the requirements for drainage as described in these performance specifications.

5.12 Traffic Signals

a) General

(i) Project Co shall be responsible for liaising and coordinating with the City with regard to all modifications that may be required at municipal traffic signals both during and after completion of the Design and Construction. Proposed modifications shall be supported by traffic engineering analysis and meet the City's traffic signal requirements and standards.

(ii) Where municipal traffic signals are to be included in the traffic signal coordination scheme, Project Co shall define the coordination scheme, and coordinate all work with the City.

b) Design and Performance Requirements

(i) Project Co shall coordinate the design, approvals and Construction requirements for temporary and permanent traffic signals with the City.

(ii) The City shall supply and install all above ground traffic signal equipment including controller, poles and signal heads. The City shall also supply and install and make all required terminations for the traffic signal wiring.

(iii) Project Co shall be responsible for underground Construction of the permanent traffic infrastructure including supply and Construction of concrete encased ducts, direct buried ducts, pole foundations, maintenance holes, vehicle loop detectors and concrete pads. Project Co shall be responsible for wood poles, double span and anchors, along with any required civil works including conduit, foundations, manholes/hand holes etc., for temporary traffic infrastructure.

(iv) Project Co shall provide a minimum of fifteen (15) Business Days advanced notice to the City for the installation of the above ground traffic signal equipment and wiring of the signals to be completed by the City as illustrated on Project Co's Construction Documents.

(v) Where Project Co is planning to modify an approach to a signalized intersection beyond OTM Book 7 applications, a three (3) week notification to the City is required. The City will determine if a CAD drawing submission is required by the Project Co.

(vi) Traffic Control Plans shall be prepared a submitted as part of the Works Submittal according to Schedule 10 – Review Procedure.

(vii) A minimum of ten (10) Business Days prior to Commencement of Construction, Project Co shall arrange a meeting with the City to coordinate the requirements of the electrical work involving the City. Project Co shall provide a schedule of the work to the City and obtain contact names and telephone numbers for the various electrical works to be completed by the City.

(viii) Project Co shall provide a minimum of two (2) Business Days advanced notice to the City prior to commencing the following work;

A. Permanent Traffic Signals: Underground Construction of the permanent traffic signals including concrete encased ducts, direct buried ducts, pole foundations, maintenance holes, vehicle loop detectors and concrete pads;

B. Temporary Traffic Signals: Installation of the temporary traffic signal controller cabinet onto the wood pole; wood poles, double span and

anchors along with any required civil works including conduit, foundations, manholes/hand holes etc., and

C. Traffic signal activations and deactivations: The City shall be present for all traffic signal activations and deactivations.

5.13 Pavement Marking and Signing

a) General

(i) Project Co shall provide the design and obtain approvals for all permanent and temporary Pavement marking and roadway signs.

(ii) Signing and Pavement Marking shall be designed, applied and installed in accordance with the criteria contained in this Article, the requirements of OPS and the applicable Reference Documents.

b) Design and Performance Requirements

(i) Project Co shall coordinate the design, approvals and Construction requirements for Pavement markings with the City.

(ii) Project Co shall provide for the supply of materials, labour, equipment, inspection and testing associated with the requirements for all temporary pavement marking.

(iii) Project Co shall provide for the supply of materials, labour, equipment, inspection and testing associated with the requirements for all temporary and permanent non regulatory signing.

(iv) The City shall supply all labour, equipment and materials for the supply and installation of all temporary and permanent regulatory signing requirements.

(v) The City shall supply all labour, equipment and materials for the supply and installation of all permanent Pavement Markings between April 16 and November 14. Project Co shall be responsible for permanent Pavement Markings between November 15 and April 15.

(vi) Project Co shall be responsible for ensuring the Pavement surface is prepared, clean and free of debris.

(vii) Project Co shall have completed final grading prior to installation of all permanent and temporary signs. Project Co shall also be responsible for the reinstatement of all areas disturbed during the installation of new or relocated signs.

(viii) Project Co shall provide a minimum of ten (10) Business Days advanced notice to the City for the installation of the permanent Pavement markings and regulatory

signing to be completed by the City as illustrated on Project Co's Construction Documents.

(ix) Pavement Marking and Signing CAD drawings shall be prepared and submitted by Project Co at a 1:250 scale.

(x) Project Co shall contact the appropriate municipal road authorities to confirm, in writing, the official municipal road names as well as '911' signing requirements. The location, size, and type of each sign shall be indicated on the Traffic Control Plan.

(xi) Project Co shall prepare and submit a permanent signing plan and a permanent signing table a minimum of 30 calendar days prior to the implementation of the plan. The permanent signing table shall include, but not be limited to information detailing sign location (station of final location, removal location and on which side of the road to be installed in relation to the direction of travel), height to bottom of sign, lateral offset to post, support type with dimensions, alpha-numeric sign code with dimensions and the message/description, etc.

(xii) Project Co shall prepare sign details for the following types of ground-mounted guide Signs: Roadway identification, direction & destination, and location identification. Project Co shall Design and provide all overhead Sign Structures, ground-mounted sign break-away steel supports and associated Sign footings.

c) Temporary Signing

(i) Project Co shall be responsible for the design, supply, installation, relocation, Maintenance, and removal of all temporary signage and Pavement Markings, including warning, guide, advisory and directional Signs.

(ii) Project Co shall provide signing requirements for all temporary conditions as defined in the Ontario Traffic Manual, throughout the roads. All temporary signing shall be in accordance with the Ontario Traffic Manual, and MTO standards. The location, size and type of each sign shall be indicated on the Traffic Control Plans.

(iii) Bilingual signs shall be provided.

(iv) There shall be no temporary signing placed between the bullnose of an off-ramp and the bullnose of a downstream on-ramp with the exceptions noted below:

A. Wa-33LR Object Marker Sign;

B. Wa-132 Ramp Speed KM/H Sign;

C. Wa-109 Chevron;

D. Post-mounted Delineators;

E. Wa-175 Truck Overturning Sign & Wa-32t KM/H tab Sign; and

F. G.f-104 Ground Mounted Exit Sign.

(v) Project Co shall prepare and submit a temporary signing plan and a temporary signing table a minimum of 30 calendar days prior to the implementation of the plan. The temporary signing table shall include, but, not be limited to information detailing sign location (station of final location, removal location and on which side of the road to be installed in relation to the direction of travel), height to bottom of sign, lateral offset to post #1, support type with dimensions, alpha-numeric sign code with dimensions and the message/description.

(vi) The temporary signing plan and temporary signing table shall be submitted to the City in accordance with the requirements of the Review Procedure 30 calendar days prior to implementation of the plan.

5.14 Street Lighting

a) General

(i) Project Co shall provide the design, approvals, and supply of materials, labour, equipment, inspection and testing associated with the City's requirements for Street lighting.

b) Design and Performance Requirements

(i) Project Co shall coordinate the Design and Construction requirements for permanent street lighting with the City. Street lighting shall meet the requirement of the City of Ottawa Right of Way Lighting Policy, Version 2009

(ii) Lighting Design for rights-of-way in the City shall be performed or supervised by a Professional Engineer. The lighting Design together with the lighting calculation summary shall be prepared and submitted as part of the Works Submittals according to Schedule 10 – Review Procedure.

(iii) Bicycle lanes shall be illuminated based on the required roadway lighting levels stipulated in the City of Ottawa Right of Way Lighting Policy, Version 2009. Any illumination requirements shall be governed by the strategy for roadway lighting.

(iv) Roadway lighting systems shall meet the Conditions of Service set out by the local Electrical Supply Authorities and the ESA.

(v) Where above ground Utility poles are located within public rights-of-way, these poles shall be utilized, where possible, for the installation of luminaires in order to minimize the number of poles. These joint use Hydro/street light poles shall be coordinated with the local Electrical Supply Authority and shall satisfy the requirements of *Ontario Regulation 22/04 Electrical Distribution Safety (Electricity Act 1998)* for third party equipment mounted on Hydro utility poles.

(vi) Project Co shall be responsible for the Design coordination of electrical power feeds for all alterations to existing street lighting, temporary lighting and new street lighting. The City shall perform all work impacting existing City owned street lighting within the contract limits, including pole removal (concrete foundations to be removed by the Project Co), wiring, luminaire replacement and aerial cables. Project Co shall coordinate its work with the City.

(vii) Project Co shall provide a minimum of fifteen (15) Business Days advanced notice to the City for the installation of temporary roadway illumination and removal of existing roadway illumination.

(viii) A minimum of ten (10) Business Days prior to the Commencement of Construction, Project Co shall arrange a meeting with the City to coordinate the requirements of the electrical work involving the City. Project Co shall provide a schedule of its proposed work to the City and obtain contact names and telephone numbers for the various electrical works to be completed by the City.

(ix) Lighting shall not contain an upward component. Light Trespass and Disability Glare for drivers shall be minimized.

(x) All Roadway luminaries shall be Full Cut-Off.

(xi) All permanent roadway lighting levels shall meet the appropriate standard for the roadway classification.

c) Temporary Lighting During Construction

(i) All existing lighting in each staging phase shall be maintained in operational order during performance of the Construction on the relevant Construction phase until such time as replacement temporary or permanent lighting is energized.

(ii) Temporary illumination shall be provided for the roads to accommodate traffic detours and diversions in accordance with the OPSS 601 and Electrical Engineering Manual (MTO).

5.15 Miscellaneous

a) Dust Suppressants

(i) Project Co shall provide the design, approvals, and supply of materials, labour, equipment, inspection and testing associated with application of dust suppressants in accordance with the City of Ottawa Standards and Specifications and OPSS 506.

b) Rip Rap Protection and Gravel Sheeting

(i) Project Co shall provide the design, approvals, and supply of materials, labour, equipment, inspection and testing associated with rip-rap, rock protection in accordance with the City of Ottawa Standards and Specifications and OPSS 511.

c) Dewatering

(i) Project Co shall provide the design, approvals, supply of materials, labour, equipment, inspection and testing associated with the dewatering of pipelines, utility and associated structure excavation to stabilize the ground and keep excavations free of water.

ARTICLE 6 UTILITY DESIGN CRITERIA

6.1 Project Co General Responsibility

a) Project Co shall be solely responsible for confirming the actual locations of all Utility Infrastructure within the Lands, identifying all Utility Infrastructure relocation requirements, developing and carrying out a Utility Infrastructure Relocation Plan, and performing all required work and coordination with all Utility Companies in connection with the Construction, installation, operation, repair, preservation, relocation, or Maintenance of Utility Infrastructure in, on, under, over, or adjacent to the Lands.

b) Project Co shall prepare and submit a Utility Relocation Plan in accordance with the requirements of Schedule 10 – Review Procedure.

c) The City has negotiated memoranda of understanding that set out the general terms for conducting the required work relating to the relocation of Utility Infrastructure with all Utility Companies that have Utility Infrastructure on, in, under, over, and/or adjacent to the Lands at Commercial Close. Project Co shall be responsible for developing and reaching its own agreements with the Utility Companies as required. The City memoranda shall only serve as a basis for these agreements.

d) Project Co shall not construct, install or permit the Construction or installation of any Utility Infrastructure on, in, under or over the Lands or any part thereof without the prior written consent of the City (which consent may be given or withheld in the discretion of the City).

e) Without limiting the generality of the foregoing, at no time shall Project Co use or permit the use of the Lands or any other OLRT Infrastructure for Utility Infrastructure (other than Utility Infrastructure, if any, located within the Lands at Commercial Close) without the prior written consent of the City (which consent may be given or withheld in the discretion of the City).

f) Project Co shall provide access within two (2) hours of request from all Utility Companies to their respective Utilities.

g) Project Co shall replace all surface and subsurface features disturbed, damaged or removed during the activities related to the Work and reinstate to original or better condition. All such work in accordance with current City or individual standards and specifications.

h) All detour routes, lane shifts and diversions required to undertake Utility works shall be in accordance with the requirements of Schedule 15-2 Part 7.

i) All BRT Lane Closures and Lane Closures to undertake Utility works shall be in accordance with the requirements of PA Schedule 37.

6.2 General Provisions for Utility Work

a) Project Co shall provide, at all times, continuity of Utility service to properties adjoining the Lands. Where utility work affects service to adjacent property owners, Project Co shall coordinate and/or perform such Utility work so as to minimize interference to those affected.

b) The utilities listed in Part 1 Article 7 – Enabling Works shall not be relocated by Project Co without prior approval of the City.

6.3 Protection of Utilities

a) All Utility Infrastructure located at Commercial Close or thereafter on, in, under, over, or adjacent to the Lands (including Utility Infrastructure within any excavation) are to remain in service and be protected and preserved by Project Co throughout the Project Term unless otherwise agreed upon by the Utility Company.

b) Project Co shall be responsible for any damage done by any Project Co Party to Utility Infrastructure throughout the Project Term.

c) For all Utilities crossing the Lands, utilize the Transport Canada document titled *Standard Respecting Pipeline Crossings Under Railways*. This document shall be utilized for all utilities regardless of the age of the utility.

d) Project Co shall not damage the Hydro One tower located adjacent to Belfast Road.

e) Project Co shall maintain the existing OC Transpo optical fibre feed to the BRT stations during OLRT Construction and for the duration of the Maintenance Term. Any temporary communications arrangements to maintain the OC Transpo communications network during Construction shall not disrupt OC Transpo operations or degrade existing OC Transpo network performance.

6.4 Location

a) Project Co shall be responsible for confirming the actual locations of all Utility Infrastructure, from Financial Close to the Final Completion Date, located on, in, under or over the Lands and ensuring compliance at all times with the provisions of this Schedule 15-2. Project Co shall not rely solely on previous engineering work, location plans, as-built drawings supplied by Utility Companies or other similar documents for confirming locations of Utility Infrastructure.

b) Project Co shall ensure that a member of its team has a minimum level II (secret) clearance with the Department of Public Works and Government Services in order to access documentation from the Department of Public Works and Government Services throughout the Project.

6.5 Project Co Responsibilities for Utility Work

a) Project Co shall be responsible for all temporary and permanent Utility Infrastructure required in connection with or as part of the Project, and for all utility work to be carried out in connection with or as part of the Work under the provisions outlined in Project Co's Utility Infrastructure relocation strategy and any Utility Agreements reached with Utility Companies. Subject to the rights of Utility Companies, all utility work shall be carried out by or under the supervision of and at the risk and expense of Project Co and, without limiting the generality of the foregoing. Project Co shall be responsible for:

(i) obtaining all rights of entry or access to the relevant Utility Infrastructure that are necessary or expedient in connection with the utility work or providing access to the relevant Lands if such work is to be carried out by the Utility Company;

(ii) identifying all requirements in respect of the utility work, including determining the most effective strategies for undertaking the utility work;

(iii) liaising, arranging, coordinating, and entering into all necessary agreements with relevant Utility Companies in connection with the utility work, including obtaining any necessary consents or approvals in connection therewith, providing access for inspections and providing information and plans during and following completion of the Utility work;

(iv) ensuring that all Permits, Licences, and Approvals in connection with the Utility work are obtained, including preparing all required documentation in connection therewith;

(v) observing and complying with any instructions or directions relating to the Utility work that may be issued by the City on its own behalf or on behalf of a relevant Utility Company;

(vi) securing or causing to be secured the entry into or execution of all relevant construction and maintenance agreements, service contracts, and other agreements in connection with the Utility Work;

(vii) when any Utility Work affecting the Utility Infrastructure referred to in a Utility Agreement is to be carried out by or on behalf of Project Co, Project Co shall, prior to commencing such Utility Work, give reasonable written notice to the relevant Utility Company confirming that the Utility Work is being carried out by or on behalf of Project Co pursuant to this Project Agreement;

(viii) Project Co shall complete any utility abandonment as per the standards of the relevant Utility Company;

(ix) For Bell, Project Co shall install all necessary temporary and/or permanent civil works associated with the relocation of the Utility Infrastructure, which may include duct banks, maintenance holes, handwells, vaults, pads, etc. for the

purpose of the installation of Bell's plant. The civil works shall be installed as per the standards and specifications of Bell.

(x) For telecommunication utility companies, Project Co shall design and install all necessary temporary and/or permanent civil works associated with the relocation of the Utility Infrastructure, which may include duct banks, maintenance holes, handwells, vaults, pads, etc. for the purpose of the installation of the relevant telecommunication utility company's plant. The civil works shall be installed as per the standards and specifications of the corresponding Utility Company.

(xi) For HOL Project Co shall install all necessary temporary and/or permanent civil works associated with the relocation of the utility infrastructure, which may include duct banks, maintenance holes, handwells, vaults, pads, etc. for the purpose of the installation of the HOL's plant. The civil works shall be installed as per the standards and specifications of the corresponding Utility Company.

b) The Utility Companies shall be individually responsible for the following work which will be covered in the cash allowance (Utilities Work) as noted in Project Agreement Section 20.13:

(i) Bell shall be responsible for the design of all necessary temporary and/or permanent civil works associated with the relocation of the Utility Infrastructure, which may include duct banks, maintenance holes, handwells, vaults, pads, etc. for the purpose of the installation of the Bell's plant. Bell shall be responsible for the design and installation of all temporary and/or permanent plant works required including wiring, cables, fibres, equipment, etc., installed or placed in, on, over, under or through the civil works including connections to existing Utility Infrastructure for their plant;

(ii) Telecommunication Utility Companies shall be responsible for the design and installation of any temporary and/or permanent plant works including wiring, cables, fibres, equipment, etc., installed or placed in, on, over, under or through the civil works including connections to existing Utility Infrastructure;

(iii) HOL shall be responsible for the design of all necessary temporary and/or permanent civil works associated with the relocation of the Utility Infrastructure, which may include duct banks, maintenance holes, handwells, vaults, pads, etc. for the purpose of the installation of the HOL's plant. HOL shall be responsible for the design and installation of all temporary and/or permanent plant works required including wiring, cables, equipment, etc., installed or placed in, on, over, under or through the civil works including connections to existing Utility Infrastructure for their plant; and

(iv) Enbridge shall be responsible for all design and installation of all temporary and/or permanent works required for their plant.

c) Project Co shall attend and update the Ottawa UCC at the first UCC meeting of each year with the following:

(i) On-going stray current assessment and mitigation response;

(ii) Major maintenance plans for the up-coming year to allow other utilities to coordinate; and

(iii) Change of standards, procedures, and methods that would affect other utilities.

6.6 Watermain Requirements

a) All watermain Design and Construction shall conform to all relevant codes and standards.

b) The timing of watermain relocations are subject to operational constraints and require hydraulic modelling, by the City, to ensure the adequate supply of water. Project Co shall coordinate the scheduling of all watermain relocation work with the City.

c) Project Co shall not remove the watermain on Booth Street prior to the completion of a new watermain connecting Albert Street to Fleet Street.

d) Project Co shall engage a company that can demonstrate a minimum of 10 years of experience in large diameter watermain installation, 3 references where large diameter watermain installation has been provided within the last 5 years, and describe the experience of said company, as well as the individuals who shall be responsible for the management and services delivery and their relevant experience and qualifications, to the City in accordance with the requirements of Schedule 10 – Review Procedure.

6.7 Storm and Sanitary Sewerage System Requirements

a) Storm and Sanitary Sewer requirements shall conform to all relevant codes and standards.

b) Relocate sewer maintenance holes out of the OLRT Guideway. By exception-basis only, an offset maintenance hole may be considered at the City's discretion.

c) Project Co shall conduct a precondition survey by way of CCTV on all storm and sanitary sewers within the construction limits as per the City of Ottawa Standards.

d) Relocation of the Merton Street storm sewer shall be completed between November 15th and April 15th of any year.

6.8 Hydro Ottawa Limited

a) Refer to Appendix H in the "Hydro Ottawa Information to Support the City of Ottawa's Proposed light Rail System – Phase 1" report, provided in the Data Room for details regarding limits of responsibility for Underground Stations and At-Grade Stations electrical equipment. HOL will operate up to the electrical ownership demarcation point and may operate the customer's first protective device in from Hydro Ottawa's

distribution system. HOL clarifies the customer's interface responsibilities with the connection agreement. HOL defines three areas of responsibility between itself and the customer's interface: ownership demarcation ('O'), electrical control authority ('C'), and maintenance authority ('M'). All electrical devices and support structures on HOL's distribution system receive unique identifying nomenclature with the required 'OCM' suffix indicating the defined roles.

b) Project Co shall ensure that HOL's control authority and staff has 24/7 access to its primary circuits to control the distribution system, ensure public safety, and replace failed components, and a maximum field emergency response time of 60 minutes not withstanding a force majeure. Typical circuit restoration times are outlined in the "Hydro Ottawa Information to Support the City of Ottawa's Proposed light Rail System – Phase 1" report, which is available in the Data Room as Background Information. As well, Project Co shall ensure it has only one control authority over the OLRT electrical system.

c) Automatic load transfer scheme may be deployed by Project Co where higher than normal reliability is required. Such schemes are subject to HOL approval and any such scheme will be required to be break before make (open transition of greater than 100 milliseconds) configuration. An ongoing monthly stand-by HOL reliability backup capacity charge shall apply where Project Co automatic transfer schemes are implemented and approved and such standby charges shall be the responsibility of Project Co.

ARTICLE 7 ENABLING AND EARLY WORKS

7.1 Hydro Ottawa Limited Enabling Works

a) The following work is planned to commence by HOL in 2012 in coordination with the City:

(i) Temporary Construction Power:

A. TWP (Tunnel - West Portal)

B. DTW (Downtown West Station)

C. RID (Rideau Station)

D. TEP (Tunnel – East Portal)

E. MSF

(ii) HOL forecasts completion of Temporary Power works during Q2 2013 and as detailed in "HOL Temporary Electrical Construction Power" report provided in the Data Room.

b) Table 1-7.1 summarizes the planned temporary construction power requirements to be provided by HOL recognizing that 1.5 MVA is the maximum capacity 13.2 KV transformer that HOL can provide. Project Co shall be responsible for providing and installing any transformers of greater capacity that may be required to support their construction power needs.

Table 1-7.1: Planned Temporary Construction Power Requirements

Location	Meter #1	Meter #2	Transformer #1	Transformer #2	Equipment Configuration
TWP	7 MVA	5 MVA	Customer Owned	HOL 1.5MVA pad	92006563 **E1**
DTW	7 MVA	N/A	Customer Owned	N/A	**UGS0007**
RID	7 MVA	N/A	Customer Owned	N/A	**UGS0007**
TEP	7 MVA	5 MVA	Customer Owned	HOL 1.5MVA pad	92006563 **E1**
MSF	Secondary	N/A	HOL 750 kVA pad	N/A	**UGS0007**

(i) Temporary Plant Relocation:

A. TWP (Commissioner)

(ii) Permanent Plant Relocation:

A. TWP (old Wellington)

(iii) System Expansion:

A. TWP

B. DTW

C. RID

D. TPS04 (Traction Power Substation 4 - near Campus Station) (King Edward)

i. This work is divided over two different time periods (Enabling and Early). The initial underground primary cable, from King Edward HOL substation to King Edward Avenue at Laurier Avenue, is planned to commence in 2012 to supply the temporary supply requirements at TEP. Once construction at TEP is complete, HOL plans to re-use this cable in 2016 for TSP04 permanent supply power by adding on another piece of underground primary cable from King Edward Avenue at Laurier Avenue to King Edward Avenue at Mann Avenue.

c) Project Co shall provide HOL the required power details for temporary connection assets to support temporary construction power.

7.2 Hydro Ottawa Limited Early Works

a) Project Co shall be responsible for all coordination of works and timely flow of information, in particular a Level D loading schedule to support permanent power needs, with HOL through own contractual agreements and memorandums.

7.3 Infrastructure Services Department (ISD) Enabling Works

a) The following work is planned by the City. The City will complete all of the design and construction of the Innes Road Widening, Blair/174 interchange modifications, Blair Road and Gloucester Centre entrance modifications. The work is scheduled for tender in 2013 with construction complete in 2014. Project Co shall be responsible to coordinate their work with respect to these roadway modifications being undertaken by the City.

(i) Highway 417/OR 174 eastbound Ramp: Should OR174 and Highway 417 be used as a BRT detour, the 417WB to OR174EB Ramp shall be temporarily closed during the period of time the BRT detour is in operation. This is required to allow

the 417 EB to OR174 EB BRT Detour to operate without the buses mixing with general traffic.

(ii) OR 174 Road Interchange Modifications: There are modifications to the Blair Road/OR174 interchange westbound ramp required for Transit Priority measures.

(iii) Blair Road and Gloucester Center Entrance Modifications: A northbound double left-turn lane from Blair Road into Gloucester Centre and associated entrance road receiving lanes will be required to accommodate the BRT detour. In addition, Blair Road northbound lanes will be realigned from three lanes to two lanes to match the downstream northbound right turn lanes and through lanes at Ogilvie Road.

ARTICLE 8 COMMITMENTS AND COMPLIANCE REQUIREMENTS

8.1 General Requirements

a) In addition to Project Co's obligations under Schedule 17 – Environmental Obligations, Project Co shall ensure that the following commitments, which were made during various public consultations, are addressed:

(i) Project Co shall provide for effective pedestrian connections to Bayview Station via Albert Street from the Hintonburg and Dalhousie neighbourhoods.

(ii) Project Co, by use of one or all of the following options, and in consultation with The City, shall provide for bicycles to use the LRT:

A. Bicycles shall only be permitted on the last car of any Train.

B. Bicycles shall only be permitted on Trains during off-peak hours.

8.2 City of Ottawa Council Direction

a) Per the results of DOTT Planning and EA – Recommended Plan (16-Dec-09 http://www.ottawa.ca/calendar/ottawa/citycouncil/tc/2009/12-16/disposition40eng.htm ISCS - RIO), Project Co shall comply with the following:

(i) Direction to use Kent and Lyon Streets as detour streets only as a last resort and ensure that those alternative detour corridors are explored for use during and after DOTT construction.

(ii) Direction to find, identify and include alternate ways of providing priority to transit vehicles moving from eastbound Albert to northbound Booth.

(iii) Direction to explore options to ensure that there is room for the BikeWest project to safely pass the Tunney's Pasture Station on the south side between the station and Scott Street.

8.3 List of External Stakeholders

a) In addition to the requirements and Stakeholders denoted in Schedule 17 – Environmental Obligations and Schedule 18 – Communications and Consultations of this Project Agreement, Project Co include in its Consultation Plan, the following Stakeholders:

(i) CPCS Transcom Ltd.

(ii) Steer Davies Gleave

(iii) Noxon Associates

(iv) Acart Communications

(v) Economic Development Branch

(vi) Ottawa Seniors Transportation Committee

(vii) RCAC

(viii) Envirocentre

(ix) University of Ottawa

(x) School Travel Planning / Green Communities Canada

(xi) Cycling Vision

(xii) Citizens for Safe Cycling

(xiii) OSTC

(xiv) PTAC

ARTICLE 9 SAFETY MANAGEMENT PLAN

9.1 General Requirements

a) The SMP shall be in accordance with the criteria contained in this Article and all Applicable Law.

b) The SMP shall be prepared and submitted as part of the Works Submittals according to Schedule 10 – Review Procedure. Project Co shall coordinate with the City to ensure existing maintenance, and safety plans are not violated.

c) Project Co, upon request, shall make available a valid Clearance Certificate from the Workplace Safety and Insurance Board.

9.2 Safety Management Plan

a) The SMP shall demonstrate in detail how Project Co shall meet all of its obligations under the OHSA. The SMP shall also include, but is not limited to, the obligations to: provide a safe workplace; provide information and educate workers on workplace hazards; appoint a designated safety officer; prepare and implement a health and safety policy, mine rescue plan, implement a comprehensive health and safety program to support the policy and take every reasonable precaution to protect the health and safety of Project Co personnel and ensure safe passage for the public.

b) Project Co's SMP shall take into account a PHA and TVA, and shall include, but not be limited to the following:

(i) Safety Policy Statement

A. The SMP shall include a Safety Policy Statement that clearly articulates Project Co's health and safety objectives and its commitment to continually improve the effectiveness of the implemented SMP. The Safety Policy Statement shall be communicated to all of Project Co personnel and shall be reviewed, as a minimum, annually to ensure it is current.

(ii) Safety Management

A. The personnel and responsible staff who shall implement, maintain, and enforce the SMP rules and policies shall be identified. As a minimum, Project Co shall provide a full time on-the-job safety manager meeting the qualifications outlined below. In addition, Project Co's safety management shall also have the minimum additional designated personnel identified below.

B. The safety manager's qualifications, as a minimum, shall include:

i. 15 years of progressive safety management experience on complex rail infrastructure projects;

ii. Training and current certification for CPR and First Aid;

iii. Possess verifiable competency in the Construction safety disciplines related to the Works to be performed and/or retain fulltime competent persons required by provincial and federal safety standards;

iv. Training in the development and presentation of safety training programs and meetings; and

v. Knowledge in safety incentive programs.

C. As part of Project Co's safety management, all work shifts shall have, as a minimum, an onsite shift safety representative. The shift safety representative shall have the following minimum qualifications:

i. Three years of progressive safety experience and general competency in the Construction safety disciplines related to the Works; and

ii. Training and current certification for CPR and First Aid.

D. The SMP shall define the role and responsibilities of the safety manager and safety staff, the hierarchical relationship between the safety manager and other managers, supervisors, and employees, and how responsibility and accountability for safety shall be incorporated at all levels.

E. A clearly stated policy shall be provided that articulates the obligations of all personnel in adhering to the policy.

F. Clear goals shall be established and communicated, for safety, security, and health, including defined objectives for meeting the goals.

G. Requirements for evaluating the effectiveness of policies and measuring success in meeting the goals and objectives of the SMP shall be set forth. An environment and means for continuous evaluation and improvement shall be established to achieve the SMP goals and to identify deficiencies so that the goals and objectives can be revised as needed.

H. A process through which all incidents, emergencies, accidents, and injuries are reported, investigated, and documented shall be established. In addition, provision shall be made that investigation of all accidents be conducted by a trained accident investigator.

(iii) Worksite and Jobsite Analysis

A. Procedures and requirements shall be established for a comprehensive baseline worksite survey for safety, security, and health issues. In addition, requirements shall be established to involve employees in periodic update surveys, performing routine job hazard analyses, and conducting regular site safety, security, and health inspections so that new or previously missed hazards and hazard control failures, are identified.

B. A reliable system shall be provided that allows employees to notify management personnel about conditions that appear hazardous, and to receive timely and appropriate responses, without fear of reprisal.

C. Procedures shall be established to investigate accidents and "near miss" incidents so that their causes and means of prevention can be identified. The procedures shall provide a means for analyses of injury and illness trends so that patterns with common causes can be identified and prevented.

(iv) Hazard Prevention and Personal Safety

A. Methods and procedures shall be provided to identify and detail all hazards that may be encountered by employees while performing the Works. Practices and procedures shall be developed and implemented to address prevention of identified hazards. A communications protocol shall be established to ensure all employers and employees are aware of hazards in all areas and how to deal with them appropriately. Means shall be provided to evaluate all anticipated and unanticipated activities, and address potential hazards related to these activities.

B. Means shall be provided to ensure employees understand and comply with safe work practices and procedures through training, positive reinforcement, correction of unsafe performance, and if necessary, enforcement through a clearly communicated disciplinary system.

C. Project Co shall handle hazardous materials in compliance with Schedule 17 – Environmental Obligations, and the applicable requirements of this Article.

(v) Training

A. Methods shall be established to identify, develop, and provide relevant training for employees and supervisors designed to ensure that all employees understand and are aware of the hazards to which they may be exposed, and are aware of the proper methods for avoiding the hazards.

B. Methods shall be established to identify, develop, and provide supervisory training programs to ensure supervisors understand the key role they play in job site safety and to enable them to carry out their safety and health

responsibilities effectively; to analyze the work under their supervision to anticipate and identify potential hazards; and to maintain physical protection in their work areas, including the establishment of policies that ensure each employee is provided with the equipment necessary to complete assigned tasks safely.

C. Procedures shall be provided to plan and prepare for emergencies, and to conduct training and Emergency drills, as required.

(vi) Incident and Emergency Management

A. Project Co shall provide comprehensive policies and procedures pertaining to incident and Emergency planning, response, mitigation, and recovery. Policies and procedures for safety during incidents and emergencies shall also be addressed. Project Co shall establish procedures to achieve at a minimum, the following:

i. Maintain communication for the exchange of information between Project Co, the City, and other involved agencies;

ii. Develop coordinated support through interaction with local, provincial, and federal governmental entities, as well as other entities, for safe and efficient Construction;

iii. Discuss and coordinate Emergency response, traffic control, security, and operational issues affecting Construction of the Project, and associated system feeders and exits; and

iv. Update Emergency response agencies regarding status of Construction of the Project, and associated system feeders and exits, to assure safe and timely response to Emergency events. As a minimum, this shall include off-site and on-site traffic routing changes, and changes to job site access, fire suppression system modifications and in-service availability of standpipes or fire suppression water supply, and changes in the Work that may create a greater likelihood of occurrence of a particular type of Emergency.

(vii) Safety Records

A. Project Co shall maintain safety records to provide verification of conformity to Project Co's SMP requirements. Safety records shall be in electronic format and shall be legible, readily identifiable and retrievable and available to the City upon request.

(viii) Accidents and Incidents

A. The SMP shall include a process to ensure all accidents and incidents are investigated, documented and reported in compliance with all Applicable Law. Accident and incident investigation shall be conducted by qualified personnel, and where corrective and preventive action is required; all such action shall be fully documented and completed.

B. In addition to the above requirements Project Co shall immediately notify the City of all MOL orders/ charges related to the Work, including documentation of all actions/correspondence undertaken.

ARTICLE 10 SAFETY AND SECURITY CERTIFICATION

10.1 Safety and Security Certification

a) The Project Design shall be compliant with safety and security criteria, codes, and regulations including Ontario Human Rights Commission Policy and Guidelines on Disability and the Duty to Accommodate requirements, with safety and security of Passengers and employees as the most important requirement of the Project.

b) Project Co shall be responsible for the preparation of and compliance with the Project's SSCP through strict conformance to contractual obligations. Project Co shall manage its Work and that of its Subcontractors' through final design, Construction and integrated testing in such a way as to support the overall success of the certification process and the ultimate acceptance by the City.

c) Project Co shall be responsible for performing safety and security certification tasks as specified herein in accordance with IEC 61508. These tasks shall be managed and performed in accordance with the Project SSCP.

d) Project Co's management responsibilities shall include, but are not limited to, the following:

(i) Participation in meetings with the City's SSCRT.

(ii) Completion and maintenance of appropriate validation and verification activities and other evidentiary documentation required to monitor the successful completion of safety and security certification. Project Co shall develop a systems assurance process to track PHA, safety and hazard analyses and any subsequent checklist items to final closure and provide status as the Project progresses. The checklists include, but are not limited to, safety and security related conformance for the following:

A. Design Criteria;

B. Construction Specifications;

C. Testing;

D. Hazard and vulnerability resolution; and

E. Operations and Maintenance manuals.

(iii) Cooperation and facilitation of safety and security audits of its work and that of its Subcontractors.

(iv) Preparing and submitting Certificates of Conformance to the City according to Schedule 10 – Review Procedure.

(v) Coordinating, documenting and performing training as specified in the Project Agreement.

(vi) Maintaining and updating files and submitting documentation on a timely basis.

(vii) Preparing safety and security certification progress reports every other month.

(viii) Submitting a record copy of safety and security certification files to the City upon completion of the Work.

e) Project Co's responsibilities are defined in the following table. The responsibilities are identified as Primary (P) or Secondary (S). For tasks identified as primary responsibility (P) Project Co shall be responsible for the performance of the activity. For tasks identified as secondary responsibility (S) Project Co shall be responsible to provide support, as required, to accomplish the task. The SSCP describes comprehensive primary and secondary responsibilities for the tasks identified below.

Table 1-10.1

Project Co Safety and Security Responsibilities Matrix		
Safety and Security Certification Tasks	Project Co Responsibility	Comments
Attend SSRCT and FLSSC review meetings and participate in activities as needed.	S	
Perform PHA and hazard analysis	P	
Incorporate resolutions of PHA, hazard analysis mitigations into design, and maintain files and contribute to the hazard tracking system	P	
Perform Train Control Hazard Analysis and supplementary Hazard Analysis, if necessary, and Integrate results into Design.	P	
Perform TVA and supplementary TVA; as necessary	P	
Incorporate TVA results into design, and maintain files and contribute to vulnerability tracking system.	P	
Update Design Criteria Conformance Checklists and Construction Specification Conformance Checklists	P	
Verify Design Criteria Conformance Checklists and Construction Specification Conformance Checklists for completed Work	P	
Prepare and submit Design Criteria Conformance Certificates of Completed Design for acceptance	P	

Project Co Safety and Security Responsibilities Matrix		
Safety and Security Certification Tasks	Project Co Responsibility	Comments
Prepare and submit Construction Specification Conformance Certificates of Completed Work for acceptance	P	
Update Safety Related Testing Conformance Checklists	P	
Perform safety related testing	P	
Verify Safety Related Testing Conformance Checklists	P	
Prepare and submit Safety Related Testing Conformance Certificates of Completed work for acceptance	P	
Cooperate and facilitate safety and security audits of the Project Co's	S	
Develop and implement the System Integration Test Plan	P	
Develop and implement the System Activation Plan and Procedures	P	
Attend Safety and Security Operations Review Committee meetings and participate in activities as needed.	S	
Complete Project Co Provided Training, Project Co Provided Operations and Maintenance Manual Conformance, and Issue Certificates	P	
Coordinate and Participate in Emergency Drills	S	Participate
Follow sensitive security information Procedures	P	
Update and maintenance of System Safety Case	P	

f) Following is additional explanation of some of the safety and security certification activities to be performed by Project Co.:

(i) Design criteria conformance: Project Co shall verify that the safety and security related criteria requirements are incorporated in the Construction Documents prepared as part of Project Co's completed Design. Project Co shall perform the following activities for the safety and security related criteria conformance;

A. An initial Design criteria conformance checklist shall be prepared and verified by Project Co for the design level of the Contract Documents. Project Co shall review and update the Design criteria conformance checklist and verify that Project Co's completed designs comply with the

safety and security related criteria requirements. All requirements on the checklist shall be verified and submitted according to Schedule 10 – Review Procedure;

B. Project Co shall verify that the completed designs meet the Ontario Human Rights Commission Policy and Guidelines on Disability and the Duty to Accommodate and other applicable code and regulatory compliance;

C. Project Co shall verify that all safety and security related Design review comments have been successfully resolved; and

D. After completion of Certification of Compliance with safety and security related Design criteria, Project Co shall prepare and submit Design Criteria Conformance Certificate of completed designs for acceptance by the City;

(ii) Construction Specification Conformance: Project Co shall verify that the safety and security related requirements imposed by the standards, specifications, hazard analyses and other Contract Documents are met in the as-built System or facility. Project Co shall perform the following activities for the safety and security related Construction specification conformance.

A. Project Co shall prepare a Construction specification conformance checklist and verify that as-built Systems and documentation meet the safety and security related requirements. All requirements on the checklists shall be verified and submitted to the City for review.

B. Project Co shall verify that all changes made after acceptance of Project Co's completed Design meet Design criteria, code and regulatory compliance.

C. Project Co shall verify that all identified Fire/Life Safety and Security issues are resolved.

D. After completion of inspection of Work performed and certification of compliance, Project Co shall prepare and submit Construction Specification Conformance Certificates according to Schedule 10 – Review Procedure.

(iii) Witness Point Selection is a City Responsibility. The purpose of defining witness points is to select those locations at which the City wishes to formally witness testing. Project Co shall be responsible for performing the tests covering the City-selected points and for notifying the City at least seven Business Days in advance of the date and time for the test. Selected areas shall include items of high risk, where concerns of compliance have been raised, or those selected by

random sampling. The City shall have the right to attend and witness any and all testing that takes place.

(iv) Safety-Related Tests: Project Co shall verify that subsystems and systems function safely as specified and do not contain or create unforeseen hazards. Safety-related tests cover both intra-discipline and integrated tests. Project Co shall perform the following activities for the safety-related tests:

A. An initial safety-related testing conformance checklist shall be prepared for the design level of the Contract Documents. Project Co shall update the safety-related testing conformance checklist and submit it for review. Project Co shall verify that all safety-related tests identified in the specifications and other Contract Documents are successfully performed and the completed tests have been verified within defined test parameters and the systems and subsystems function safely as specified, do not contain or create unforeseen hazards, and contain specified safety features. All requirements on the checklists shall be verified and submitted for review;

B. Project Co shall report any noncompliance with applicable code and regulatory requirements noted as a result of safety-related testing. All non-compliances shall be rectified in accordance with applicable codes and regulations; and

C. After completion of safety-related testing and certification of compliance with specifications, Project Co shall prepare and submit safety-related testing conformance certificates according to Schedule 10 – Review Procedure.

(v) Safety Training and Drills: This task is a Project Co responsibility. Project Co shall participate and provide support as defined herein. The purpose of the training and drills verification process is to verify that key safety-related training on new equipment is adequate and appropriate for the tasks to be performed in both normal and Emergency response environments. Project Co shall be responsible for providing equipment and setting up locations for test drills to be performed. Where indicated elsewhere herein, Project Co shall also provide instructors to assist in the training.

A. Verifying safe System operation through drills is an integral part of a closed-loop, pro-active System safety process. The methodology employed by the training/drill verification process is to obtain written verification from the City that:

i. Training and drills are adequate and appropriate for the assigned task, and contain instructions on safety features for normal and Emergency environments;

ii. Lessons learned from training and drills have been reviewed and all identified hazards or open safety issues have been resolved; and

iii. All known comments and issues concerning training and drills, which impact safety, have been satisfactorily resolved.

(vi) PHA: Project Co shall perform a PHA of the OLRT Project. The methodology for the performance of PHA shall be in accordance with the APTA *Manual for the Development of System Safety Program Plans for Commuter Railroads*. During the progress of the Work, Project Co shall be responsible for identifying hazards that are specific to the OLRT Project which shall be included and analyzed in the PHA. The PHA shall be submitted according to Schedule 10 – Review Procedure prior to proceeding in areas of Work affected by the analyses. The PHA shall contain adequate information to define the conditions being analyzed and discuss the alternatives and mitigations to eliminate the hazard or reduce it to an acceptable level of safety. Project Co shall address and incorporate applicable mitigations from the OLRT PHA.

A. Mitigations shall include Design considerations, safety devices, warning devices or recommendations for adopting special procedures or training. The resolution process shall verify but not be limited to the following:

i. That the resolution of a hazard in one system does not create a new hazard in another system;

ii. That hazards involving interfaces between two or more systems have been analyzed and resolved;

iii. That all program participants are providing required analyses in a timely manner, and that determination is made where delinquent receipt is delaying hazard resolution; and

iv. That proper resolutions are implemented for areas identified with hazard resolutions requiring a change in system Design or development of special procedures.

B. The PHA shall also be in accordance with Hazard Analysis Guidelines for transit Projects DOT-FTA_-MA-26-5005-00-01 US Department of Transportation Federal Transit Administration, IEC 61508 and EN 50126 (IEC62278).

(vii) Project Co shall be responsible for maintaining a HTM to record and track hazards for implementation of resolutions covered in the PHA and hazard analysis. The HTM shall include a description of all identified hazards, a description of the measures taken to resolve each hazard and results of reviews, comments and approvals by the City and outside agencies. All identified hazards shall be tracked through to resolution. Project Co shall submit the most current

copy of HTM to the City for review upon request. After all hazards tracked on HTM have been resolved Project Co shall prepare a hazards resolution certificate of conformance. The HTM shall be submitted according to Schedule 10 – Review Procedure.

(viii) Preliminary TVA: To be undertaken and provided by the City to Project Co.

(ix) Fire/Life Safety – Project Co shall be responsible for compliance with fire/life safety requirements included in federal, provincial, local codes and regulations, and the Project Agreement. Project Co shall incorporate these requirements into the Design and Construction of the Project and include all applicable certifiable fire/life safety elements in the appropriate safety and security certification checklists.

(x) Project Co shall support the approval process by participating in reviews, inspections and technical discussions between the City and local jurisdictional authorities and other Authorities Having Jurisdiction, and incorporating the resulting agreements into the Construction Documents. Project Co shall be responsible for verifying that Project Co's completed Design complies with the resolutions of fire/life safety issues, and is acceptable to the Authorities Having Jurisdiction.

(xi) Project Co shall also indicate that all submissions that are safety related and/or are deemed certifiable are in accordance with the SSCP. Submissions shall be in accordance with Schedule 10 – Review Procedure. Those items that are safety related shall be identified as a SCIL element, and shall be classified as a certifiable element. Certifiable safety elements reflected in the contract Submittals and schedules shall be included in Project's overall safety and security certification checklist. All Submittals identified as a certifiable element shall be clearly marked as such when submitted to the City for review.

10.2 Checklist Format

a) Checklists for monitoring the completion of certifiable elements shall be maintained by Project Co in electronic "Spreadsheet" format. The files shall consist of the following:

(i) Item Number;

(ii) Safety Requirement;

(iii) Document Reference:

A. Document Name; and

B. Article Number;

(iv) Evidence:

A. Method of Verification by Project Co;

B. Method of Validation by Audit Team;

C. Validated By (Name of Auditor);

D. Date; and

E. Remarks.

10.3 RAMS

a) Introduction

(i) Project Co shall develop and implement a system for the management of RAMS as part of the conceptual detailed design, Construction, installation, commissioning, testing, acceptance and operation phases of the contract. The RAMS program shall provide a statistical foundation for each asset's contribution to overall System performance.

(ii) Technical Specifications

A. The RAMS program shall be undertaken consistent with the following minimum standards:

i. RAM studies (IEEE 497)

ii. ISO Standard (14224)

iii. CAN/CSA-0632-90 – Reliability and Maintainability Management Guidelines

iv. CAN/CSA-0396 – Software Quality Assurance Standards

v. EN 50126 – Specification and Demonstration of Management of Reliability Availability, Maintainability and Safety

(iii) Content of RAMS Analysis

A. The RAMS program outlined in this Article is intended to influence the reliability, availability and maintainability of Project elements and the System as a whole as part of an overall quality assurance program and is separate and distinct from the performance targets that may have been established in this Project Agreement to monitor service performance related to revenue operations.

(iv) Outline of RAMS Analysis/Modeling

A. The RAMS program undertaken by Project Co shall include the following:

i. Analysis of RAMS component and System performance;

ii. The use of Monte Carlo simulation as appropriate; and

iii. Sensitivity tests to vary the performance of individual assets, interaction of assets, and the overall System.

(v) RAMS Analysis/Modeling Report

A. Within Article references to the RAMS study are references to the necessity to comply with the requirements including but not limited to the production of reports, calculations, analyses and test data as appropriate to demonstrate compliance with the safety, quality and reliability requirements.

B. The RAMS reports shall be organized into the following major categories:

i. Data collection;

ii. Review and model validation;

iii. Modeling and simulation;

iv. Validation and documentation of simulation results and sensitivity testing; and

v. Report generation/Systems assurance compliance.

C. The initial RAMS report shall be submitted according to Schedule 10 – Review Procedure

ARTICLE 11 EMERGENCY RESPONSE PLAN

11.1 General Requirements

a) The ERP shall be in accordance with the criteria contained in this Article and all Applicable Law.

b) Project Co shall create and implement an ERP, which ensures that Project Co has considered, trained, addressed, and planned for all potential catastrophic natural and man-made disasters, and has established protocols, procedures, responsibilities and guidelines to mitigate the potential impacts and respond to and recover from the occurrence of a disaster event, in accordance with the ERP.

c) The ERP shall be completed and submitted as part of the Works Submittals according to Schedule 10 – Review Procedure.

d) It is understood that the ERP developed by Project Co shall be incorporated into the City of Ottawa Emergency Response Plan, and the Province of Ontario Provincial Emergency Response Plan (PERP). As such, the general outline, organization and structure of the ERP shall generally follow the City of Ottawa Emergency Response Plan and the PERP.

e) Project Co shall coordinate the development of the ERP with the City and EMO.

f) This Article is provided as a general outline for the requirements of the ERP, as the ERP shall be modified, revised or changed, as appropriate, to address specific issues, needs, threats, Hazards, vulnerabilities, or concerns, including those identified in the PHA, hazard analysis and FMEA related to the OLRT that develop during the Project Term.

11.2 Emergency Response Plan

a) Project Co shall implement procedures designed to provide for a safe environment throughout the Project Term. The ERP shall include the required scenario analyses with an incident command hierarchy between Emergency Service Providers and demonstrate in detail how Project Co shall respond to and recover from the occurrence(s) of catastrophic natural and man-made disasters detailed in the PHA and subsequent safety analysis. The ERP shall be consistent and in accordance with all Applicable Law governing Emergency planning, response and recovery. The plan shall be prepared with the involvement of and input from all applicable Emergency Service Providers.

b) Project Co's ERP, as a minimum, shall include the following:

(i) Emergency Response Policy Statement;

A. The ERP shall include an Emergency response policy statement that clearly articulates the purpose of the ERP; scope and applicability of the ERP; and the methodology utilized to develop and implement the ERP. The Emergency response policy statement shall be communicated to all

Project Co Parties and shall be reviewed, as a minimum, and coordinated annually with EMS, Fire, City and others to ensure it is current.

(ii) Situation Analyses;

A. The ERP shall be based upon an analysis of the potential Emergency situations specific to this Project.

(iii) Planning Assumptions;

A. A section describing and indicating the basic planning assumptions upon which the ERP is based. It shall include lead times, effects of Emergencies, when and how an Emergency is to be declared, what outside assistance is available and the conditions under which an evacuation may be required.

(iv) Response Capabilities; and

A. A section describing the current response and recovery capabilities of Project Co, which shall summarize the basic capabilities both in-house and from outside sources to deal with response and recovery issues. It shall contain a general description of how resources are currently managed and deployed. It shall also identify shortfalls in response capabilities and strategies to resolve these shortfalls.

(v) Critical Facilities.

A. Identification of critical facilities of Project Co, providing the system name, address, contact person, property classification, primary Emergency function, the secondary Emergency function, the primary or normal use, the priority for power restoration and the Emergency power requirements. A location map indicating the location of all critical facilities shall be included in this section.

c) System Management Polices

(i) This section shall address the current management policies and practices regarding the major factors that can have an impact on the operation of the OLRT. Copies of all written policies and procedures shall be included in an appendix to the plan.

(ii) This section is to contain, at a minimum, a discussion of the following factors:

A. Surveillance and Incident detection;

B. Interdepartmental dependency and communication;

C. Information dissemination;

D. Traffic Incident management procedures;

E. Interface with the TSCC, the City, LRT and Bus Operations;

F. Public Information and Notifications; and

G. Business impact and interruption.

d) Project Co OLRT Resources

(i) Project Co shall provide a listing and description of the resources that the City and Project Co have available on a day-to-day basis and a listing of Project Co Parties or outside resources that are available on an on-call or contract basis. Project Co shall also include a listing of all vehicles and equipment owned, leased or available on-call by Project Co.

e) Day-To-Day Functions and Responsibilities

(i) Project Co shall provide details on how the various responsibilities and specific parties are organized and managed with respect to Emergencies.

f) Basic Operations

(i) Project Co shall provide an overview of the basic operational approach to Emergency situations. Specific details and descriptions of the response organization and assign specific tasks to the agencies and organizations that may be involved in responding to an Emergency. It shall be used by Project Co to guide and direct the development of functional and Emergency specific annexes that provide specific direction and responsibilities for various types and magnitudes of Incidents.

g) Functional Annexes

(i) The functional annexes section of the ERP shall provide specific information and direction and shall focus on operations of the OLRT. These annexes shall emphasize responsibilities, tasks and operational actions that pertain to the specific functions. These annexes shall clearly define and describe the policies, processes, roles and responsibilities inherent in the various functions before, during and after any Emergency situation, including how each agency and Project Co shall perform each of the functions. An annex shall include information on the following:

A. The purpose of the function;

B. A description of the situations that trigger implementation of the function;

C. A description of the assumptions that apply to the function;

D. The concept of operations for the function; and

E. Assignment of responsibility for annex Maintenance, review and updating.

h) Emergency Specific Annexes

(i) The Emergency specific annex section of the ERP shall describe and offer a means of extending functional annexes to address special and unique response procedures, notifications, protective actions and other needs generated by a specific Incident. Emergency specific annexes shall follow the same structure and similar content as the Basic Operations and Functional Annexes description above.

(ii) As per (i) above, at a minimum, the following specific Hazards are to be addressed:

A. Major traffic accidents and/or Incidents;

B. Hazardous material Incidents;

C. Nuclear or radiological Incidents;

D. Terrorism Incidents;

E. Earthquake;

F. Biological Incident;

G. Weather related events;

H. Railroad Incidents;

I. Structural or Tunnel fires;

J. Structural failure;

K. Electrical power Incidents; and

L. Other Utility Incidents.

i) Recovery Annexes

(i) The recovery annex section of the ERP shall address the methodology and processes that shall be implemented during the recovery process and shall include, at a minimum the following:

A. Identification of the agencies with responsibility for recovery efforts;

B. Establishment of the documentation and record keeping requirements following the disaster event;

C. Establishment of the initial post disaster priorities and responsibilities (0-12 hours);

D. Addressing of human needs; and

E. Developing and addressing mitigation strategies.

j) Training and Exercises

(i) This section of the ERP shall identify and address the specific training program(s) and exercise schedule(s) for Project Co. It shall address, at a minimum, the following:

A. Types of training required for each Project Co Party involved in a particular Incident;

B. A specific annual training program and schedule for each Project Co Party so identified; and

C. Establishment and implementation of the exercise and training program(s) that provides both table-top and full scale training exercises based upon the potential Emergencies to which the OLRT is exposed.

ARTICLE 12 GEOTECHNICAL / FOUNDATION DESIGN CRITERIA

12.1 Order of Precedence

a) The Design and Construction of all geotechnical and foundation work shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between the criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) Criteria contained in this Article;

(ii) Schedule 15-2, Part 1 Article 21 – Civil Structural Design Criteria;

(iii) Schedule 17 – Environmental Obligations;

(iv) City Design Standards and Guidelines;

(v) OBC;

(vi) NBC;

(vii) CHBDC;

(viii) OPSS;

(ix) CSA Standards;

(x) ASTM Standards;

(xi) OPSD;

(xii) Canadian Foundation Engineering Manual, Third and Fourth Editions;

(xiii) Guideline for Professional Engineers Providing Geotechnical Engineering Services, published by Professional Engineers of Ontario; and,

(xiv) AREMA Manual for Railway Engineering.

12.2 General Requirements

a) Geotechnical and foundations Design shall be carried out in accordance with the principles of Limit States Design based on Load and Resistance Factor Design as described in the OBC, CHBDC and Canadian Foundation Engineering Manual, based on the purpose of the Structure. In specific instances, such as slope stability for example, this Article requires use of WSD as a check on other numerical or analytical procedures that may be selected by Project Co.

b) Project Co shall perform a geotechnical ground conditions assessment based on the available data and develop a complete list of geotechnical design parameters (including a basis for selection) for use in the Design of the Tunnels and underground Structures. In addition, Project Co shall prepare geotechnical profiles for the downtown Tunnel, MSF connection tunnel and shafts greater than 3 meters in diameter. Geotechnical profiles shall include anticipated distribution of the various ground types.

12.3 Foundations

a) Foundations for Structures shall be designed such that their displacements (Serviceability Limit States, as defined in the relevant Codes and Standards) are compatible with the structural design, function, structure and Performance Requirements, and clearance envelope requirements over their Design Life.

b) Frost protection for foundation elements shall be provided by either:

(i) Earth cover above the underside of foundation elements at least equal to the design frost penetration depth; or

(ii) Insulating foundation elements using suitable materials such as high density polystyrene rigid foam. The insulation may be wrapped around the foundation element or may be placed under the foundation element (i.e., such that the foundation bears on the insulation) but shall provide at least the equivalent frost protection as the earth cover specified in (i) above.

(iii) The following shall be considered for the use of foundation insulating material:

A. The insulation details shall be designed to limit the damage to the insulation due to the placement of backfill or concrete; and

B. The insulation details shall ensure that the insulation is continuous and does not provide thermal gaps that could result in localized frost penetration and subsequent freezing induced expansion of the subgrade soils.

(iv) Insulation placed under footings shall be designed such that long term creep (compression) of the insulation, and therefore foundation settlement, is limited to less than 5 mm. The loading shall be limited to less than 35% of the insulation manufacturer's quoted compressive strength for high density polystyrene rigid foam.

(v) Frost protection details shall be provided to limit differential frost heaving. Typical details to limit the magnitude and extent of differential frost heaving shall include:

A. Maintaining a uniform subgrade level or, where the ground surface level changes (such as under a stairway or ramp), maintaining a uniform thickness of frost susceptible soil within the depth of frost penetration;

B. Where the subgrade level must change, the transition shall be accomplished by sloping the subgrade surface at no steeper than 3 horizontal to 1 vertical;

C. Providing suitable transition details at the edge of insulated areas to avoid drastic differences in the depth of frost penetration over short distances;

D. Draining the granular backfill materials to carry away water which would readily feed ice lensing in adjacent frost susceptible soil; and

E. Maintaining a uniform composition of the subgrade by using excavated backfill materials which, within the zone of frost penetration, match the surrounding soils.

12.4 Cut and Fill Slopes

a) Permanent cut and fill slopes shall be designed to:

(i) Be protected against surficial erosion and shallow surface failures;

(ii) Control discharge of surface water and subsurface seepage; and,

(iii) Allow for regular Maintenance of the slope surface.

b) Existing cut and fill slopes shall be modified where necessary to meet all requirements of this Article.

c) Permanent cut and fill slopes shall be designed with adequate minimum factor of safety no less than 1.5. The minimum factor of safety may be reduced to 1.3 in areas considered a passive land use situation in accordance with the City of Ottawa Slope Stability Guidelines for Development Applications. The Design slope configuration shall also be checked for short-term stability during Construction using appropriate undrained strength parameters. The minimum factor of safety shall be 1.5 for slopes supporting buildings, Bridge abutments or other Structures. The minimum factor of safety during design seismic event shall be no less than 1.1.

d) Where water bearing deposits, layers, seams or lenses are present at the slope surface, subsurface drainage works shall be incorporated into the slope Design to adequately control seepage and resultant piping at the slope surface, and to control the build-up of pore-water pressures within the slope.

e) Permanent cut and fill slopes shall exhibit no signs of tension cracks, toe bulging, slumping, or sloughing of embankment or cut slope.

12.5 Embankments

a) The total and differential post-Construction (i.e., after the Track or road is put in use) settlements of road or Track bed embankments and Pavement surfaces shall be such that

the smoothness and cross-slope requirements are met, ponding and sheeting of water is prevented, Pavement drainage is maintained, and the function of Constructions and ditches is preserved.

b) No vertical offset at longitudinal joints in Pavement surfaces shall be permitted after Construction.

c) No vertical offset at longitudinal or transverse joints along Station Platforms, interior walkways or at building connections shall be permitted after Construction.

d) The post-Construction differential settlement along the Track bed including due to frost heave shall meet the requirements of AREMA.

12.6 Permanent Retaining Structures

a) The following requirements apply to new and existing Retaining Walls:

(i) Reinforced soil slopes equal to or steeper than 40 degrees measured up from horizontal shall also be considered as Retaining Walls;

(ii) Proprietary retaining systems shall be designed and constructed in accordance with the manufacturer's guidelines and to meet the requirements of the Project;

(iii) Proprietary retaining systems with galvanized steel embedded in the soil shall not be permitted;

(iv) Design of all permanent retaining Structures shall allow for full-depth replacement of Track bed or Pavements;

(v) When calculating lateral resistances counteracting earth pressures, Project Co shall neglect passive earth pressures above the frost penetration depth.

(vi) The stability of the soil mass supporting or contained by the retaining wall shall be checked with respect to all potential surfaces of sliding and shall meet or exceed a minimum global factor of safety of 1.5. The minimum global factor of safety may be reduced to 1.3 in passive land use situations;

(vii) Differential rotation displacements, at no time during the Project Term shall be greater than 50% of the as-built wall batter;

(viii) Design of all permanent retaining Structures shall address long-term (creep) displacements, as well as the swelling potential of the shale for excavations in rock; and

(ix) The global factor of safety against uplift shall be a minimum of 1.1. Side friction shall be neglected for the purpose of computing the factor of safety against uplift.

12.7 Services

a) The following requirements apply to new water and sewer services installed for this Project:

(i) Where fill material is encountered below invert level, the fill material shall be removed from below the pipe and the service shall be founded on engineered fill;

(ii) Engineered fill, pipe bedding, cover and trench backfill material shall conform to OPSS and the requirements of this Schedule 15.

12.8 Temporary Slopes and Retaining Structures

a) The performance of each temporary work shall be sufficient for its expected Service Life. All temporary works shall comply with the OHSA and the construction projects requirements thereunder current at the time of excavation and the additional criteria identified below:

(i) Temporary retaining Structures shall be designed and constructed to meet the more stringent requirements of OPSS 902S01, AREMA, and the requirements of this Article. Temporary retaining Structures shall also meet the requirements of limiting surface settlements and ground movements as stipulated under Part 1 Article 20 – Protection of Existing Adjacent Structures. All elements of temporary retaining structures within the upper 1.5 meters of the ground surface shall be removed and properly disposed of upon completion of backfilling;

(ii) The Design loads on struts, rakers, or other structural support elements and for flexible wall systems shall not be less than those obtained from the apparent earth pressure diagrams as provided in the Canadian Foundation Engineering Manual, unless detailed numerical models and analyses are performed to demonstrate otherwise;

(iii) The global factor of safety against shear failure below the base of the shoring system shall be no less than 1.3. In addition, the Design and Construction of temporary works shall maintain displacements of the soil mass as required to meet the criteria of this Article for protection of Roadways, Buildings, Utilities, and other Adjacent Structures;

(iv) Sheet pile walls, contiguous caisson walls and diaphragm walls designed to penetrate granular deposits and partially cut-off the seepage shall be designed with a minimum global factor of safety of 1.5 against piping;

(v) The global factor of safety against uplift shall be a minimum of 1.1; and

(vi) For excavations in rock, adequate protection shall be provided to address the shale propensity toward swelling upon exposures, and the resulting forces acting on the excavation support system shall be considered.

12.9 Earthwork

a) Earthwork shall be designed and constructed to meet the applicable requirements of OPSS 501, OPSS 514, and OPSS Construction Specification for Grading, OPSS 212, and OPSS 1010.

b) Design and preparation of the Track bed subgrade shall be in accordance with AREMA.

c) All lightweight fills shall be adequately protected from wheel loads, groundwater, road salts, weather, fire, flotation under flood conditions, and fuel spills.

d) Penetration due to landscaping and sign foundation systems shall be designed such that protective membrane covers required to protect the lightweight fill are not compromised.

e) Flotation forces corresponding to inundation of the fill to the 100-year flood level shall be considered in the Design of lightweight fills, regardless of any flood protection provided for the area in which the fill is to be constructed.

f) Expanded polystyrene meeting CAN/ULC-S701 Type 2 (as a minimum) and ASTM material specification requirements shall be used.

g) Lightweight Fill and Ultra-lightweight Fill shall be defined as materials with angle of internal friction > 35° (ASTM D2850-95), hydraulic conductivity 8x10-03 cm/s (ASTM D5856-95, Method A), in situ wet unit weight (ASTM D2922) shall be less than 14.5 kN/m3 for Lightweight Fill and 12.5 kN/m3 for Ultra-lightweight Fill when placed and compacted.

h) All Granular A, B, M, and Select Subgrade Materials, slag fill, shredded tire fill, ultra-lightweight, lightweight, or other proposed fill materials shall be accordance with the Leachate Quality Criteria provided in Regulation 347 General—Waste Management under the Environmental Protection Act (Ontario);

12.10 Instrumentation and Monitoring

a) Instrumentation shall be installed in key/critical areas needing special attention, including fill embankments, deep cut sections, permanent retaining Structures, and existing Building, Bridge or other Structures along the Project Alignment that shall remain in service.

b) Measurements of differential settlements shall be taken annually during the Project Term following Final Completion. Measurement data shall be provided to the City within 15 Business Days following completion of the measurements.

c) Project shall decommission existing groundwater observation wells and piezometers installed by the City within the Lands for the purpose of the OLRT Project.

12.11 Groundwater Control – Dewatering/Unwatering

a) Project Co shall develop and submit plans and procedures in accordance with Schedule 10 – Review Procedures.

b) Design, Construction, and operation of dewatering/unwatering or groundwater drawdown/depressurization shall not induce detrimental short or long term movements of surrounding Infrastructure. Particular attention shall be given in areas with sensitive clays known to be present in the Ottawa area, and impact of groundwater drawdown or depressurization of the clay settlement.

c) Specific Water Table and Groundwater Control Requirements

(i) A detailed hydrogeological impact assessment and associated risk assessment shall be carried out by Project Co to ensure that any water table drawdown and subsequent effects on the groundwater regime during Construction or during the Design Life of the Project Works, shall have no adverse impact on property, adjacent Infrastructure, the Works and the Environment, over any length of each Tunnel cut-and-cover Structure and shaft, with respect to:

A. groundwater draw down effects including contamination migration and impacts on available water for ground water dependent ecosystems and existing groundwater users;

B. groundwater draw down effects which may cause settlement of existing Structures or utilities adjacent to the Project Works as required in Part 1 Article 20 – Protection of Existing Adjacent Structures;

C. durability requirements and Maintenance consequences from water inflows; and

D. treatment and discharge requirements of any water inflows.

(ii) Project Co shall ensure that the Work causes no adverse impact on available water for groundwater dependent ecosystems and existing groundwater users, including any impact on the surface water flows of any existing watercourses, the existing use of groundwater resources and deterioration of vegetation within or adjacent to the Lands.

(iii) Permanent underground linings shall be designed for groundwater pressures as derived from the above hydrogeological modeling, where required to be undrained, and shall account for the 100 year flood level requirements, whichever governs the Design.

d) Where groundwater control is essential to successfully completing and maintaining excavations, the necessary piezometric levels to be achieved at each stage of the Work shall be determined. Adequate monitoring of groundwater pressures to verify the adequate performance of the groundwater control system shall be incorporated in the

Design and implemented prior to and during excavation until the permanent Structures or facilities are complete.

e) Project Co shall provide a water treatment system such that release of gases to the atmosphere shall be controlled to meet OHSA requirements and avoid public nuisance from odours.

f) All dewatering systems shall be designed and constructed in accordance with the requirements of this Article and OPSS 517 and 518.

12.12 Subsurface Investigations and Testing Prior to Construction

a) Project Co shall undertake additional subsurface investigations to permit the detailed Design and Construction of the Project as determined to be required by Project Co. Results of investigations shall be provided to the City.

b) All field and laboratory testing shall be carried out in accordance with applicable CSA or ASTM standards.

c) The locations and elevations of all boreholes, test pits, cone penetration tests, and other field testing or sounding locations shall be surveyed and referred to fixed reference points and data. Locations shall be identified using the coordinate system identified in Part 1 Article 4 – Design and Construction Provisions. The vertical and horizontal accuracy of survey readings shall be within 0.1m.

12.13 Protection of Potentially Expansive Shale

a) The shales in the Ottawa area, particularly of the Billings formation, are considered to have a significant swelling potential and this swelling is considered to be caused by the weathering of pyrite which may be present in the shale bedrock and the formation of volumetrically larger gypsum crystals. This swelling occurs when the rock is exposed to moisture and oxygen (i.e., such as when the groundwater level is lowered below the surface of shale bedrock during excavation for Construction works).

b) Project Co shall undertake all reasonable precautions to prevent short and long term expansion of shale.

12.14 Geotechnical Seismic DesignSoil liquefaction, cyclic mobility (or cyclic softening), ground movements associated with soil liquefaction or cyclic mobility, increases in lateral earth pressure, settlement and soil structure interaction effects due to seismic events shall be accounted for in the design.

ARTICLE 13 ARTWORK

13.1 General Requirements

a) The purpose of this article is to outline the process for the implementation of the OLRT Art Program.

b) Project Co shall protect existing artwork located within or in the vicinity of the existing BRT west of existing Bayview Station.

c) The OLRT Art Program includes integrated artwork and non-integrated artwork.

d) Integrated artwork includes art/art projects that are linked and/or integrated into the architectural and/or landscape Design of Station elements.

e) Non-integrated artwork includes stand-alone art projects which can be implemented on their own provided the appropriate means of affixing/supporting the artwork is designed and constructed by Project Co.

f) Objectives of the OLRT Art Program

(i) The primary objective of the OLRT Art Program is to enhance the transit riders' experience in utilizing Stations by implementing specific non-integrated and integrated art projects.

(ii) The mandate of the OLRT Art Program is driven by and shall comply with the City of Ottawa's Public Art Policy.

(iii) To ensure that the OLRT Art Program achieves its overall objectives, the City has developed a specific listing of art projects by Station as outlined in Table 1-13.1.

(iv) Project Co shall be responsible for coordinating the implementation of the OLRT Art Program for integrated art and the coordination of the installation of the non-integrated art as outlined in Table 1-13.1 and as outlined in this article.

(v) For Federally Mandated Stations, the location, configuration, and setting for specific art projects has been proposed by the City and is reflected in the Federally Mandated Station Drawing Package.

(vi) The final location and setting of the art projects are to be resolved between the artist and Project Co.

13.2 Implementation of Art Budget

a) Project Co shall contract with and pay the artists on the integrated projects with funding provided by the City and allocated according to the Public Art Budget. While the overall art budget is fixed, the budget for individual art projects is subject to change.

b) Project Co shall be responsible for the base costs to architecturally finish Federally Mandated Stations and other Stations in accordance with Schedule 15-2 Part 5 – Design and Construction Requirements – Stations.

c) Project Co shall be responsible for the cost of installing non-integrated artwork.

d) The City is responsible for funding the incremental cost/budget to implement the specified art projects identified in Table 1-13.1 including being responsible for the following incremental costs to implement art over and above standard Station finishes:

(i) The incremental cost to implement the specified integrated art projects and the cost of the non-integrated projects excluding installation and support requirements respecting the overall art budget;

(ii) The Design fees for artists;

(iii) The cost for the artist to develop drawings/specifications in cooperation with Project Co to implement the art projects;

(iv) The cost for the artist to produce any artwork as part of the Construction Documents or as part of the fabrication/installation of the artwork;

(v) The costs associated with the adjudication for the pre-selection of artists of integrated and non-integrated artwork; and

(vi) Except for the cost to affix/support non-integrated art, the City is responsible for the costs associated with non-integrated art.

13.3 Responsibilities for OLRT Art Program

a) Project Co

(i) Project Co shall be responsible for the integration of art into all Stations including the following:

A. The hiring of a Public Art Manager

i. The Public Art Manager shall have:

1 Minimum of five (5) years' experience managing public art projects;

2 Successfully completed a minimum of three (3) outdoor public art commissions in urban environments, minimal capital value of each project: $150,000;

Or

3 Minimum five (5) years experience working on complex urban development projects that included a public art program.

ii. The Public Art Manager shall:

1 Be familiar and ensure compliance with the City's public art program policies and procedures;

2 Coordinate all aspects of Project Co's participation and deliverables of the OLRT Art Program;

3 Liaise with the OLRT art consultant and the City's public art department to ensure successful delivery of the OLRT Art Program;

4 Liaise with the Algonquin art liaison on the art projects for Lebreton Station;

5 Ensure fair and equitable involvement of artists on the Project; and

6 Coordinate the design and review process for the art program as outlined in Schedule 10 – Review Procedure.

B. In collaboration with the artist, developing integrated art concepts for each Station consistent with the budget available for the incremental cost of each integrated project;

C. Coordinating with the artist to resolve aesthetic issues between the artist and Project Co on integrated projects;

D. The procurement of the artists from Table 1-13.2 – Prequalified List of Artists for Integrated Art Projects ;

E. The execution of agreements between the individual artists and Project Co;

F. Providing detailed reports on payments to individual artists for work performed for reimbursement from the City;

G. The substitution of standard architectural finishes in Stations in favour of the specified art projects designed by the artist;

H. Coordination and integration of the art projects into the overall Station architectural finishes to ensure complete integration from a design, specification, and Construction perspective;

I. The review of the artist's concepts and providing comments to the artist on:

i. Constructability;

ii. Suitability of materials;

iii. Safety/security issues;

iv. Maintainability; and

v. Rough order of magnitude design/Construction costs of art concepts and assisting the artist in finding alternative solutions to Design and construct the artwork within the City budget for art projects;

J. Submitting artwork to, and responding to comments from, the Design review process;

K. Maintenance of the integrated and non-integrated art projects;

L. All approvals for concept and final Design of art projects in accordance with Schedule 10 – Review Procedure; and

M. The artist shall be responsible for the following components of the art program:

i. In collaboration with Project Co, developing integrated art concepts for each Station consistent with the budget available for the incremental cost of each integrated project;

ii. Coordinating with Project Co to resolve aesthetic issues between the artist and Project Co on integrated projects; and

iii. Assisting Project Co, as required, in the integration of art drawings/specifications into Construction Documents.

b) The City

(i) The City will be responsible for the following with respect to the implementation of the art projects.

A. The prequalification of artists no later than two months prior to Financial Close;

B. The establishment of the art projects to be implemented by Station (consistent with Table 1-13.1);

C. Ensuring that the overall budget for the incremental cost of the art program is not exceeded. Information related to the budget is provided in Table 1-13.3; and

D. The manufacture and supply of non-integrated art projects.

13.4 Process for Selection and Assignment of Artists to Individual Art Projects

a) In a collaborative and consultative process, individual artists shall be selected by Project Co to work on each individual art project outlined in Table 1-13.1.

13.5 Review Process for Art Projects

a) As part of the review process outlined in Schedule 10 – Review Procedure, Project Co shall be responsible for submitting three-dimensional renderings as integrated into the station design, drawings, specifications and material samples for integrated projects including the following:

(i) Overview of art concept;

(ii) Location/setting of art project;

(iii) Integration details;

(iv) Implications for other disciplines/agencies;

(v) Itemized pricing for each integrated art project; and

(vi) Comments concerning safety, maintainability, cost, suitability of materials, constructability and any other matter that affects the sustainability of the Project over its intended life.

13.6 Maintenance of Artwork (Integrated and Non-Integrated)

a) Project Co shall:

(i) Clean and maintain all artworks in the OLRT art program in accordance with an annual Maintenance schedule as part of the overall Station Maintenance program;

(ii) Consult every five (5) years, or as required due to damage, with a professional conservator to provide a condition report on each art project;

(iii) Take any necessary action to mitigate any recommendations within these condition reports; and

(iv) Provide overstock on art materials at the time of installation and fabrication of artwork, where applicable, in order to assist in the long-term Maintenance of art projects.

13.7 Description of Art Projects

a) For further clarification of the art projects outlined in Table 1-13.1, the following describes the scope of the individual art projects.

(i) Integrated Projects

A. Roof and Windscreens Projects

i. The roof and windscreens artwork has been conceived to allow artists to participate in the Design of the most visible components of the architecture of the Stations. This artwork allows for a broad range of artistic expression; variations in artworks will allow each Station to be unique from one another while providing a consistent architectural element for artistic expression.

ii. Participating Stations

1 Tunney's Pasture (windscreen combined with benches), Bayview, Lebreton (windscreens only), Campus, Lees, Hurdman, Train (includes covered walkway), Cyrville, Blair.

iii. Artwork Locations for Federally Mandated Stations

1 Refer to the Federally Mandated Station Drawing Package.

iv. Role of Project Co

1 Project Co shall cooperatively collaborate with the Artist to develop integrated artwork into the roof and windscreens of the Stations.

2 Project Co shall coordinate all components of their work to include the Construction and implementation of the integrated artwork.

v. Artist Allocation

1 Each artist shall work on a maximum of one (1) Station. Artworks shall be substantially different between Stations. The Windscreen project for Lebreton Station shall be in collaboration with an artist from the Algonquin community.

2 Artists for the roof and windscreen projects shall be selected from the list of pre-qualified artists for integrated projects.

vi. Technical Specifications

1 Artworks shall respect considerations of public safety and shall be constructed of materials that are appropriate to continuous public display, are durable and resistant to vandalism and to repetitive cleaning.

2 Artworks shall be structurally sound.

3 Artworks shall not have any complex mechanical or electronic devices directly associated with the artwork.

B. Landscape Projects

i. The integrated landscape artworks have been considered for three (3) Stations that lend themselves to this type of project. These site-specific landscape artwork integrations shall address space, object, and pedestrian movement. Maximizing public access and visibility of the artwork integrations are important considerations for the success of these projects.

ii. Participating Stations

1 Lebreton, Cyrville, Bayview

iii. Artwork Locations for Federally Mandated Stations

1 Refer to Federally Mandated Stations drawing Package.

iv. Role of Project Co

1 Project Co shall cooperatively collaborate with the artist and landscape designer to develop integrated landscape artworks.

2 Project Co shall coordinate all components of their work to include the Construction and implementation of the integrated landscape artworks.

v. Artist Allocation

1 Each artist shall work on one (1) landscape art integration for each of Cyrville and Bayview Stations.

2 The integrated landscape artwork for Lebreton Station shall involve collaboration with an artist from the Algonquin community.

3 The artists for landscape projects shall be selected from the list of pre-qualified artists for integrated projects.

vi. Technical Specifications

1 Integrated landscape artworks shall respect considerations of public safety and shall be constructed of hard and soft landscaping materials that are appropriate to continuous public display, are durable, require minimal Maintenance and are resistant to vandalism.

C. Walls and Tunnels

i. Artworks for walls and Tunnels shall consider space and pedestrian movement, as well as surface, in their Design.

ii. Participating Stations

1 Walls: Lebreton, Downtown West, Downtown East, St. Laurent, Rideau

2 Tunnel: Downtown West

iii. Artwork Locations for Federally Mandated Stations

1 Refer to Federally Mandated Station Drawing Package

iv. Role of Project Co

1 Project Co shall cooperatively collaborate with the Artist to develop integrated artwork(s) into the Platform walls and Tunnels of the participating Stations.

2 Project Co shall coordinate all components of their work to include the Construction and implementation of the integrated artwork(s).

v. Artist Allocation

1 Each artist shall work on a maximum of one (1) Station.

2 Artists for the wall and Tunnel projects shall be selected from the list of pre-qualified artists for integrated art projects.

3 The integrated wall project at Lebreton Station shall involve collaboration with an artist from the Algonquin community

vi. Technical Specifications

1 Artworks shall respect considerations of public safety and shall be constructed of materials that are appropriate to continuous public display, are durable and resistant to vandalism and to repetitive cleaning.

2 Artworks shall be structurally sound.

3 Artworks shall not have any complex mechanical or electronic devices directly associated with the artwork.

D. Rideau Station Escalator Chambers, non-fare paid underground connector and entry Structures

i. The walls of the escalator chambers can be considered by the artist recognizing that the Structure that will define the art opportunity is the responsibility of Project Co and not the artist. Perception of the artwork as transit Passengers move vertically shall be considered.

ii. The non fare paid underground connector crossing Rideau Street can be considered by the artist recognizing that the Structure that will define the art opportunity is the responsibility of Project Co and not the artist.

iii. In the event that Project Co constructs an entrance within the William Street right of way, the entrance structure and elevator enclosures can be considered by the artist recognizing that the Structure that will define the art opportunity is the responsibility of Project Co and not the artist.

iv. Role of Project Co

1 Project Co shall cooperatively collaborate with the Artist to develop integrated artwork(s) into the escalator chambers within Rideau Station.

2 Project Co shall cooperatively collaborate with the Artist to develop integrated artwork(s) into the non fare paid underground connector at Rideau Station.

3 Project Co shall cooperatively collaborate with the Artist to develop integrated artwork(s) into the entrance structures to the stair/escalator enclosures and elevator enclosures at Rideau Station.

4 Project Co shall coordinate all components of their work to include the Construction and implementation of the integrated artwork(s).

v. Artist Allocation

1 One artist or artist team shall work on this project.

2 Artists for the Rideau Station escalator chamber, non fare paid underground connector and entry structures shall be selected from the list of pre-qualified artists for integrated projects.

vi. Technical Specifications

1 Artworks shall respect considerations of public safety and shall be constructed of materials that are appropriate to continuous public display, are durable and resistant to vandalism and to repetitive cleaning.

2 Artworks shall be structurally sound and reflect the architectural space defined by others.

3 Artworks shall not have any complex mechanical or electronic devices directly associated with the artwork, other than illumination.

(ii) Non-Integrated Projects

A. Benches

i. There shall be two (2) artist-designed benches installed on the Platform at each Station. Benches shall be of dimensions similar to typical park-style benches but shall vary from bench to bench.

ii. Participating Stations

1 All Stations except for those Stations where the installation of the bench would cause the platform to be of insufficient dimension to meet passenger volume requirements or would create a condition that compromises public safety.

iii. Project Drawings Artwork Locations for Federally Mandated Stations

1 Refer to Federally Mandated Station Drawing Package.

iv. Role of Project Co

1 Project Co shall prepare locations for the receipt of the art benches,

2 Project Co shall install art benches, at specific locations on Station Platforms as per consultation with the City.

v. Artist Allocation

1 Artists for benches shall be selected from the list of pre-qualified artists for non-integrated art projects.

2 The bench artwork project for Lebreton Station shall involve collaboration with an artist from the Algonquin community.

vi. Technical Specifications

1 Project Co shall install art benches in a permanent manner, using corrosion-resistant, high strength fasteners.

B. Signbox Program

i. The signbox program will provide illuminated sign boxes for the display of two-dimensional artworks. Signboxes will be the same as those used in transit shelter advertising programs and shall be integrated into the Station Design. Artworks shall be rotated on a quarterly basis. The City will coordinate the rotation of the artworks.

ii. Participating Stations

1 Downtown East, Hurdman, Train, Blair, Campus (digital media screen).

iii. Artwork Locations for Federally Mandated Stations

1 Refer to Federally Mandated Station Drawing Package

iv. Role of Project Co

1 Signboxes will be supplied by others. There shall be three (3) signboxes installed at Downtown East, Hurdman, Train and Blair Stations. In addition, Campus Station will involve a digital media screen.

2 Project Co shall provide electrical conduits, power supply and electricity to the signboxes and media screen.

v. Artist Allocation

1 Artists for the signbox project shall be selected from the list of pre-qualified artists for non-integrated projects.

vi. Technical Specifications

1 Project Co shall install signboxes and media screen in a permanent manner, using corrosion-resistant, high strength fasteners.

2 Electrical specifications for signboxes and media screen to be provided at later date. Signboxes and media screen shall meet appropriate safety standards.

C. Lebreton Station Gate

i. There shall be one (1) artist-designed gate installed at the Platform level entrance to the Station.

ii. Participating Stations

1 Lebreton

iii. Artwork Locations for Federally Mandated Stations

1 Refer to Federally Mandated Station Drawing Package

iv. Role of Project Co

1 Project Co shall prepare locations for the receipt of the gate.

2 Project Co shall install gate.

v. Artist Allocation

1 Artists for the Lebreton Station Gate project shall be selected from the list of pre-qualified artists for non-integrated projects.

2 This project shall involve collaboration with an artist from the Algonquin community.

vi. Technical Specifications

1 Project Co shall install gate in a permanent manner, using corrosion-resistant, high strength fasteners.

D. Lantern

i. The Lantern artwork is an opportunity for artists to work on a highly visible artwork that will provide amenity to Lebreton Station patrons.

ii. Participating Stations

1 Lebreton

iii. Artwork Locations for Federally Mandated Stations

1 Refer to Federally Mandated Station Drawing Package

iv. Role of Project Co

1 Project Co shall prepare the lantern for the receipt of the artists' panels.

2 Project Co shall install the artists' panels.

3 Project Co shall provide electrical conduits, power supply and electricity to the Lantern.

v. Artist Allocation

1 Artists for the Lantern project shall be selected from the list of pre-qualified artists for non-integrated projects.

2 This project shall involve collaboration with an artist from the Algonquin community.

vi. Technical Specifications

1 Artworks shall respect considerations of public safety and shall be constructed of materials that are appropriate to continuous public display, are durable and resistant to vandalism and to repetitive cleaning.

2 Artworks shall be structurally sound.

3 Artworks shall not have any complex mechanical or electronic devices associated with the artwork other than the required illumination of the Lantern.

Table 1-13.1 – OLRT Artworks by Station

Station	Roof & Screen	Landscape	Wall&/ or Tunnel	Escalator, Non Fare paid Underground Connector and Entry	Benches	Signbox	Gate	Lantern
Tunney's Pasture	●				●			
Bayview	●	●			●	●		
Lebreton	●	●			●		●	●
Hurdman	●				●	●		
Train	●				●	●		
Downtown West			●		●			
Downtown East			●		●	●		
Rideau			●	●	●			
Campus	●				●	●		
Lees	●				●	●		
St. Laurent			●		●			
Cyrville	●	●			●			
Blair	●				●			

Table 1-13.1 Legend

Upper Left Quadrant: Integrated Projects – Federally Mandated Stations

Upper Right Quadrant: Non-Integrated Projects – Federally Mandated Stations

Lower Left Quadrant: Integrated Projects – Non- Federally Mandated Stations

Lower Right Quadrant: Non-Integrated Projects – Non- Federally Mandated Stations

Table 1-13.2 – Pre-qualified List of Artists for Integrated Art Projects

[●]

Table 1-13.3 – Preliminary OLRT Art Budget by Project

Preliminary OLRT Art Budget by Project					
Project	**Station**	**Capital Amount**	**Design Fees**	**Production Fees**	**Notes**
Roof & Screen	Tunney's Pasture	400,000	50,000	25,000	Bench and screen combined
Integrated	Bayview	400,000	50,000	25,000	
	Lebreton	400,000	50,000	25,000	Wall & Screens
	Campus	700,000	50,000	25,000	
	Lees	350,000	50,000	25,000	Bike Rail
	Hurdman	350,000	50,000	25,000	
	Train	300,000	50,000	25,000	Roof and Covered Walkway and/or screen
	Cyrville	350,000	50,000	25,000	
	Blair	350,000	50,000	25,000	
	4,275,000	3,600,000	450,000	225,000	
Escalator Chambers, Non Fare Paid Underground Connector and Entry Structures Integrated					
	Rideau	350,000	50,000	50,000	
	450,000	350,000	50,000	50,000	
Tunnel & Platform Walls Integrated	Downtown West	250,000	50,000	25,000	
	Downtown East	250,000	50,000	25,000	Platform Walls
	Rideau East	250,000	50,000	25,000	Platform Walls
	St. Laurent	250,000	50,000	25,000	Wall only
	1,300,000	1,000,000	200,000	100,000	
Lantern Non-integrated	Lebreton	250,000	50,000	0	
	300,000	250,000	50,000	0	
Ceremonial Gate Non-integrated	Lebreton	200,000	50,000	0	

Preliminary OLRT Art Budget by Project					
Project	**Station**	**Capital Amount**	**Design Fees**	**Production Fees**	**Notes**
	250,000	200,000	50,000	0	
Landscape Integrated	Lebreton	225,000	50,000	0	
	Cyrville	150,000	50,000	0	
	Bayview	225,000	50,000	0	
	750,000	600,000	150,000	0	
Benches	Tunney's Pasture	30,000	10,000		Bench and Screen
Non-Integrated (2 per station)	Bayview	20,000	10,000		
	Lebreton	20,000	10,000		
	Downtown West	20,000	10,000		
	Downtown East	20,000	10,000		
	Rideau	20,000	10,000		
	Campus	20,000	10,000		
	Lees	20,000	10,000		
	Hurdman	20,000	10,000		
	Train	20,000	10,000		
	St. Laurent	20,000	10,000		
	Cyrville	20,000	10,000		
	Blair	20,000	10,000		
	400,000	270,000	130,000		
Signbox	Downtown East	15,000			
	Campus	80,000			
Non-integrated (3 per station)	Hurdman	15,000			
	Train	15,000			
	Blair	15,000			
	140,000	140,000			
Future Art Project Non-Integrated	To be Determined	150,000	25,000		
	175,000	150,000	25,000		
ART COST SUBTOTAL		6,560,000	1,105,000	375,000	

ARTICLE 14 CORROSION CONTROL

14.1 General Requirements

a) The Design and Construction of corrosion control work shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) UIC605OR – Protection from Corrosion;

(ii) EN 50162:2000 – Railway Applications;

(iii) CSA C22.3 No. 4-1974(R1995) Control of Electromechanical Corrosion of Underground Metallic Structures;

(iv) ACI Publication SP-77 Sulphate Resistance of Concrete;

(v) ACI Publication 201.2R Guide to Durable Concrete;

(vi) ACI Publication 222R Protection of Metals in Concrete Against Corrosion;

(vii) ACI Publication 506.2 Below Grade Shotcrete Used as Permanent Support;

(viii) ASTM G-51, D-516, C 452-75;

(ix) AWWA Standard C105;

(x) NACE Standards: SP0169 Control of External Corrosion on Underground and Submerged Metallic Piping Systems, SP0187 Design Considerations for Corrosion Control of Reinforcing Steel in Concrete, SP0290 Design Considerations for Corrosion Control of Reinforcing Steel in Atmospherically Exposed Concrete Structures;

(xi) TCRP Report No. 57 Track Design Handbook for Light Rail Transit Chapter 8, Corrosion Control;

(xii) CSA C22.1-09 Canadian Electrical Code Part I Safety Standard for Electrical Installations;

(xiii) CSA C22.2 Canadian Electrical Code Part II General Requirements; and

(xiv) Ontario Electrical Code.

14.2 Operational Requirements

a) Grounding of all Structures and equipment shall meet the requirements for protection of the public as described in IEC 62128-1.

b) A NACE certified corrosion specialist with a certification in cathodic protection shall serve as the responsible professional and shall approve and coordinate all elements of the corrosion mitigation measures for the OLRT.

c) Soil Corrosion Control

(i) Soil corrosion Control requirements apply to systems or measures installed to mitigate corrosion caused by soil, rock and groundwater.

(ii) Project Co shall be responsible to obtain adequate soil/rock samples and ground water samples in areas of anticipated extensive below grade Construction. The soil/rock samples shall be analyzed for resistivity (or conductivity), moisture content, pH, chloride and sulphate ion concentrations and for the presence of sulphides.

(iii) Structures shall be protected against environmental conditions by the use of coatings, insulation, cathodic protection, electrical continuity, or a combination of the preceding, as appropriate.

d) Stray Current Corrosion Control

(i) Stray current corrosion control minimum requirements apply to measures installed with the Traction Power system and trackwork to assure that stray earth traction currents do not exceed maximum acceptable levels. These levels are based on system characteristics and the characteristics of underground Structures.

(ii) These minimum requirements also apply to measures installed with fixed facilities, and to facilities belonging to others. They are based on anticipated stray earth traction current levels and the characteristics of fixed facilities and other buried Structures.

(iii) A baseline survey shall be performed to post-Construction and pre-energization to establish the reference levels of stray current existing prior to energization of the OLRT.

(iv) The proponent shall provide continuous track to ground current monitoring to detect any stray current faults.

e) Atmospheric Corrosion Control

(i) Atmospheric corrosion control requirements apply to systems or measures installed to mitigate corrosion caused by local climatological conditions including

condensation, temperature cycling, industrial and vehicle emissions, spray by motor vehicles and snow and air pollutants.

(ii) The requirements to be applied to all areas where atmospheric corrosion may be anticipated, are selection of materials of proven durability, protective coatings both barrier and sacrificial, sealants to prevent moisture intrusion and prohibiting the use of dissimilar metals.

(iii) Project Co shall ensure that the electrical insulation design is not affected by the contamination from adjacent road de-icing or dust suppression, which includes but may not be limited to the following compounds:

A. Sodium Chloride (NaCl);

B. Calcium chloride (CaCl2);

C. Magnesium chloride (MgCl2);

D. Potassium chloride (KCl);

E. Brines used in road de-icing/salting; and

F. The salt portion of abrasive mixtures and additives commonly used in road salts (ferrocyanides).

f) Coatings

(i) Coatings specified for corrosion control of buried metallic or concrete facilities shall satisfy the following requirements:

A. Minimum thickness as recommended for the specific system, but not less than 380 microns;

B. A chemical or mechanical bond to the metal or concrete surface; Pressure-sensitive systems shall not be accepted; non-bonding systems may be used in special instances, after review;

C. Minimum 5-year performance record for the intended service;

D. Mil application wherever possible, with field application of a compatible system; and

E. Mechanical characteristics capable of withstanding installation abuse during handling and earth pressure after installation for the Design Life of the system.

g) Electrical Insulation of Piping

(i) Devices used for electrical insulators for corrosion control shall include non-metallic inserts, insulating flanges, couplings, unions, and/or concentric support spacers.

(ii) Devices shall meet the following requirements:

A. A minimum resistance of 10 megohms prior to installation;

B. Sufficient electrical resistance after insertion into the operating piping system such that no more than 2 percent of a test current applied across the device flows through the insulator, including flow through conductive fluids if present;

C. Mechanical and temperature ratings equivalent to the Structure in which they are installed;

D. Internal coating (except complete non-metallic units) with a polyamide epoxy for a distance on each side of the insulator equal to two times the diameter of the pipe in which they are used. Where conductive fluids with a resistivity of less than 2,000 ohm-centimeters are present, internal coating requirements shall be based on separate evaluation;

E. Devices (except non-metallic units) buried in soils shall be encased in a protective coating;

F. Devices (except non-metallic units) installed in chambers or otherwise exposed to partial immersion or high humidity shall have a protective coating applied over the components;

G. Inaccessible insulating devices, such as buried or elevated insulators, shall be equipped with accessible permanent test facilities;

H. In the event that construction of the OLRT disturbs or affects an existing grounding system, Project Co shall be responsible for the reinstatement or modification of the system equal to the pre-existing conditions.

(iii) A minimum clearance of 300mm shall be provided between new and existing metallic structures. When conditions do not allow a 300mm clearance, the Design shall include special provisions to prevent electrical contact with existing Structure(s).

h) Electrical Continuity of Piping

(i) Electrical continuity shall be provided for the non-welded metallic pipe joints and shall meet the following requirements:

A. Use of direct burial, insulated, stranded, copper wire with the minimum length necessary to span the joint being bonded; and

B. Wire size shall be based on the electrical characteristics of the structure and resulting electrical network to minimize attenuation and allow for cathodic protection.

(ii) A minimum of two wires shall be used per joint for redundancy.

i) Cathodic Protection

(i) Cathodic protection shall be accomplished by sacrificial galvanic anodes to minimize corrosion interaction with other underground Utilities. Impressed current systems shall be used only when the use of sacrificial systems is not technically and/or economically feasible. Cathodic protection schemes that require connection to the transit System negative return system, in lieu of using a separate isolated anode groundbed, shall not be permitted.

(ii) Cathodic protection system Design shall be based on theoretical calculations that include the following parameters:

A. Estimated percentage of bare surface area (minimum 1 percent);

B. Cathodic protection current density;

C. Estimated current output per anode;

D. Estimated total number of anodes, size, and spacing;

E. Minimum anode life of 30 years; and

F. Estimated anode groundbed resistance.

i. Impressed current rectifier systems shall be capable of operating in constant voltage, constant current or potential control mode. Rectifiers shall be rated at a minimum of 50 percent above calculated operating levels to overcome a higher-than-anticipated anode groundbed resistance, lower-than-anticipated coating resistance, or presence of interference mitigation bonds. Other conditions which may result in increased voltage and current requirements shall be considered.

ii. Test facilities consisting of a minimum of two structure connections, one reference electrode connection, conduits and termination boxes shall be designed to permit initial and periodic testing of cathodic protection levels, interference currents, and system components (anodes, insulating devices, and continuity bonds). The designer shall specify the locations and types of test facilities for each cathodic protection system.

j) Structures and Facilities

(i) The following paragraphs establish the protective measures to be considered for specific underground Utilities and buried Structures.

A. Ferrous Pressure Piping

i. All new buried cast iron, ductile iron, and steel pressure piping shall be cathodically protected. System Design shall satisfy the following minimum requirements:

B. Application of a protective coating to the external surface of the pipe;

C. Electrical insulation of pipe from interconnecting pipe, other Structures and segregation into discrete electrically isolated sections depending upon the total length of piping;

D. Electrical continuity through the installation of copper wires across the mechanical pipe joints other than intended insulators; and

E. Permanent test/access facilities to allow for verification of electrical continuity, electrical effectiveness of insulators and coating, and evaluation of cathodic protection levels, installed at the insulated connections. Additional test/access facilities shall be installed at intermediate locations, at intervals determined on an individual Structure basis.

i. Number and location of anodes and size of rectifier (if required) shall be determined on an individual Structure basis.

F. Copper Piping

i. Buried copper pipe shall be electrically isolated from non-buried piping, such as that contained in a Station Structure, through use of an accessible insulating union installed where the piping enters through a wall or floor. Pipe penetrations through walls and floors shall be electrically isolated from building structural elements. The insulator shall be located inside the Structure and not buried.

G. Gravity Flow Piping

i. Corrugated steel piping shall be internally and externally coated with a sacrificial metallic coating and a protective organic coating.

ii. Cast or ductile iron piping shall be designed and fabricated to include the following provisions:

1 An internal mortar lining with a bituminous coating on ductile iron pipe only (not required for cast iron soil pipe);

2 A bonded protective coating on the external surfaces in contact with soils;

3 An unbounded dielectric encasement shall not be allowed; and

4 A bituminous mastic coating on the external surfaces of pipe 150mm on each side of a concrete/soil interface.

iii. Reinforced concrete non-pressure piping shall include the following provisions:

1 Water/cement ratios meeting the minimum provisions of applicable codes; and

2 Maximum 250 ppm chloride concentration in the total concrete mix.

H. Electrical Conduits

i. Buried metallic conduits shall include the following provisions:

1 Galvanized steel with PVC or other coating acceptable for direct burial, including couplings and fittings. The PVC coating is not required when conduits are installed in concrete.

ii. Electrical continuity through use of standard threaded joints or bond wires installed across non-threaded joints.

k) Hydraulic Elevator Cylinders

(i) Steel hydraulic elevator cylinders shall be designed, fabricated and installed to meet the following requirements:

A. External protective coating resistant to deterioration by petroleum products;

B. Outer concentric FRP casing. Casing thickness, diameter and resistivity shall be designed to prevent moisture intrusion (including the bottom) and to maximize electrical insulation between the cylinder and earth;

C. Sand fill between the cylinder and FRP casing with a minimum resistivity of 25,000 ohm-centimeters, a pH of between 6 and 8 and a maximum chloride content of 250 ppm;

D. Cathodic protection through the use of impressed current with the anodes installed in the sand fill; and

E. Permanent test facilities installed on the cylinder, anodes and earth reference to permit evaluation, activation, and periodic retesting of the protection system.

(ii) Removable moisture-proof sealing lid installed on the top of the casing prior to installation of the cylinder. The top of the casing shall be permanently sealed against moisture intrusion after installation of the cylinder.

l) Buried Concrete/Reinforced Concrete Structures

(i) The Design of cast-in-place concrete Structures shall be based on the following provisions:

A. Use Type I cement. ASTM C452-75 and ACI Publication SP-77 *Sulfate Resistance of Concrete* shall be used as guidelines for evaluating the sulphate resistance of concrete mixes with non-standard cement types;

B. Water/cement ratio and air entrainment admixture in accordance with the structural requirements to establish a dense, low permeability concrete. Refer to applicable sections of ACI 201.2R *Guide to Durable Concrete*;

C. Maximum chloride concentration of 250 ppm in the total mix (mixing water, aggregate, cement, and admixtures). The concrete mix shall be such that the water soluble and acid soluble chloride concentrations, at the concrete/ reinforcing steel interface, do not exceed 0.15 and 0.2 percent by weight of cement, respectively, over the life of the Structure. Refer to applicable sections of ACI 222R *Corrosion of Metals in Concrete*;

D. Concrete cover over reinforcing steel shall comply with appropriate codes and provide a minimum of 50mm of cover on the soil/rock side of reinforcement when pouring within a form and a minimum of 75mm of cover when pouring directly against soil/rock; and

E. The need for additional measures, as a result of localized special conditions, shall be determined on an individual basis.

(ii) Precast standardized facilities, such as vaults and maintenance holes, shall be reviewed on an individual basis to determine alternative requirements when they cannot be practically modified to meet some or all of the requirements herein.

(iii) Precast segmented concrete ring Construction shall meet the requirements of this Article or be reviewed on an individual basis to determine alternative requirements when they cannot be practically modified to meet some or all of the provisions specified.

m) Support Pilings

(i) The following is applicable only to support piling systems which are to provide permanent support. Pilings used for temporary support do not require corrosion control provisions.

(ii) Designs based on the use of metallic supports exposed to the environment, such as H or soldier piles, shall include the use of a barrier coating. The need for special measures, such as cathodic protection, shall be determined on an individual basis, based on type of Structure, analysis of soil borings for corrosive characteristics and the degree of anticipated structural deterioration caused by corrosion.

(iii) Reinforced concrete piling, including fabrications with prestressed members, shall be designed to meet the following minimum requirements:

A. Water/cement ratio and cement types in accordance with applicable codes;

B. Chloride restrictions for concrete with non-prestressed members shall be in accordance with applicable codes;

C. Chloride restrictions for concrete with prestressed members shall be in accordance with applicable codes, with exception that the concrete mix shall be such that the water soluble and acid soluble chloride concentrations, at the concrete/prestressed steel interface, do not exceed 0.06 and 0.08 percent by weight of cement, respectively, over the life of the Structure; and

D. A minimum of 75mm of concrete cover over the outermost reinforcing steel, including prestressing wires, if present.

(iv) Concrete-filled steel cylinder columns, where the steel is an integral part of the load bearing characteristics of the support structure, shall be designed considering the need for special measures, such as increased cylinder wall thickness, external coating system, and/or cathodic protection. The Design shall be determined on an individual basis, based on type of Structure, analysis of soil borings for corrosive characteristics and the degree of anticipated structural deterioration caused by corrosion.

n) Stray Current Corrosion Control

(i) This section provides requirements for designs to minimize the corrosive effect of stray earth traction currents from transit operations on transit Structures and Adjacent Structures.

(ii) Stray current control shall reduce or limit the level of stray currents at the source, under normal operating conditions, rather than trying to mitigate the corresponding effects (possibly detrimental) which may otherwise occur on transit facilities and other underground Structures. The basic requirements for stray current control are as follows:

A. Maximize the isolation of the electrical systems and prevent inadvertent electrical connections between the positive and negative Traction Power distribution circuits and ground; and

B. Design the Traction Power System and trackwork to minimize stray earth currents during normal revenue operations.

o) Traction Power System

(i) Traction Power supply System shall be designed as a dedicated system, providing power to the LRT System. The Traction Power supply System for the LRT shall be designed electrically isolated.

(ii) TPSS shall be spaced at intervals such that maximum track-to-earth potentials do not exceed 50 volts during normal operations and 70 volts during contingency operation as defined in Part 4 Article 2 – Traction Power.

(iii) Substations shall be provided with access to the dc negative bus for stray current monitoring. Access shall be provided either inside, through use of dedicated space if available, or outside through the use of a weather tight enclosure with an open conduit between the enclosure and the dc negative bus.

(iv) Substations shall be provided with a Utility drainage panel(s) for connection of Utility drain cables if deemed necessary. The drainage panels shall be connected through a raceway system to a drainage pullbox exterior to the substation to facilitate Utility interconnection.

(v) Provisions shall be included to monitor track-to-earth potentials on a continuous basis at traction power substations.

p) Positive Distribution System

(i) Positive distribution system shall be normally operated as an electrically continuous bus, with no breaks, except during Emergency or fault conditions. Intentional electrical segregation of mainline positive distribution systems is the only type of segregation permitted.

(ii) OCS, consisting primarily of support poles, insulators, the contact wire and the messenger wire, shall be designed to meet the following minimum requirements and include the following minimum provisions:

A. Discrete grounding of individual at-grade support poles, in lieu of interconnecting poles to each other or to a common ground electrode system. Establish electrical continuity of reinforcing steel in OCS support poles and electrically connect support poles to the foundation reinforcing steel; and

B. Common grounding of support poles on aerial structures through electrical connection to either bonded (welded) reinforcing steel in the deck or to each other and a common ground electrode system, when present.

q) Negative Return System

(i) Running Rails. The mainline, including special trackwork, and grade crossings shall be designed to have a minimum, uniformly distributed, in-service resistance to earth per 300 m of Track (two rails) (based on 115# rail resistance) as determined by the following:

A. A computerized simulation shall be used to determine the level of stray current to be permitted and the required Track to earth resistances;

B. Soil layer resistivity (ASTM G-57) along the entire Alignment shall be used in the above simulation to determine anticipated earth potential gradients; and

(ii) The requirements shall be met through the use of appropriately designed insulating Track fastening devices, such as insulated tie plates, insulated rail clips, direct fixation fasteners, rail boots, or other approved methods.

(iii) Ballasted Track Construction shall meet the following minimum provisions:

A. Use of a hard rock, non-porous, well drained ballast material;

B. A minimum 25mm clearance between the ballast material and the metallic surfaces of the rail and metallic Track components in electrical contact with the rail;

C. Mainline Track shall be electrically insulated;

D. Mainline Track shall be electrically insulated from foreign railroad connections (sidings) by use of insulating rail joints. Location of the insulating joints shall be chosen to reduce the possibility of a vehicle bridging the insulator(s) for a time period larger than required moving onto or off mainline;

E. MSF Track shall be electrically isolated from mainline Track;

F. MSF shop Track shall be electrically isolated from yard Track and grounded; and

G. Select grade crossing and Track locations shall utilize permanent reference electrode arrays with test stations for monitoring of stray current activity and evaluating the isolation of Track. The requirements for the use of these earth potential gradient test arrays shall be based upon a case by case review of the Track or grade crossing location, type of Track

Construction, adjacent critical utility Structures and others as deemed appropriate.

(iv) Track-to-earth resistance shall be monitored periodically during Construction to detect variations or decrease in resistance. Investigations shall be initiated as soon as a low resistance reading is obtained and the cause of the low reading repaired.

(v) Ancillary Systems

A. Switch machines, signalling devices, Train to wayside Communication Systems, and other devices or systems attached to the rails shall be electrically isolated from the rails. The requirements shall be met through the use of dielectric materials electrically separating the devices/Systems from the rails.

(vi) Electrical Continuity

A. The running rails shall be constructed as an electrically continuous Traction Power return circuit through use of rail joint bonds, continuously welded rail, or a combination of these, except for the use of insulated rail joints at specific locations. The linear resistance of each individual negative rail shall not exceed 1 ohm per linear 300m of rail at any point along the Tracks.

r) Aerial Trackway Structures

(i) Column and Bearing Assemblies, Tie and Ballast

A. This section applies to aerial structures and Bridges that use a column and bearing assembly, but with tie and ballast Track Construction. Welding of reinforcing steel in the deck is not required for this configuration.

B. A waterproof, electrically insulating membrane (with protection board on top of the membrane) shall be provided over the entire surface of the deck that will be in contact with the ballast. The membrane system shall have a minimum volume resistivity of 1 x 1012 ohm-cm.

C. Electrical isolation of reinforcing steel shall be provided in deck/girders from columns, abutments, and other grounded elements. Isolation can be established through the use of insulating elastomeric bearing pads, dielectric sleeves and washers for anchor bolts and dielectric coatings on selected components. Use of bearings shall take into account the appropriate electrical grounding to ensure that stray current does not pass through the bearing race.

(ii) Bents and Girders, Tie and Ballast

A. This section applies to aerial Structures that use bent type supports with reinforcing steel extending into the deck/girders, but with tie and ballast Track Construction.

B. Provide electrical continuity of the column/bent steel by welding appropriate reinforcing to at least two vertical column bars. Make these connections to each of the two vertical bars at the top and bottom of the column/bent.

C. Provide electrical continuity of the deck longitudinal bars by welding all lap splices.

D. Electrically interconnect column/bent steel to deck/girder steel by welding at least two vertical column bars to collector bars installed at bents.

E. Electrically interconnect column/bent steel to footing steel when column/bent steel penetrates the footing. Weld at least two vertical column/bent bars to footing reinforcing steel.

F. Electrically interconnect pre or post tensioned cables to continuous longitudinal reinforcing steel by welding a cable between each anchor plate and the longitudinal reinforcing steel.

G. Provide test facilities at each hinge and expansion joint and at every other column/bent, starting with the first column/bent from an abutment. Test facilities at hinges and expansion joints shall house bonding cables from adjacent collector bars on each side of the hinge/joint.

H. Facilities at columns/bents shall house two wires from vertical column/bent steel and from the collector bar at the top of the bent.

I. Provide a waterproof, electrically insulating membrane (with protection board on top of the membrane) over the entire surface of the deck that will be in contact with the ballast. The membrane system shall have a minimum volume resistivity of 1 x 1012 ohm-cm.

(iii) Concrete Deck/Exposed Steel, Tie and Ballast

A. This section applies to Bridge Structures that use a reinforced concrete deck with exposed steel superstructure and have insulated trackwork Construction, but with tie and ballast Track Construction. Welding of reinforcing steel in the deck is not required for this configuration.

B. Provide a waterproof, electrically insulating membrane (with protection board on top of the membrane) over the entire surface of the deck that will be in contact with the ballast. The membrane system shall have a minimum volume resistivity of 1 x 1012 ohm-cm.

C. Provide electrical isolation of reinforcing steel in the deck and superstructure steel from columns, abutments and other grounded elements. Isolation can be established through the use of insulating elastomeric bearing pads, dielectric sleeves and washers for anchor bolts and dielectric coatings on selected components.

D. If electrical isolation of reinforcing steel in the deck and superstructure steel from columns, abutments, and other grounded elements cannot be obtained, then electrical continuity of metallic components within these latter elements shall be established by appropriate welding and bonding procedures.

(iv) Retaining Walls

A. The longitudinal bar overlaps in both faces of the wall, including the top and bottom bars in the footing, shall be tack welded to insure electrical continuity. Longitudinal bars in the footing shall be made electrically continuous to the longitudinal bars of the walls. Collector bars, bonding cables and test facilities shall be installed.

s) OCS Pole Foundation Grounding

(i) All metallic components, inclusive of the pole baseplate, that will be partially embedded or come in contact with concrete surfaces shall be coated with a sacrificial/barrier coating. The coating shall be applied to the entire component. The coating shall extend a minimum of 6-inches into the concrete and a minimum of 12.7mm above the surface of the concrete.

(ii) At-Grade OCS Support Poles

A. Electrical continuity of reinforcing steel within support pole foundations shall be established to provide an adequate means for dissipating any leakage current from the contact wire and, where applicable, the messenger wire. The following minimum provisions shall be included with design:

i. The outermost layer of vertical reinforcing steel within the concrete foundation shall be tack welded at the intermediate vertical lap joints and to reinforcing bar collector rings (two) installed at the top and bottom of the reinforcing bar cage;

ii. A copper cable shall be connected between the base of the catenary support pole and the foundation reinforcing steel. The cable shall be thermite welded or brazed to the support pole and routed in such a manner that it shall not be susceptible to damage during Construction or after installation is complete. The connection to

the pole shall be coated with a zinc-rich weather resistant coating material; and

iii. The copper cable shall be sized based upon anticipated fault current and fault clearing time.

(iii) OCS Poles on Aerial Structures

A. OCS poles located on aerial structures shall include either of the following minimum set of provisions, depending on the type of aerial structure.

B. Where the aerial structure includes welded deck reinforcing steel connected to a ground electrode system, electrically interconnect the OCS support poles on the structure and connect these poles to the ground electrode system.

i. Cabling used to interconnect the poles and the ground electrode system shall be sized based upon anticipated fault current and fault clearing time.

ii. The cabling shall be routed in conduit and terminated in junction boxes or test cabinets that also house wires from the deck reinforcing steel and the ground electrode system.

iii. Cabling shall be designed to allow for connection of interconnected OCS poles along the aerial structure to the ground electrode systems installed with a particular aerial structure.

C. Where the aerial structure has welded deck reinforcing steel but does not include a ground electrode system, electrically connect the OCS support poles to the welded deck reinforcing steel.

i. Provide a copper cable from each OCS support pole to the deck reinforcing steel. The copper cable shall be sized based upon anticipated fault current and fault clearing time.

ii. Thermite weld or braze the cable to the OCS support pole and to the nearest transverse collector bar installed in the aerial structure deck.

iii. Where it is not practical to connect an OCS pole directly to a transverse collector bar, because of excessive distance or other factors, connect the pole to a local transverse reinforcing bar using a copper cable and weld the transverse reinforcing bar to at least three upper layer longitudinal reinforcing bars in the deck.

t) Utility Structures

(i) Piping and conduit shall be non-metallic, unless metallic facilities are required for specific engineering purposes

u) Metallic Facilities (Systemwide)

(i) Pressure or non-pressure piping exposed in crawl spaces or embedded in concrete inverts shall not require special corrosion prevention provisions.

(ii) Pressure piping that penetrates foundation, or Station walls shall be electrically insulated from the external piping to which it connects and from watertight wall sleeves. Electrical insulation of interior piping from external piping shall be made on the inside of the foundation or wall.

v) Facilities Owned by Others

(i) Replacement/Relocated Facilities

A. Corrosion control facilities provided for protection of buried Utilities and installed by Project Co as part of OLRT shall become the responsibility of the individual Utility owner/operator following acceptance of the corrosion protection system.

B. Project Co shall protect the buried Utilities including City watermains so that the maximum anodic potential shift caused by dynamic stray currents on any watermain or buried Utility along the OLRT Alignment shall not exceed 50 mV anodic shift from the average baseline value of the voltage time data logger graphs. Monitoring locations of the dynamic potential shifts and stray currents shall be at the discretion of the Utility operators. Project Co shall obtain copies of the sample baseline monitoring charts and information on some of the possible future monitoring locations from the individual Utilities. Such testing shall be performed by a corrosion/cathodic protection specialist. Where the anodic shift exceeds 50 mV, cathodic protection shall be installed by Project Co at all affected areas to mitigate any adverse impact of corrosive stray currents that are induced by the OLRT System.

C. Project Co shall contain City watermains buried under the Guideway to a distance of 3m beyond outside Tracks within a steel casing and install sacrificial anodes and test stations. Watermains requiring relocation by Project Co shall be installed with adequate cathodic protection, coating and test stations.

D. Relocated or replaced Utilities installed by Project Co as part of a separate contractual agreement between Project Co and the Utility, shall be installed in accordance with the Utility owner agreed upon specifications and shall include the following minimum provisions. These provisions are

applicable to ferrous and reinforced concrete pressure piping. Other materials and Structures shall require individual review.

i. Electrical continuity through the installation of insulated copper wires across the mechanical joints for which electrical continuity cannot be assured;

ii. Electrical access to the Utility Structure via test facilities installed; and

iii. The need for additional measures, such as electrical isolation, application of a protective coating system, installation of cathodic protection, or any combination of the preceding, shall be based on the characteristics of the specific Structure and to not adversely affect the existing performance within the environment.

(ii) Existing Utility Structures

A. The need for stray current monitoring facilities shall be jointly determined by Project Co and the individual Utility operators. If utilities have no stray current guidelines, Project Co shall provide direction based on the following:

i. Test facilities at select locations for the purpose of evaluating stray earth current effects during start-up and revenue operations. Guidelines for location of test facilities shall be as follows:

1 At the utility crossings with the system and on Structures parallel to the LRT Tracks; and

2 At locations on specific utility Structures that are near the System TPSS.

(iii) Existing Bridge Structures

A. Stray current corrosion control for existing Bridge Structures shall be addressed by limiting earth current levels at the source (running rails). Meeting the requirements established shall provide the primary stray current control for these facilities.

w) Corrosion control coatings

(i) Coatings shall have established performance records for the intended service and be compatible with the base metal to which they are applied.

(ii) Coatings shall be able to demonstrate satisfactory gloss retention, color retention, and resistance to chalking over their minimum life expectancies.

(iii) Coatings shall have minimum life expectancies, defined as the time prior to major Maintenance or reapplication, as determined by the manufacturer's standard.

x) Metallic-Sacrificial Coatings

(i) Acceptable coatings for carbon and alloy steels for use in crawlspaces, vaults, or above grade shall be as follows:

A. Zinc (hot-dip galvanizing or flame sprayed);

B. Aluminum (hot-dip galvanizing or flame sprayed);

C. Aluminum-zinc;

D. Cadmium and electroplated zinc (sheltered areas only); and

E. Inorganic zinc (as a primer).

y) Organic Coatings

(i) Organic coating systems shall consist of a wash primer (for galvanized and aluminum substrates only), a primer, intermediate coat(s), and a finish coat. Acceptable organic coatings, for exposure to the atmosphere, are as follows:

A. Aliphatic polyurethanes;

B. Vinyl copolymers;

C. Fusion-bonded epoxy polyesters, polyethylenes, and nylons;

D. Acrylics, where not exposed to direct sunlight;

E. Alkyds, where not exposed to direct sunlight; and

F. Epoxy as a primer where exposed to the atmosphere or as the complete System where sheltered from sunlight.

z) Conversion Coatings

(i) Conversion coatings, such as phosphate and chromate coatings, shall be used as pre-treatments only for further application of organic coatings.

aa) Ceramic-Metallic Coatings (Cermets)

(i) This hybrid-type coating system shall be acceptable for use on metal panels and fastening hardware.

bb) Sealants

(i) Crevices shall be sealed with a polysulfide, polyurethane or silicone sealant.

cc) Barrier Coating System

(i) One of the following barrier coating systems shall be used where corrosion protection is required but appearance is not a primary concern:

A. Near white blast surface according to NACE NO. 2/SSPC-SP 10;

B. Commercial blast surface according to NACE NO. 3/SSPC-SP 6;

C. Near white blast surface according to NACE NO. 3/SSPC-SP 10; or

D. Apply the coatings according to manufacturer's specifications.

(ii) Use one of the following barrier coating systems where corrosion protection and good appearance is needed.

A. Near white blast surface according to NACE NO. 2/SSPC-SP 10;

B. Near white blast surface according to NACE NO. 2/SSPC-SP 10;

C. Commercial blast surface according to NACE NO. 3/SSPC-SP 6;

D. Commercial blast surface according to NACE NO. 3/SSPC-SP 6; or

E. Apply the coating according to manufacturer's specifications.

dd) Grounding Coordination

(i) Coordination shall be undertaken to ensure that grounding Design and corrosion control measures do not conflict so as to render either the grounding system or the corrosion control system ineffective.

ee) A stray current test program shall be performed prior to operation of the OLRT. This test program shall be a pre-operation baseline and serve as the basis for decisions regarding mitigation of OLRT caused stray current impacts.

ARTICLE 15 SITE WORK

15.1 General

a) Project Co shall restore or rehabilitate any disturbed areas extending beyond the limits of the Works, including but not limited to, paving, trackwork, planting or sodding. These areas shall be cleaned of debris and have any temporary paving or structures removed and replaced with planting soil in accordance with the requirements of Part 1 Article 17-Landscaping Design Criteria. A review of the adjacent land uses and site development shall be completed for these locations and the most appropriate groundcover shall be selected.

b) Existing Conditions

(i) Existing conditions shall be verified by Project Co

(ii) Underground and surface Utility lines and buried objects are to be identified in the field prior to excavation operations.

c) Protection

(i) Protect and/or transplant existing fencing, trees, landscaping, natural features, bench marks, buildings, Pavement, surface or underground utility lines which are to remain. If damaged, restore to original or better condition unless directed otherwise.

(ii) Replace any damaged trees designated to remain, or as directed by the City.

(iii) Project Co shall be responsible for installing, maintaining and removing any temporary facilities necessary to access the site, including but not limited to fences, gates, Constructions, granular, silt fences and traffic control devices.

15.2 Order of Precedence

a) All Project site work shall be designed in accordance with the criteria contained or referenced in this article and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between the criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) Specific obligations and criteria identified in the Articles in this Schedule;

(ii) City Standards;

A. The City of Ottawa's Current Version of Standard Tender Documents and Specifications including:

B. City of Ottawa Right of way Lighting Policy, Version 2009.

C. City of Ottawa's Electrical, Signals, and Lighting Criteria.

D. City of Ottawa Road Corridor Planning & Design Guidelines, Urban & Village Collectors / Rural Arterials & Collectors- October 2008.

E. City of Ottawa Sewer Design Guidelines.

(iii) Geometric Design Guide for Canadian Roads (TAC-1999); and

(iv) Ontario Provincial Standard Specifications and Drawings (OPSS).

ARTICLE 16 DEMOLITION, REMOVALS AND DISPOSAL

16.1 General

a) Project Co shall demolish any buildings or other Structures on the Real Property interests as required for Construction and obtain all Permits required for demolition. All Demolition refuse and materials shall be the property of Project Co and Project Co shall dispose of all such refuse and materials and leave the Lands in a clean and tidy condition upon completion of the Work.

b) Performance Criteria

(i) Guideway

A. Project Co shall remove obstructions encountered in the Construction of the Guideway elements that hinder the installation of said elements. Obstructions may include but are not limited to – pipes, conduits, ductbanks, foundations, debris, poles and any other object.

B. Project Co shall remove existing roadway and sidewalk pavements obstructing the Construction of the Guideway elements. Use equipment and methods of removal and hauling which protect underlying Pavement or existing Pavement not designated for removal.

C. Project Co shall remove the roads and parking lots associated with the existing Transitway that are no longer being used and are within the Lands but not within the proposed Guideway limits. The Pavement structure and bedding shall be removed and replaced with fill material that shall sustain plant materials as described in Schedule 15.2-Part 1-Article 17 Landscape Design Criteria.

(ii) Stations

A. The following Stations shall be completely removed or demolished:

i. Bayview Station;

ii. Lebreton Station;

iii. Campus Station;

1 With the exception of the elevators from the pedestrian Tunnel that are to be retained and included in the reconstructed pedestrian Tunnel;

iv. Hurdman Station;

v. Train Station; and

vi. Cyrville Station.

B. The following Stations shall be selectively demolished and rehabilitated or renovated:

i. Tunney's Pasture Station;

ii. Lees Station;

iii. St. Laurent Station; and

iv. Blair Station.

C. The demolition, selective demolition and or removals shall be coordinated with City for any salvageable materials that City may want to reuse elsewhere.

D. Project Co shall be responsible for the complete removal of the Scotiabank building located at the north east corner of Rideau Street and William Street. For further clarity, any designated substances, if present, within the Scotiabank building shall be the responsibility of Project Co.

(iii) MSF

A. Project Co shall inspect the site and perform any pre demolition testing as required to meet all applicable federal, provincial and local regulations. This testing shall be performed in accordance with the City of Ottawa Standards, MOE Standards and OPSS

B. Project Co shall remove existing internal roadway, parking lot and sidewalk Pavements obstructing the Construction of the new MSF features.

C. Project Co shall remove existing building foundations to a depth sufficient to not interfere with any proposed work necessary to complete the Project.

D. The demolition of the existing City facility at 805 Belfast shall be coordinated with the City. Project Co shall provide the City with 30 days' notice of its intention to proceed with the building demolition to allow the City to remove any salvageable materials that the City may want to remove and reuse elsewhere including but not limited to:

i. The fuelling equipment.

E. The remaining buildings shall be demolished without any restrictions pertaining to previous owner's equipment and material.

c) Materials

(i) Project Co shall dispose of all materials removed in accordance with City Standards and OPSS.

(ii) Project Co shall manage the hazardous materials in accordance with City Standards and OPSS. Project Co shall not store materials on site without precautions to prevent adverse effects of adjacent watercourses, groundwater, the migration of materials offsite, nor allowing the development of a nuisance condition.

(iii) Project Co shall properly stockpile the materials resulting from removals and/or demolition by using separate stockpiles for waste materials and reusable or recyclable materials.

ARTICLE 17 LANDSCAPE DESIGN CRITERIA

17.1 Introduction

a) This article presents the Design guidelines for the landscape architecture and urban design that shall be integrated into the Design of the OLRT Project. The work of this section includes the standards for streetscape elements, pedestrian and cycling access to the Stations, planting and tree compensation.

17.2 Reference Documents

a) The Design and Construction of urban design and landscape works shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) City of Ottawa – Official Plan;

(ii) City of Ottawa – Transportation Master Plan;

(iii) Ottawa Urban Design, A Reference Guide to Creating Great Places and Great Spaces, Publication #2103;

(iv) Downtown Ottawa Urban Design Strategy;

(v) City of Ottawa – TOD Guidelines;

(vi) City of Ottawa – Green Space Master Plan;

(vii) City of Ottawa Cycling Plan;

(viii) City of Ottawa – Pedestrian Plan;

(ix) City of Ottawa – Integrated Street Furniture Program;

(x) Ontario Building Code;

(xi) Accessibility for Ontarians with Disabilities Act (AODA);

(xii) CTA Terminal Code of Practice, Terminal Accessibility;

(xiii) City of Ottawa Construction Specifications and Details;

(xiv) Canadian Standards for Nursery Stock, most recent edition; and

(xv) The City Transitway Design Manual, most recent edition.

b) In addition to the above, the following reference materials shall apply to the applicable Stations:

(i) Tunney's Pasture Master Plan;

(ii) Bayview/Somerset Area Secondary Plan;

(iii) Lebreton Flats South Development;

(iv) Ottawa Escarpment Area District Plan;

(v) An Urban Design Strategy for Sussex Dr., Rideau St. and Colonel By;

(vi) University of Ottawa – Main Campus Strategy; and

(vii) Federally Mandated Stations Drawing Package for Tunney's Pasture Station, Bayview Station, Lebreton Station, Campus Station, Hurdman Station, Train Station and OLRT corridors.

17.3 Urban Design and Landscape Architectural Design

a) All areas adjacent to Stations are subject to future land use intensification and Station designs shall support transit-oriented development. Designs shall facilitate barrier free movement of Passengers between surrounding bus waiting areas, sidewalks, entrances and pathways to the Station Platform / OLRT Vehicle area. Safe, efficient and accessible pedestrian circulation shall be given the highest priority in Station Design.

b) There shall be a consistent use of standard landscape elements including fencing, paving, plant material and other items identified in this article utilized throughout the Alignment.

c) Urban development and landscape treatments shall compliment the adjacent land use. Pedestrian and cycling links shall be protected and connections to the adjacent communities provided.

d) Native plant material shall be used.

e) Weather protection shall be provided along pathways, Station Platforms and waiting areas to ensure customers are protected from inclement weather. The use of plant material as wind screens and shade shall be permitted.

f) Where appropriate, existing landforms and vegetation shall be preserved and incorporated into urban design. Designs shall be achieved with the intent to minimizing impacts to the surrounding environment.

g) The landscape Design of each Station shall have standard and common finishes. All Stations shall express the local character and qualities of their communities and planning context and assist in wayfinding/Station identification. Station entrances shall be easily

identifiable and be designed to discourage loitering and to maximize safety/observation through the use of lighting and glazing.

h) The landscape Design of all Stations, entrances to Underground Stations and surrounding areas shall be subject to CPTED principles. CPTED principles shall be applied in all aspects of Station landscape architecture Design.

17.4 Landscape Plans

a) Project Co shall submit landscape plans as part of the Works Submittals according to Schedule 10 – Review Procedure.

17.5 Urban Design and Landscape Elements

a) Sidewalk, Pathways and Plaza Pavement

(i) A combination of concrete and unit paving stones shall be used to construct primary sidewalks and plaza spaces. Sidewalks and plazas shall be barrier-free, have a minimum width of 3.0m and shall be a paved surface capable of withstanding heavy duty commercial use including access by Emergency and Maintenance vehicles as per city standards.

(ii) Design and materials used at primary sidewalks shall assist in wayfinding.

(iii) Contrasting pavers and textures delineating thresholds and pedestrian routes to meet the standards of the AODA shall be provided at all stations. This shall commence at the public sidewalks and be continuous through to the station. The pavers and textures shall be consistent with the materials utilized within the station.

(iv) Sidewalks and MUPs to Stations shall be designed in accordance with the applicable existing and recreational networks of the surrounding community and shall adhere to City standards for MUPs. Design and selection of Construction materials and layout alignment shall be consistent with specific site context and associated landscape type.

A. These pathways shall be minimum 3.0 m in width unless specified otherwise in this Article or in Schedule 15-2 Part 5 and shall be a paved surface capable of withstanding heavy duty commercial use, including access by Emergency and Maintenance vehicles and shall not be used for calculating the requirements for loading or unloading of the buses.

B. A sodded clearance strip of 0.6 m shall be provided on each side of a MUP except in the following conditions;

i. Where MUPs are located beneath a Bridge, provide 0.6m of shoulder on each side of MUP;

ii. Where MUP transverses an open paved plaza, provide pavement markings, change in paving colors or change in hard surface material to identify the route of the MUP; and

iii. Where a MUP is adjacent to an existing or a proposed vertical constructed surface or element such as a building, guardrail, retaining wall, fence, etc., a 0.5 m "buffer" space shall be provided from the existing constructed surface in addition to the width of the MUP.

C. Outside of the Station areas where existing Structures limit the available right of way width and prevent the construction of a MUP in excess of 3.0 m wide, Project Co may reduce the width of the MUP to 3.0 m provided a 0.5m buffer space to vertical obstructions is maintained.

(v) The MUPs and sidewalks at Stations shall be designed to ensure crossing locations to minimize the potential conflict between cyclists and pedestrians. This may include "T" intersections, small walls, planters or other design elements.

(vi) NCC recreational pathways shall remain open to public use to the fullest extent possible during construction. Project Co shall provide temporary signage indicating detours if pathway closures are required.

(vii) The primary sidewalks and secondary pathways shall be barrier free, and shall not exceed a grade of 5%. Cross slopes shall not exceed 2%. The primary sidewalks and secondary multi-use pathways shall be designed to maintain proper drainage and eliminate water accumulation in accordance with City guidelines.

(viii) Depressed curbs shall be provided at all sidewalk roadway interfaces and shall be in proximity to bicycle parking areas to facilitate safe access from roadway to sidewalk.

(ix) Paving Materials shall be as follows:

A. Primary Paving Stones: Cambrian Black Buffed, as manufactured by Transpave, or approved equal. Size to meet and match the dimensions of the Platform edge pavers;

B. Accent Paving Stones: Beige/Grey, as manufactured by Transpave, or approved equal. Size to meet and match the dimensions of the Platform edge pavers. When utilized as the contrasting colour for the visually impaired, the paver shall have a texture variation to meet the standards of the AODA; and

C. Concrete Paving: shall be to 32 MPa, with a magnesium float finish, caulked expansion joints and saw cut control joints. There shall be no tooled edges.

(x) Where the construction of, including but not limited to, sidewalks, pathways, MUP's and plazas adjoin existing construction, Project Co shall design and construct the new work to provide smooth, safe and seamless transition of materials.

b) Site Furnishing

(i) Site furniture shall be selected from a family of complementary site furnishings that provide an unobstructed view of the underside of the furniture, coordinated with the interior Station furniture and sustainable in terms of its recycled content and long-term durability. Site furnishings shall be strategically placed along sidewalks, plaza spaces and Platform areas to maximize their use and not encumber pedestrian movement. All furniture shall be fastened to the surface to reduce vandalism and to protect for future replacement requirements.

(ii) The site furniture shall be located to provide clear access and visibility to any site wayfinding signage, so that it does not obstruct views for CCTV.

(iii) In addition to the requirements above, the minimum quantities for the site furnishings shall be:

Station	Bicycle Racks**	Additional Bicycle Racks***	Standard Benches*	Waste Receptacles	Pedestrian Lights
Tunney's Pasture	16	16	10	4	38
Bayview	8	8	10	4	10
LeBreton	14	14	10	4	10
Downtown West	4	4	10	2	0
Downtown East	8	8	10	2	0
Rideau	4	4	10	0	0
Campus	16	16	10	3	6
Lees	8	8	10	2	4
Hurdman	16	16	10	5	12
Train Station	8	8	4	2	2
St. Laurent	0	0	10	1	0
Cyrville	16	16	10	4	4
Blair	32	32	10	4	4
MSF	**		1	1	6
Total	150	150	125	38	96

** The above bench quantities do not include custom benches that may be developed under the art program for each Station.*

*** The minimum number of bicycle racks as required by City regulations or number to satisfy LEED requirements shall be*

Station	Bicycle Racks**	Additional Bicycle Racks***	Standard Benches*	Waste Receptacles	Pedestrian Lights

provided at the Maintenance and Storage Facility.

**** Bicycle racks included in this column are not subject to the minimum sheltered area described in this Article and should be configured and arranged such that they are placed and reside within the Lands.*

(iv) Waste/Recycle Receptacle units shall be provided and shall be easily accessible for Maintenance and trash pick-up. A clear, transparent type of waste/recycle receptacle design is required. Waste/recycle receptacles shall be open installed outside of all Stations and at the bus platform areas. A minimum of one (1) waste/recycle receptacle unit(s) shall be required per Station entrance and shall be located such that it does not obstruct pedestrian traffic flow. Additional waste receptacles shall be provided as per drawings.

(v) Benches shall be strategically placed at key gathering and waiting zones, be highly visible (CPTED) and clear of any pedestrian traffic. Both backrest and armrest shall be built into benches to increase its use (AODA). Benches shall not be required where the sitting stone walls are identified.

(vi) Bicycle Racks shall be provided in accordance with the quantities noted above and configuration as identified in the Federally Mandated Station Drawing Package. A minimum of 80% of bicycle racks shall be sheltered by the Station roof. Clear access from the MUP to the bicycle parking shall be provided and additional area to accommodate dismounting and mounting of the bicycle beyond the width of the MUP.

(vii) Fencing barriers at all Stations shall be provided to prevent public access to the Tracks and Fare Paid zones. Galvanized steel fencing shall be incorporated with concrete walls and plinths along Platforms and sidewalks. Black vinyl coated chain link fence shall prevent access to the Track. Fences shall also serve as dividers separating pedestrians and cyclists at specific areas.

A. Fencing shall be installed in the locations and of the type indicated on the Federally Mandated Station Drawing Package.

B. Landscape handrails shall be designed to meet the OBC and the AODA and shall be integrated with the Design of the stairways and ramps to meet the above codes. All handrails shall be stainless steel, exterior grade.

(viii) Stone walls shall be provided to assist in grade transitions, to provide variation in the landscape and as sitting walls in key locations. Stone materials for retaining walls shall include local limestone to match the regional stone used in Station designs.

A. Stone walls: as per Federally Mandated Station Drawing Package are designed as dry stone stacked walls, founded on a granular base. All walls shall be designed with a coping stone adhered to the top three (3) layers of the drystone stack wall.

B. Limestone: varying thickness from 50 mm to 200 mm, lengths from 300 mm to 1.2m, as supplied from the Cloutier Construction quarry, or approved equal.

(ix) Bollards shall be provided to control vehicular and cycling activities adjacent to the Stations. Bollards shall be designed to facilitate replacement as required.

c) Site Lighting

(i) All Station plazas, sidewalks, OLRT / bus Platforms and other areas external and immediately adjacent to Stations that are accessible to the public shall be lit with an LED light source to provide improved safety and security, and meet the requirements of Part 5 Article 5 – Electrical Design Criteria.

(ii) Aesthetic and functional considerations shall include: the lighting for visual impact; the aesthetic character of luminaries and poles; and colour of light. Light poles shall be 5.0 to 6.0 m in height and provide continuous lighting along primary sidewalks. All pedestrian lighting shall be downcast and have full cut-off to minimize light pollution. Additional shielding or cut-off fixture shall be provided adjacent to residential communities.

A. Exterior Pedestrian Lights shall be Roadstar Series (756 mm), LED lamps, as manufactured by Philips Lumec or approved equal. Colour shall be natural grey.

B. Exterior bollard lights shall be Bollard Series BOR80-W as manufactured by Phillips Lumec or approved equal. Colour shall be black.

C. Exterior pedestrian lights for Campus Station and pedestrian sidewalks and MUPS adjacent to the University of Ottawa shall meet and match the University standard.

D. Exterior Road/Parking Lot Lighting shall be Roadstar Series (1146 mm), LED lamps, as manufactured by Philips Lumec or approved equal. Colour shall be natural grey.

d) Signage

(i) The location of the wayfinding signage shall take precedence over the location of street furniture, plant material or other items which may restrict clear access to the view the signage.

e) Existing Plant Material

(i) Existing plant material shall be protected where feasible.

(ii) Protect plant material during Construction as per City standards.

f) Any plant material required to be removed for the construction of the OLRT shall be replaced to the City standards for trees, and one to one replacement for shrubs and perennials. Proposed Planting

(i) Planting outside of Stations shall be used to define spaces, provide shade and reduce wind speed on Platforms to help direct customers safely between public streets and Station entrances and assist in deterring pedestrian crossings through restricted access areas. Plant material shall be designed to be harmonious with the architecture and scale of the Station and coordinated with sight line locations for security cameras and Station lighting, in particular with respect to anticipated vegetation growth.

(ii) Street trees shall be integrated into the pedestrian plazas adjacent to the Stations to provide shade and comfort to the pedestrians. To enhance the growing opportunities for these trees, a structural support system or a root control system below the paved surfaces shall be integrated into the overall Design to provide a sufficient root growth to sustain growth.

(iii) On Federal Lands, vines shall be planted in front of all chainlink fencing at a consistent spacing, so as to completely cover the wire fabric mesh.

(iv) Quality and source shall comply with the CNLA metric guide referring to size, development and rootball of plant material. Measure plants when branches are in their natural position. Use trees and shrubs of No.1 Grade. All plant material shall be hardy to the local urban conditions and native to the Ottawa area where possible. All plant material shall meet the requirements of "Canadian Standards for Nursery Stock."

(v) Plant material shall be hardy to the urban conditions, winter Maintenance requirements and be designed to be low-Maintenance both in the short and long term. Local native species shall be selected wherever feasible. Supplemental watering to assist in establishment of the plant material shall be required. A long term potable water irrigation system shall not be permitted. Supplemental water from the roof drains shall be considered.

(vi) The plant material palette shall include a variety of plant material to provide seasonal variety and colour.

Minimum Planting Criteria for Station and Guideway Landscapes

Plant Material	Size	Spacing
Deciduous Trees – large	70 mm cal.	5.0 metres
Deciduous Trees – medium	45 mm cal.	4.0 metres
Coniferous Trees	1.5 m ht	3.0 metres
Coniferous Shrubs	45 cm spread	900 mm
Deciduous Shrubs	45 cm ht	900 mm

A. OLRT planting along the Alignment shall ensure that the accumulation of leaf materials on the Guideway is minimized and that operations and maintenance are not negatively affected by leaves accumulating on the Alignment.

g) Naturalized Landscapes – Bio-swales and Stormwater Management Ponds

(i) The landscape treatment for the bio-swales and any Stormwater Management ponds shall be designed to provide a naturalized planting scheme for the Stormwater Management facilities and create an aesthetic compliment with the adjacent landscape. The grades for side slopes shall vary from 4:1 to 10:1 to replicate a natural environment.

(ii) Vegetation shall consist of native or hardy grasses, shrubs, vines and trees established through a mixture of seeding, planting and managed natural succession. Utilize drought and salt tolerant plant species for bio-swales subject to adjoining sidewalk and roadway runoff.

(iii) Naturalized landscapes shall consist of mass plantings of deciduous tree whips, coniferous trees and shrubs. They shall be a blend of native or naturalized plant material of the Ottawa area and be designed to provide seasonal colour and variety.

(iv) Hydric soil, harvested soil from an existing wetland, creek or ditch may be utilized to establish the seed source for the native grasses and forbes. All soils shall be from sites that shall not be affected by its removal.

(v) Specific species shall be determined based on adjacent natural area ecology and size of the Stormwater Management landscape. The following table outlines the minimum requirements for plant size and planting density:

Minimum Planting Criteria for Stormwater Management and Naturalized Landscapes

Plant Material	Size	O.C. Spacing
Deciduous Trees	60 mm cal.	6.0 metres
Deciduous Tree Whips	2.0 m height	2.4 metres
Coniferous Trees	1.5 m B&B	4.0 metres
Coniferous Shrubs	2 gallon	900 mm

Shrubs – whips	450 mm ht.	900 mm
Aquatic plants	Seed/Plugs	300 mm
Native Groundcovers	Seed/Plugs	150 mm
Prairie Seed Mix	Seed	N/A

h) Topsoil

(i) All in-situ topsoil stripped for Construction requirements shall be removed off-site unless there is sufficient room to stockpile topsoil at no greater height than 1.2 metres. Stockpiled topsoil shall only be used in areas of seeding adjacent to the track corridor.

(ii) All topsoil shall be fertile, friable, natural sandy loam containing not less than 4% of organic matter for sandy loams, with an acidity value ranging from pH 6.0 to pH 7.5 and capable of sustaining vigorous plant growth. It shall be free of stems or roots, stones and clods more than 50mm diameter or other extraneous matter. Topsoil shall be screened. Topsoil shall not be supplied in a frozen state.

i) Sod

(i) All turf areas within nine (9) metres of pedestrian pathways, BRT platforms, and plazas within or adjacent to the Stations, shall be sodded.

(ii) Nursery Sod: quality and source shall comply with standards outlined in 'Canadian Standards for Nursery Stock', most recent addition.

j) Seed

(i) The limits of Construction and staging areas for some Stations and sections of the Track will extend beyond the limits of sodding indicated above. Any disturbed areas extending beyond the limits identified for sod above shall be rehabilitated as per Part 1 Article 15 – Sitework. A review of the adjacent land uses and site development shall be completed for these locations and the most appropriate groundcover shall be selected.

(ii) Seed: to meet the requirements of the City specifications.

17.6 Tree Compensation

a) Existing Trees

(i) As per the City by-law, Project Co shall complete a Tree Compensation Plan that shall identify trees to be removed, the value of the tree removals and the mitigation opportunities. To complete the tree mitigation plan, the full extent of the OLRT corridor shall be reviewed.

(ii) The Tree Mitigation Plan shall be developed in conjunction with the overall planting plan for the OLRT site, including Stations and corridors.

(iii) The mitigation plan shall be done by a qualified arborist in conjunction with the landscape architect and submitted according to Schedule 10 – Review Procedure.

(iv) Existing trees (including crown, trunk and root system) in proximity or vulnerable to damage by the Work, shall be protected during all stages of Work. No material, construction equipment or vehicles shall be stored under the drip-line of trees at any time. Trees are to be protected and watered regularly as required by standard horticultural practice during the construction period.

(v) Work on all Lands subject to FLUA shall be in accordance with the following:

A. Snow fencing shall be installed to secure the periphery of zones of tree preservation and is to be kept in good condition at all times. The zones of tree preservation shall be kept free of any circulation, use and storage at all times during construction; and

B. Tree removal shall be kept to the minimum required to implement the Project. The area cleared for construction activities shall extend no more than 6 meters from the outside of new building and Structure faces unless otherwise indicated on the Federally Mandated Station Drawings.

17.7 Planting Lists

a) Project Co shall develop landscape plans that as a minimum identify the species, quantity, size and rootball of plant material for each Station.

b) Project Co's approach to Landscaping at the Federally Mandated Stations will be assessed as outlined in Schedule 15-2 Part 5 Article 1.

c) The following plant lists were developed for the Federally Mandated Stations. Species and quantities can be adjusted to suit Project Co's design.

TUNNEY'S PASTURE – PLANT LIST

SYM.	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	REMARKS
TREES –					
UA	ULMUS AMERICANA 'LIBERTY'	LIBERTY ELM	30	80MM. CAL.	WB
AF	ACER X FREEMANII 'JEFFERSRED'	AUTUMN BLAZE MAPLE	7	80MM CAL.	WB
AS	ACER SACCHARUM 'COMMEMORATION'	COMMEMORATION MAPLE	10	70MM. CAL.	WB
AST	ACER SACCHARUM 'TEMPLE'	TEMPLE COLUMNAR MAPLE	84	60MM. CAL.	WB
QC	QUERCUS COCCINEA	SCARLET OAK	9	80MM. CAL.	WB
GT	GLEDITSIA TRIACANTHOS 'SKYLINE'	SKYLINE HONEYLOCUST	33	70MM. CAL.	WB
PP	PICEA PUNGENS	GREEN COLORADO SPRUCE	6	3000MM. HT.	WB
PS	PINUS STROBUS	EASTERN WHITE PINE	8	3000MM. HT.	WB
AG	ACER GINNALA	AMUR MAPLE	84	70MM. CAL.	WB , MULTI-STEM
AM	AMELANCHIER CANADENSIS	NATIVE SERVICEBERRY	12	60MM. CAL.	WB , SINGLE-STEM
SHRUBS					
TC	TAXUS CUSPIDATA SPREADING	SPREADING JAPANESE YEW	110	500mm SPR.	POTTED
JS	JUNIPERUS SABINA	SAVIN JUNIPER	137	500mm SPR.	POTTED
JC	JUNIPERUS CHINENSIS 'OLD GOLD'	OLD GOLD JUNIPER	150	500mm SPR.	POTTED
BT	BERBERIS THUNBERGII 'BAILONE'	RUBY CAROUSEL JAP. BARBERRY	315	500mm, HT.	POTTED
PO	PHYSOCARPUS OPUL. 'DARTS GOLD'	DART'S GOLDEN NINEBARK	75	400mm HT.	POTTED
DL	DIERVILLA LONICERA	BUSH HONEYSUCKLE	75	400mm HT.	POTTED
CS	CORNUS SERICEA FLAVIRAMEA	YELLOW TWIG DOGWOOD	50	500mm HT.	POTTED
GRASSES and VINES					
CK	CALAMAGRO. X ACUT. KARL FOERSTER	KARL FOERSTER FEATHER REED GRASS	345	1 GAL. POTS	
PT	PARTHENOCISSUS TRI. 'VEITCHI'	BOSTON IVY	120	1 GAL. POTS	

BAYVIEW – PLANT LIST

SYM.	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	REMARKS
TREES –					
UA	ULMUS AMERICANA 'LIBERTY'	LIBERTY ELM	2	100MM. CAL.	WB
AF	ACER X FREEMANII 'JEFFERSRED'	AUTUMN BLAZE MAPLE	37	80MM CAL.	WB
AS	ACER SACCHARUM 'COMMEMORATION'	COMMEMORATION MAPLE	20	70MM. CAL.	WB
AST	ACER SACCHARUM 'TEMPLE'	TEMPLE COLUMNAR MAPLE	10	60MM. CAL.	WB
QC	QUERCUS COCCINEA	SCARLET OAK	5	80MM. CAL.	WB
PS	PINUS STROBUS	EASTERN WHITE PINE	7	3000MM. HT.	WB
SHRUBS					
JS	JUNIPERUS SABINA	SAVIN JUNIPER	450	500mm SPR.	POTTED
JC	JUNIPERUS CHINENSIS 'OLD GOLD'	OLD GOLD JUNIPER	250	500mm SPR.	POTTED
BT	BERBERIS THUNBERGII 'BAILONE'	RUBY CAROUSEL JAP. BARBERRY	350	500mm, HT.	POTTED
PO	PHYSOCARPUS OPUL. 'DARTS GOLD'	DART'S GOLDEN NINEBARK	150	400mm HT.	POTTED
DL	DIERVILLA LONICERA	BUSH HONEYSUCKLE	100	400mm HT.	POTTED
CS	CORNUS SERICEA FLAVIRAMEA	YELLOW TWIG DOGWOOD	150	500mm HT.	POTTED
GRASSES					
CK	CALAMAGRO. X ACUT. KARL FOERSTER	KARL FOERSTER FEATHER REED GRASS	300	1 GAL. POTS	
MS	MISCANTHUS SINENSIS 'GRACILLIMUS'	MAIDEN GRASS	250	1 GAL. POTS	

LEBRETON – PLANT LIST

SYM.	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	REMARKS
TREES					
UA	ULMUS AMERICANA 'LIBERTY'	LIBERTY ELM	25	100MM. CAL.	WB
AF	ACER X FREEMANII 'JEFFERSRED'	AUTUMN BLAZE MAPLE	35	70MM CAL.	WB
AS	ACER SACCHARUM 'COMMEMORATION'	COMMEMORATION MAPLE	35	70MM. CAL.	WB
AST	ACER SACCHARUM 'TEMPLE'	TEMPLE COLUMNAR MAPLE	25	60MM. CAL.	WB
QC	QUERCUS COCCINEA	SCARLET OAK	20	50MM. CAL.	WB
PP	PICEA PUNGENS	GREEN COLORADO SPRUCE	25	5000MM. HT.	WB
PS	PINUS STROBUS	EASTERN WHITE PINE	15	3000MM. HT.	WB
POM	PICEA OMORIKA	SERBIAN SPRUCE	10	1800MM. HT.	WB
SHRUBS					
JS	JUNIPERUS SABINA	SAVIN JUNIPER	100	500mm SPR.	POTTED
JC	JUNIPERUS CHINENSIS 'OLD GOLD'	OLD GOLD JUNIPER	100	500mm. SPR.	POTTED
AA	AMELANCHIER ALNIFOLIA	SASKATOON SERVICEBERRY	60	1250mm. HT.	B&B
DL	DIERVILLA LONICERA	BUSH HONEYSUCKLE	150	400mm HT.	POTTED
BT	BERBERIS THUNBERGII 'BAILONE'	RUBY CAROUSEL JAPANESE BARBERRY	100	500mm. HT.	POTTED
CS	CORNUS SERICEA FLAVIRAMEA	YELLOW TWIG DOGWOOD	150	500mm HT.	POTTED
BIOSWALE					
TL	TYPHA LATIFOLIA	COMMON CATTAIL	1800	1 GAL. POTS	
SP	SALIX PURPUREA NANA 'GRACILIS'	BLUE ARCTIC WILLOW	450	600mm. HT.	POTTED
AM	ARONIA MELANOCARPA	NATIVE CHOKEBERRY	400	500mm. HT.	POTTED
SC	CORNUS SERICEA	RED OSIER DOGWOOD	450	500mm HT.	POTTED
CSK	CORNUS SERICEA 'KELSEY'	KELSEY DWARF DOGWOOD	550	300mm HT.	POTTED
HEM	HEMEROCALLIS 'FRANS HALS'	FRANS HALS DAYLILY	700	1 GAL. POTS	
IR	IRIS SIBERICA	SIBERIAN IRIS	500	1 GAL. POTS	

GRASSES					
CK	CALAMAGRO. X ACUT. KARL FOERSTER	KARL FOERSTER FEATHER REED GRASS	125	1 GAL. POTS	
MS	MISCANTHUS SINENSIS 'GRACILLIMUS'	MAIDEN GRASS	150	1 GAL. POTS	

HURDMAN – PLANT LIST

SYM.	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	REMARKS
TREES					
UA	ULMUS AMERICANA 'LIBERTY'	LIBERTY ELM	34	100MM. CAL.	WB
AF	ACER X FREEMANII 'JEFFERSRED'	AUTUMN BLAZE MAPLE	36	70MM CAL.	WB
AS	ACER SACCHARUM 'COMMEMORATION'	COMMEMORATION MAPLE	33	70MM. CAL.	WB
AST	ACER SACCHARUM 'TEMPLE'	TEMPLE COLUMNAR MAPLE	25	60MM. CAL.	WB
QC	QUERCUS COCCINEA	SCARLET OAK	20	50MM. CAL.	WB
PP	PICEA PUNGENS	GREEN COLORADO SPRUCE	50	3000MM. HT.	WB
PS	PINUS STROBUS	EASTERN WHITE PINE	20	3000MM. HT.	WB
POM	PICEA OMORIKA	SERBIAN SPRUCE	20	1800MM. HT.	WB
SHRUBS					
AA	AMELANCHIER ALNIFOLIA	SASKATOON SERVICEBERRY	125	1250mm. HT.	B&B
PO	PHYSOCARPUS OPUL. 'DARTS GOLD'	DART'S GOLDEN NINEBARK	185	400mm HT.	POTTED
DL	DIERVILLA LONICERA	BUSH HONEYSUCKLE	185	400mm HT.	POTTED
CS	CORNUS SERICEA FLAVIRAMEA	YELLOW TWIG DOGWOOD	200	500mm HT.	POTTED
BIOSWALE					
TL	TYPHA LATIFOLIA	COMMON CATTAIL	4000	150mm POTS	
SP	SALIX PURPUREA NANA 'GRACILIS'	BLUE ARCTIC WILLOW	600	600mm. HT.	POTTED
AM	ARONIA MELANOCARPA	NATIVE CHOKEBERRY	400	500mm. HT.	POTTED
SC	CORNUS SERICEA	RED OSIER DOGWOOD	500	500mm HT.	POTTED
CSK	CORNUS SERICEA 'KELSEY'	KELSEY DWARF DOGWOOD	650	300mm HT.	POTTED
HEM	HEMEROCALLIS 'FRANS HALS'	FRANS HALS DAYLILY	1200	1 GAL. POTS	
IR	IRIS SIBERICA	SIBERIAN IRIS	1000	1 GAL. POTS	

REFORESTATION		AREA 1	AREA 2	AREA 3		
ACER SACCHARINUM	SILVER MAPLE	145	170	200	30MM. CAL.	WB
ACER SACCHARUM	SUGAR MAPLE	175	200	275	30MM. CAL.	WB
CELTIS OCCIDENTALIS	COMMON HACKBERRY	135	160	240	30MM. CAL.	WB
TILIA AMERICANA	COMMON BASSWOOD	100	130	150	30MM. CAL.	WB
POPULUS TREMULOIDES	TREMBLING ASPEN	180	220	300	30MM. CAL.	WB
JUGLANS NIGRA	BLACK WALNUT	100	120	180	600MM. HT.	POTTED
JUGLANS CINEREA	EASTERN BUTTERNUT	140	160	200	600MM. HT.	POTTED
AMELANCHIER CANADENSIS	SERVICEBERRY	150	180	230	1000MM. HT.	POTTED
PICEA GLAUCA	WHITE SPRUCE	100	130	200	1800mm HT.	WB

TRAIN STATION – PLANT LIST

SYM.	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	REMARKS
TREES					
UA	ULMUS AMERICANA 'LIBERTY'	LIBERTY ELM	20	100MM. CAL.	WB
AF	ACER X FREEMANII 'JEFFERSRED'	AUTUMN BLAZE MAPLE	15	70MM CAL.	WB
AS	ACER SACCHARUM 'COMMEMORATION'	COMMEMORATION MAPLE	15	70MM. CAL.	WB
AST	ACER SACCHARUM 'TEMPLE'	TEMPLE COLUMNAR MAPLE	30	60MM. CAL.	WB
QC	QUERCUS COCCINEA	SCARLET OAK	10	50MM. CAL.	WB
PP5	PICEA PUNGENS	GREEN COLORADO SPRUCE	10	5000MM. HT.	WB
PP3	PICEA PUNGENS	GREEN COLORADO SPRUCE	5	3000MM. HT.	WB
PP2	PICEA PUNGENS	GREEN COLORADO SPRUCE	5	2000MM. HT.	WB
SHRUBS					
JS	JUNIPERUS SABINA	SAVIN JUNIPER	350	600mm. HT.	POTTED
AA	AMELANCHIER ALNIFOLIA	SASKATOON SERVICEBERRY	100	1250mm. HT.	B&B
PO	PHYSOCARPUS OPUL. 'DARTS GOLD'	DART'S GOLDEN NINEBARK	175	400mm HT.	POTTED
DL	DIERVILLA LONICERA	BUSH HONEYSUCKLE	250	400mm HT.	POTTED
CS	CORNUS SERICEA FLAVIRAMEA	YELLOW TWIG DOGWOOD	150	500mm HT.	POTTED
BIOSWALE					
TL	TYPHA LATIFOLIA	COMMON CATTAIL	1500	150mm POTS	
SP	SALIX PURPUREA NANA 'GRACILIS'	BLUE ARCTIC WILLOW	150	600mm. HT.	POTTED
AM	ARONIA MELANOCARPA	NATIVE CHOKEBERRY	100	500mm. HT.	POTTED
SC	CORNUS SERICEA	RED OSIER DOGWOOD	125	500mm HT.	POTTED
CSK	CORNUS SERICEA 'KELSEY'	KELSEY DWARF DOGWOOD	250	300mm HT.	POTTED
HEM	HEMEROCALLIS 'FRANS HALS'	FRANS HALS DAYLILY	750	1 GAL. POTS	
IR	IRIS SIBERICA	SIBERIAN IRIS	500	1 GAL. POTS	

17.8 Urban Design Criteria for Non-Federally Mandated Stations

a) In addition to the criteria of this article, the following design criteria and standards shall be incorporated within the following locations:

b) West Portal: The design of the portal and any improvements shall integrate the naturalized ravine landscape of the tailrace and escarpment. Naturalized woodlot planting shall be of sufficient depth to provide a visual screen upon the initial opening of the OLRT system. A minimum of 200 large deciduous and coniferous trees shall be incorporated within the planting plan with accent shrubs and perennials providing seasonal colour.

All the existing natural features of the aqueduct and escarpment shall be protected. Where there has been previous civil works which altered the adjacent land forms, they shall be reinstated to an integrated grading and landscape plan which minimizes the use of retaining walls. The fence along the right of way shall be planted with vines.

c) Downtown West Station: The urban design for the station shall maximize the sidewalk widths to accommodate pedestrian access to the station entry points. All sidewalks to be concrete with the precast paving materials and patterns as required to identify the station entry access and extend across the primary sidewalk. Vent shaft grills shall be designed to be offset from the principle sidewalks and be designed to accommodate foot traffic and wheels. The roadway intersections shall be designed to accommodate the projected peak period pedestrian flows from the station.

Bicycle parking shall be provided.

d) Downtown East Station: The urban design for the station shall maximize the sidewalk widths along the roadway corridor to accommodate pedestrian access to the station entry

points. All sidewalks to be concrete with the precast concrete paving materials and patterns required to identify the station entry access and extend across the primary walkway. Vent shaft grills shall be designed to be offset from the principle sidewalks and be designed to accommodate foot traffic and wheels. The roadway intersections shall be designed to accommodate the projected peak period pedestrian flows from the station.

Four (4) street trees shall be planted in locations where they do not impede the main pedestrian circulation and utilizing the Strata Cell Structural Soil detail for the federal stations or approved equal.

e) Rideau Station:

(i) Rideau Street Right-of-Way

A. Utilize pavements, materials, street and pedestrian lamps and site furniture products employed in the Rideau Street phase 1 reconstruction. This includes 100 x 300 x 600 precast unit pavers for all pedestrian pavements, cast-in-place concrete crosswalks, walks, and tree planting in 'strata cell' chambers with custom tree guards and grates and granite block seats. This palette will be set out in the phase I reconstruction tender in the spring of 2012.

(ii) William Street Mall

A. Surface features shall be integrated into the existing William Street Mall by minimizing visual and physical obstruction in the central open walkway between the existing sidewalk terraces. Match existing pavements, materials and site furniture products.

f) East Portal: The alignment of the OLRT immediately east of Laurier Avenue will be covered for approximately 155 metres. The lands over the covered section of the OLRT shall be developed as an integral component of the University of Ottawa open space and the works shall extend south to the Campus Station plaza. This shall include a continuous barrier free concrete/unit paving pedestrian pathway, with a minimum width of four (4) metres. Access points to all buildings will be generous, with paving materials consistent with the standards of the University. All pedestrian egress to the buildings shall be designed to be barrier free. Pedestrian lighting shall be integrated throughout the pathway, and will meet the standards for lighting on the campus.

(i) Street trees shall be planted along the pedestrian walkway to provide shade and comfort to the users. Additional accent planting shall be incorporated into the design to provide a landscape consistent with the overall campus development.

(ii) At the intersection of Laurier Avenue there shall be an open plaza with a minimum of 600 square metres of paving, and include lighting, seating locations, waste receptacles, thirty (30) deciduous street trees, 20 coniferous trees and accent planting. All paving and pedestrian lighting shall be consistent with the

University of Ottawa standards and all turf areas to be sodded. The pedestrian crossing at Laurier Avenue shall be clearly delineated with concrete paving and offset from the access road to the residential buildings to the west of the plaza. Shrub and tree planting shall extend to the east portal and provide a visual screen in front of the fence, walls and guards.

g) Campus Station: The urban design for the Station shall integrate seamlessly into the existing University of Ottawa urban fabric, centred on a broad open pedestrian plaza which leads to all precincts of the campus. Pedestrian flows to and from the Station shall be accommodated across open hard surfaces, punctuated at the edges by large trees. Designated cycling lanes up to and through the transit plaza shall be provided, leading from the south end of the campus and City, beyond to the Nicholas underpass. Pedestrian and cyclist routes shall be separated in the plaza, ramp and through the connecting tunnel to the Rideau Canal. Pavement surfaces in the plaza shall be consistent with the concrete and paver materials used throughout the campus. The threshold at the Station shall be paved with unit pavers consistent with the family of materials used throughout the system. Covered bicycle parking shall be provided, quantity to be as per the table provided. All street furniture within the Station shall be consistent with Station requirements. Street furniture outside the Station shall be consistent with University of Ottawa campus standards. Light standards in the plaza shall be to University of Ottawa campus standards. Planting location, species, and method shall be consistent with current University of Ottawa practices, emphasizing protection of root zones from contamination from winter de-icing agents.

h) Lees Avenue Station: The principle urban design element for the station shall be the main plaza leading to the station entrance that creates an open paved courtyard, extending from the face of the building to the curb edge. Twenty-five (25) street trees will be incorporated at the perimeter of the plaza to define the edges, and lead the users to the entry point. A minimum of six (6) trees shall be planted within the plaza utilizing the Stata Cell Structural Soil detail for the federal stations or approved equal. Connections to the adjacent sidewalks shall be provided as well as additional plaza space to allow for pedestrian queuing at signalized intersections. The street furniture shall be incorporated within the main plaza.

(i) There shall be a continuous four (4) metre MUP extending from Campus Station to Lees Avenue Station on the east side of the Guideway, and extending through to the bridge over the Rideau River. On the east side of the Guideway, south of Lees Avenue, there shall be a set of stairs, with a bike wheel ramp, to create a direct connection between the MUP and Lees Avenue. On the west side of the OLRT, a three (3) metre wide MUP shall extend from Lees Avenue to the Rideau River. There shall be tree planting along the MUP throughout this section, with a minimum of thirty (30) deciduous trees and 500 tree whips to create shade and shelter.

(ii) A pedestrian signalized intersection on the west side of the station synchronized with the traffic lights on the east side of the station shall be provided.

(iii) MUP's shall be provided on both sides of the Rideau River crossing structure. The MUP shall be segregated from the Guideway with protective fencing

i) Maintenance and Storage Facility: The principle urban design element for the facility will be a generous front entry to the facility. There shall be a main plaza at the building front entrance with concrete paving from the building edge to the internal roadway. Street trees will be planted in the plaza to provide shade and scale to the building. Minimum three (3) metre sidewalks shall be provided from the parking spaces to the front entrance, and delineated by additional tree planting. Tree planting shall also be incorporated in all parking lot islands.

(i) There shall be a continuous 1.8 metre chain link fence along the limits of the property. In addition to the fence, where there is sufficient space, there shall be a continuous staggered row of conifers, with a minimum of 91 spruce trees, to buffer the roadway user from the complex. Where there is insufficient space for the staggered row of conifers, a continuous row of thirty (30) deciduous street trees will be utilized to create a streetscape edge.

(ii) Any stormwater management ponds shall be designed as constructed wetlands, and incorporate hydric soils and native plant species. There shall be a minimum of 1000 deciduous tree whips integrated around the pond.

(iii) Project Co shall provide a 2.0m wide sidewalk adjacent to the westbound lane of Belfast Road extending from the eastern property line to the intersection of Belfast Road and Trainyards Drive.

(iv) The MSF site design shall include at a minimum one 3.0m wide pedestrian pathway connection from the sidewalk to the public entrance of the building.

j) St. Laurent Station: The principle urban design element for the station will be the inclusion of tree planting at the upper platform level. Ten (10) raised planters that provide a seating area as well as sufficient depth for topsoil shall be incorporated within the platform. Bicycling parking shall be provided at the east end of the local platform.

k) Cyrville Road Station: The principle urban design elements for the station are the paved entrance plaza. This ensures direct pedestrian access from the sidewalk. The plaza shall extend from the building edge to the face of the curb, and integrate the site furniture. Project Co shall provide accessible curb ramps at existing PPUDO locations as identified by the City on each side of Cyrville Road.

(i) The planting on the north side of the station shall be a combination of trees and shrubs to provide a buffer between the OLRT and the community and shall reflect the species diversity and spacing from the south side of the corridor, with a minimum of 80 deciduous and coniferous trees and 300 square metres of shrub planting. The plant material shall be designed to provide clear lines of sight from the pathway and the community. Bioswales shall be located in the centre of the tracks and utilize the rainwater from the roof.

l) Blair Station: The principle urban design element for the station is the integration of the direct pedestrian connections to the community from the station. A three (3) metre concrete sidewalk will be provided from the existing walkway under Blair Road to the north side of the local station with a 2.4 metre concrete sidewalk extending west to the existing sidewalk adjacent to City Park Drive. A six metre walkway shall be provided between the shopping centre and the north station entrance. At the BRT, the width of the platform will extend to the western entrance to the OLRT station.

(i) A minimum of one hundred (100) deciduous trees shall be located along the sidewalks, roadways and transit corridors to provide shade and delineate the public and transit spaces. One thousand 1 000 square metres of shrub planting shall be completed to reinforce the street trees and assist in control pedestrian movements.

(ii) Bicycle parking shall be consolidated on the northeast side of the local bus platform, with the stone walls along the perimeter of the parking area. Use of additional low seating height stone walls, to match the walls at the federal stations, at the entry points and grade transitions shall be used.

m) OLRT Track: The principle urban design element for the track is the integration with the adjacent landscape. In all locations where the existing BRT roadways and BRT access roads are being modified or removed, all existing road base materials shall be removed, and the landform re-graded to remove the visual appearance of the previous civil engineering works and to reinstate a natural topography. The slopes shall be a maximum of 3:1 to accommodate maintenance activities and shall be reinstated as turf.

ARTICLE 18 DRAINAGE AND STORMWATER MANAGEMENT DESIGN CRITERIA

18.1 Order of Precedence

a) Drainage Design and Construction shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between the criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) The criteria contained in this Article;

(ii) Fisheries Act;

(iii) Ontario Water Resources Act;

(iv) Drainage Act (Ontario);

(v) Approval Exemption Regulation (AER) 525;

(vi) MOE Stormwater Management Planning and Design Guidelines, (most recent version);

(vii) MOE Design Guidelines for Sewage Works (most recent version);

(viii) City of Ottawa Sewer Design Guidelines;

(ix) City of Ottawa by-laws; and

(x) Regional Municipality of Ottawa-Carleton Transitway Design Manual, October 1983.

b) Other federal, provincial, and municipal acts, policies, and guidelines may apply. A listing of relevant legislation, policy documents, and Design guidelines can be found in Section 1.7 of the *"City of Ottawa Sewer Design Guidelines"* (November 2004).

18.2 General Criteria

a) The drainage strategy and Stormwater Management Plans shall be developed and submitted as part of the Works Submittals according to Schedule 10 – Review Procedure.

18.3 Drainage Criteria

a) All Guideway, Tunnel, Stations, MSF, and new roadway/parking lot drainage features shall be designed in accordance with the City of Ottawa Sewer Design Guidelines. Project specific criteria are listed below.

(i) The minor system associated with the OLRT Infrastructure shall be designed to capture and convey the 10-year storm event.

(ii) Major system flows, resulting from storms with a return period of up to 1:100 year, shall be controlled to meet available capacity downstream, and not create flow depths above the top of rail.

(iii) OLRT facilities shall meet all requirements of City of Ottawa Drainage By-Law No. 2007-398 and shall not have a negative impact on existing overland flow routes.

(iv) Any new outlets to the receiving water shall be approved by the City of Ottawa, RVCA, MNR, and MOE.

(v) In Tunnels and other areas without a gravity outlet, groundwater, fireflow discharge, and storm runoff shall be collected and pumped to a municipal sanitary sewer or combined sewer in compliance with Section 4 of City of Ottawa Sewer Use By-Law No, 2003-514.

(vi) Any new sewers that cross under the Guideway shall meet the requirements of "Standards Respecting Pipeline Crossings Under Railways" (Transport Canada TC E-10).

b) Project Co shall provide and maintain all equipment and infrastructure required to ensure adequate drainage during the entire Project. All discharge shall comply with City of Ottawa Sewer Use By-Law No. 2003-514. Any discharge that does not meet the requirements of this by-law shall be treated on-site or Project Co shall obtain an exemption from the City (in the form of a written agreement as stipulated in the by-law).

(i) Application for an exemption shall be made through the City's Sewer and Compliance Office. Documentation regarding the quantity of the discharge and its impact on receiving sewers shall be submitted, along with documentation that shows the quality with respect to the limits set out in the by-law.

c) Agreements shall be obtained for both temporary and permanent discharges.

d) Project Co shall be responsible for all costs associated with obtaining the required approvals and the construction, operation, and maintenance of the drainage works.

18.4 Stormwater Management Criteria

a) Project Co shall Design and implement a Stormwater Management Plan and apply practices that are in accordance with the City of Ottawa Sewer Design Guidelines. Project specific criteria are listed below.

(i) Any new storm sewer outlets shall meet the MOE "Enhanced" standard for water quality control.

(ii) Specific Stormwater Management requirements are in place for drainage outlets to the Ottawa River, Rideau River and Greens Creek.

(iii) Project site components that ultimately drain to the Ottawa River or Rideau River, and are considered Infill Development, as defined in section 8.3.7.2 of the City of Ottawa Sewer Design Guidelines, shall control peak flows to the minor system as prescribed in section 8.3.7.3 of the Ottawa Sewer Design Guidelines. Water Quality Stormwater Management Practices (SWMPs) for infill development are to provide a net improvement over existing conditions.

(iv) Drainage components that drain within the Greens Creek watershed shall meet the stormwater criteria that are currently in effect for the Pinecrest Creek watershed (Pinecrest/Centrepointe Stormwater Management Criteria Study, J F Sabourin & Associates Inc., June 2009) This applies to Guideway areas at the east end of the system, as well as the Cyrville Road and Blair Road Stations.

(v) Major flows are to be stored on site to limit the release rate to storm sewers to the minor system capacity or the existing 1:10 year peak flow, whichever is lower.

(vi) From a drainage perspective, the MSF and Hurdman Station are considered Greenfield Developments. As such, they require peak flow and volume control and provide treatment to meet the MOE "Enhanced" level.

(vii) Drainage/Stormwater Management for the MSF shall include a rainwater harvesting and re-use system.

(viii) The maximum instantaneous peak discharge from the MSF to the receiving sewer shall not exceed 90 l/s/ha, as stipulated in the "Ottawa Train Yards Site Servicing Report" (David McManus Engineering Ltd., 2001).

b) Extended detention or "wet-pond" Stormwater Management facilities shall be designed and constructed to prevent both losses of permanent pool due to infiltration and losses of active storage due to intrusion of groundwater, if required.

c) New storm sewers, swales and ditches shall be designed in accordance with the City of Ottawa Sewer Design Guidelines.

d) Stormwater extended detention facilities shall be designed in accordance with MOE guidelines, and guidelines currently being applied by the City on other development projects.

e) Oil/grit separators shall be designed and specified with a required performance of removal of fine sediment (50-microns), oil, floating and sinking debris, and 80% removal efficiency for TSS.

f) Water quality treatment, as required for Greenfield development shall be provided by bioswales, infiltration basins or rain gardens. These facilities shall be designed as

described in Section 18.5 of this Article and in accordance with MOE and City of Ottawa guidelines.

g) An Erosion and Sediment Control Plan shall be prepared and submitted as part of the Works Submittals according to Schedule 10 – Review Procedure.

h) Project Co shall obtain PTTWs from the MOE for all Works involving the taking of 50,000 litres or more of water per day, including, but not limited to: watercourse works, Construction dewatering, and any permanent installation of groundwater pumps.

18.5 Bioretention

a) Bioswales, infiltration trenches and rain gardens shall be designed with an underdrain and a filter bed composed of a mixture of sand, fines and organic material. The selection of mulch ground cover and plants shall be in accordance with the landscaping requirements.

b) Bioretention facilities shall be located at least 4 metres away from Structure foundations or an impermeable liner shall be applied under the filtration media. Slopes shall be a minimum of 1% and a maximum of 5%. Catchbasins shall be provided to convey runoff directly to the storm sewer when water depth approaches the limit of the available storage.

c) In situations where the bioretention facility is to capture runoff from parking or road areas, flows may be conveyed by way of opening in the curbs or curb cuts. During winter, snow and ice from road clearing will likely block the inlets. To account for this, alternative drainage, such as catchbasins designed to capture runoff that may accumulate against snow and ice banks, shall be provided.

18.6 Numerical Computational Procedures and Models

a) All numerical computation procedures shall comply with the principles outlined in Appendix 3 of the City of Ottawa Sewer Design Guidelines. Computer models used shall comply with the computer models listed in Appendix 3 of the City of Ottawa Sewer Design Guidelines. Computer models not listed in Appendix 3 may be used upon written approval from the City. Peak discharges used for Design purposes shall be confirmed using a different method to ensure that conservative estimates are achieved.

18.7 Site Specific Criteria

a) To meet the Stormwater Management criteria outlined in this article, site-specific SWMPs shall be implemented. Project Co shall design and implement SWMPs as described in this section as follows:

(i) Tunney's Pasture

A. Peak flow shall be controlled as prescribed in section 8.3.7.3 of the City of Ottawa Sewer Design Guidelines.

B. A bioswale, infiltration trench, or a rain garden design shall be applied in the center of the proposed bus loop, the northeast landscaped portion of the site, and the southwest landscaped portion along Scott Street. Runoff from the impervious area draining to the BRT shall be intercepted and treated by an oil/grit separator;

(ii) Bayview

A. Peak flow shall be controlled as prescribed in section 8.3.7.3 of the City of Ottawa Sewer Design Guidelines.

B. An oil/grit separator shall be applied to intercept and treat runoff before discharging to the existing storm sewer;

(iii) Lebreton Flats

A. Peak flow shall be controlled as prescribed in section 8.3.7.3 of the City of Ottawa Sewer Design Guidelines.

B. Bioswales/infiltration trenches/rain garden Design shall be used in the landscaped areas to the northwest/southwest and northeast/southeast of the Booth St Bridge. Drainage from the Booth Street Bridge shall be directed north to the existing storm sewers and the Stormwater Management facility on the east side of Booth St. along the Ottawa River. A portion of Booth Street shall drain south to Wellington Street, and shall be captured by a proposed storm sewer to be constructed by the City;

(iv) West Portal

A. Peak flow shall be intercepted and discharged to a sanitary or combined sewer. The specific location shall be approved by the City. All flows up to the 1:100 year event shall be attenuated to the 1:10 year peak flow or excess flow may be diverted to other outlets subject to approval by the City;

(v) Main Tunnel

A. The Design peak flow for the main Tunnel shall be the Fire Flow (31.5 l/s for 2 hours), or the 1:100 year flow from the east and west portals combined with groundwater, whichever is greater.

B. Flows shall be captured and conveyed to one or more main Tunnel pump stations that shall discharge to suitable municipal sanitary sewers;

(vi) Rideau West Entrance

A. Peak flow shall be controlled as prescribed in section 8.3.7.3 of the City of Ottawa Sewer Design Guidelines;

(vii) East Portal

A. Peak flow shall be controlled as prescribed in section 8.3.7.3 of the City of Ottawa Sewer Design Guidelines.

B. Several feasible options exist for the East Portal drainage, including a separate pump station or conveyance of flows to a central pump station. Project Co shall evaluate drainage options and provide a Design that meets the requirements;

(viii) Campus

A. Infill: Peak flow shall be controlled as prescribed in section 8.3.7.3 of the City of Ottawa Sewer Design Guidelines.

B. Runoff from the Station roof area and surrounding surfaces shall be collected by proposed catchbasins connected to existing storm sewers. No runoff treatment shall be applied at this Station;

(ix) Lees

A. Infill: Peak flow shall be controlled as prescribed in section 8.3.7.3 of the City of Ottawa Sewer Design Guidelines.

B. Treatment for water quality shall not be required for Lees Station. Drainage shall be captured by catchbasins connected to the existing storm sewer;

(x) Hurdman

A. Greenfield Site: Peak flow shall be controlled to the pre-development level. Water quality shall be controlled to meet MOE "Enhanced" standards or 80% total suspended solids (TSS) removal.

B. Bioswales/infiltration trenches/rain garden Design shall be applied in the landscaped areas within the proposed bus loop, below the elevated Tracks, and north of the Station to treat stormwater before discharging to the existing storm sewer. An oil/grit separator shall be installed for all roadway and parking areas;

(xi) Train

A. Infill: Peak flow shall be controlled as prescribed in section 8.3.7.3 of the City of Ottawa Sewer Design Guidelines.

B. Treatment for water quality shall not be required for Train Station. Drainage shall be captured by catchbasins connecting to an existing storm sewer, which previously served the BRT;

(xii) MSF

A. Greenfield Stormwater Management criteria apply: Peak flow shall be controlled to a maximum release rate of 90 l/s/ha, unless approved otherwise by the City. Water Quality shall be controlled to meet MOE "Enhanced" standards.

B. Both minor and major system flows shall be conveyed to an extended detention facility for water quality and quantity control. The collection system shall be composed of drainage swales in the yard and storm sewers/catchbasins within roadways and parking lots. The road surface shall have a continuous slope toward the Stormwater Management facility to safely convey overland flows. The flow depth on any road surface shall not exceed 0.3 m. A rainwater harvesting and re-use system shall be provided to reduce runoff volume from the site;

(xiii) MSF Connecting Tracks

A. Storm runoff that enters the Tunnels containing the connecting Tracks to and from the MSF facility, combined with flows associated with groundwater infiltration and fire flow, shall be collected by a pump station. Flows shall be pumped to an existing or new (relocated) sanitary sewer on Belfast Road, Tremblay Road, or the sanitary sewer currently servicing the existing BRT.

B. Project Co shall determine if treatment for water quality and/or quantity is required for the MSF connecting Tracks and shall provide as necessary. The collection system shall be designed for a 1:25 year storm and the Design shall maintain water levels for the 1:100 year below the top of rail level;

(xiv) St. Laurent

A. Infill: Peak flow shall be controlled as prescribed in section 8.3.7.3 of the City of Ottawa Sewer Design Guidelines

B. Stormwater treatment for water quality shall not be required for the St. Laurent Station. Drainage shall be collected by new catchbasins connected to the existing storm sewer that currently services the BRT;

(xv) Cyrville

A. Greenfield: Peak flow and volume shall be controlled to the SWM criteria in effect for the Pinecrest Creek watershed.

B. Bioswales/infiltration trenches/rain garden Design shall be applied in the landscaped areas between the east and west Tracks and to the northwest of the west Track on both sides of the Cyrville Road overpass with

catchbasins connected to the existing 675mm diameter stormsewer that outlets to Greens Creek;

(xvi) Blair

A. Greenfield: Peak flow and volume shall be controlled to the Pinecrest Creek SWM Criteria. Stormwater retention, treatment and quantity control shall be provided by underground storage, oil grit separators and/or off-site retention at an existing extended detention facility east of the Station; and

(xvii) Guideway

A. Infill: Peak flow shall be controlled as prescribed in section 8.3.7.3 of the City of Ottawa Sewer Design Guidelines

B. Runoff shall be collected by new catchbasins connecting to existing and/or new storm sewers along the Guideway. No treatment for water quality control shall be required for the Guideway. All Guideway drainage shall be captured and conveyed within the Guideway.

18.8 Erosion and Sediment Control Requirements

a) Project Co shall develop an Erosion and Sediment Control Plan in accordance with City of Ottawa S.P. No: F-1004.

ARTICLE 19 FUTURE ADJACENT CONSTRUCTION REQUIREMENTS

19.1 General Requirements

a) The City shall prepare a Developers Guide in cooperation with Project Co for the guidance of prospective developers or other entities that may contemplate Construction activities, adjacent to, beneath, on, or over OLRT Lands, facilities, and/or operating Alignment or that will be located within the zone of influence of the OLRT Project. The document shall define the Design criteria and process requirements that prospective developers or other entities must follow for the submittal of documentation about their project to the City and Project Co, and measures that will be required when constructing a project in the vicinity of, or impacting OLRT Lands, facilities and/or operating Alignment, recognizing that the encouragement of development in the vicinity of stations is an objective of the City's Official Plan. The City and Project Co shall review submitted documentation throughout the Project Term. Further, approval of project construction and implementation procedures will be required prior to construction of future adjacent projects to ensure that no adverse impacts will be caused to the OLRT System. These policies are in addition to those other permits required for the construction of the proposed facilities.

b) Specific items to be addressed in the Developers Guide shall include but are not necessarily limited to the following:

(i) Project Co shall assist the City in defining the zone of influence for the OLRT Project with respect to this Article. General procedures and review process that will be required to obtain approval for future adjacent construction within the zone of influence for the OLRT Project, including the process that parties are to follow to obtain as-built OLRT facility information, minimum submittal requirements, review process to be followed by the City and Project Co, and review criteria;

(ii) City contact information for development review process, flat rate fees (if any) for development reviews to be paid for by prospective developers, a review classification system based on proximity to OLRT assets/Construction and operational risks and developer submittal requirements for identified risk categories;

(iii) Minimum Design criteria for future Adjacent Structures with respect to protection of the OLRT System including, geotechnical criteria, temporary excavation support criteria, specific considerations for future Structures which are above, adjacent to or below, elevated, at-grade and underground OLRT Structures, maximum allowable deflection and vibrations for OLRT Structures, corrosion considerations, electrical and mechanical system considerations, controlled blasting/excavation considerations, dewatering considerations, and, crane swing guideline;

(iv) Minimum requirements for geotechnical instrumentation and monitoring for OLRT Lands during adjacent construction including but not limited to instrumentation layout, monitoring schedule, reporting schedule, instrumentation response values and contingency plans;

(v) Minimum operational guidelines, including restrictions on hours and types of construction activities so as to minimize impacts on the OLRT service and operations;

(vi) Procedures to ensure the protection of the OLRT System during construction including potential requirements for site observations of certain activities to minimize damage potential; and

(vii) Minimum as-built and final documentation requirements.

c) Project Co shall review and comment on the draft Developers Guide and assist the City in preparing the final Guide.

d) Project Co shall coordinate and cooperate with the City with respect to the established development review process recognizing that:

(i) The City will be responsible for carrying out development reviews in accordance with the process;

(ii) The City will retain an independent consultant and/or utilize internal staff resources to undertake the development reviews;

(iii) The City will be responsible for screening development applications that require a development review;

(iv) Project Co shall be responsible for reviewing and commenting on the draft development review findings; and

(v) The development review process developed by Project Co will be formalized in a City by-law to be enacted by the City.

ARTICLE 20 PROTECTION OF EXISTING ADJACENT STRUCTURES

20.1 Scope

a) This Article provides requirements for; assessment of potential impacts to Existing Adjacent Structures due to OLRT Project Construction activities, development of mitigation measures as necessary, development of a geotechnical instrumentation and monitoring program and pre-and post-Construction surveys.

b) Reference Documents:

(i) City of Ottawa Contract Specification F1011.

20.2 General Requirements

a) Project Co shall:

(i) Assess the effects of Construction related Ground Movements on Existing Adjacent Structures. Prepare a report documenting anticipated impacts. Integrate the pertinent requirements of Part 3 and Part 1 Article 12 – Geotechnical/Foundation Design Criteria into the report.

(ii) Based upon report conclusions, Design and implement mitigation measures as necessary to ensure that the structural integrity of Existing Adjacent Structures is maintained and that the appearance, functionality, operability, and durability of Existing Adjacent Structures are unimpaired.

(iii) Develop and implement a Geotechnical Instrumentation and Monitoring Program designed to measure Construction impacts to Existing Adjacent Structures and to validate Design assumptions with respect to anticipated behaviour of soil, rock, groundwater, initial support and temporary excavation support systems in response to Project activities. Submit according to Schedule 10 – Review Procedure.

(iv) Incorporate where necessary, and as determined by Project Co, existing groundwater observation wells installed for the Project as documented in the Geotechnical Data Report into the geotechnical instrumentation and monitoring program.

(v) Prepare reports documenting the basis and development of protection of Existing Adjacent Structures Design.

(vi) Perform pre- and post-Construction condition surveys to document the condition of Existing Adjacent Structures. Surveys shall be submitted according to Schedule 10 – Review Procedure.

(vii) Remedy all damage caused by Construction or Project activities to pre-existing conditions.

(viii) Obtain all Permits necessary for performing protection of Existing Adjacent Structures work.

(ix) Coordinate with the City to facilitate meetings with Existing Adjacent Structures owners as needed to obtain permissions to perform the work needed to ensure the protection of Existing Adjacent Structures.

(x) Ensure that Utility isolation or relocations do not affect the electrical safety grounding of adjacent properties and if so, provide suitable remedies.

20.3 Qualifications

a) Design of the geotechnical instrumentation and monitoring program shall be under the direct supervision of a Professional Engineer.

b) Staff for the Design and implementation of the geotechnical instrumentation and monitoring program shall include personnel who have verifiable design and construction experience with similar programs.

c) The individual responsible for the surveyors shall be a registered land surveyor in the Province of Ontario with experience in measurements of the types of accuracies that shall be required for geotechnical instrumentation monitoring.

20.4 Design Requirements

a) Project Co shall:

(i) Adjacent Structure Verification Study

A. Confirm information related to Existing Adjacent Structure locations, dimensions, elevations, foundations, structural details, materials, and other information necessary to complete a deformation analysis of the Structures. Perform field surveys, utility locates, and foundation test pits as needed.

(ii) Deformation Analysis

A. Define the Zone of Influence based on anticipated extents of Ground Movements caused by Project activities. The Zone of Influence shall be determined by Project Co using engineering analyses and shall consider all sources of Ground Movements that may be caused by Construction activities, however the minimum Zone of Influence shall be as follows:

i. A horizontal distance from the edge of any supported excavation or temporary slope equal to twice the excavation depth as measured from the existing ground surface;

ii. A horizontal distance from the top of slope for permanent cut slopes equal to the total depth of the cut as measured from the existing ground surface;

iii. A horizontal distance from any Tunnel equal to 1.5 times the depth from the ground surface to the Tunnel invert; or

iv. A horizontal distance from any dewatering/unwatering, groundwater drawdown, or groundwater depressurization zones equal to the estimated maximum radius of groundwater pressure reduction in any soil or rock layer.

B. Estimate the magnitude and distribution of Ground Movements caused by Construction Activities. Assess the potential impacts to all Existing Adjacent Structures within the defined Zones of Influence from all forms of Construction related Ground Movements. Assess potential Construction impacts to Existing Adjacent Structures arising from Project Co's means and methods other than excavation and groundwater drawdown related ground movements including impacts from:

i. Demolition;

ii. Scaffolding;

iii. Crash decks/protective Structures;

iv. Fuel storage;

v. Plant and equipment; and

vi. Movement and storage of materials, plant and equipment.

(iii) Impact Mitigation Design

A. Design Structure-specific mitigation measures needed to prevent a loss in appearance, structural integrity, functionality, operability and durability of potentially impacted Structures. Demonstrate the effectiveness of the proposed mitigation measures by engineering analysis. Confirm and document that the proposed mitigation is acceptable to potentially affected Existing Adjacent Structures owners. Determine instrumentation monitoring requirements for evaluating the effectiveness of the mitigation measure during Construction that is consistent with the means and methods for Construction.

(iv) Geotechnical Instrumentation & Monitoring

A. Determine instrumentation requirements for monitoring vibration, displacement and strains, as appropriate for: Existing Adjacent Structures

within the Zone of Influence, temporary excavation support system structures, initial support System structures, soil, and rock adjacent to Project excavations. Determine instrumentation requirements for monitoring groundwater levels in the vicinity of Project excavations and areas that may be affected by Project related groundwater drawdown.

B. Monitoring of Construction shall be performed to: assess the effects of Construction on the surrounding ground and Existing Adjacent Structures; identify likely causes and distribution of Ground Movements; evaluate Design assumptions and refine estimates of future performance; and check compliance with performance specifications. As needed, the monitoring shall address movements, vibrations, pressures, loads and strains in the ground, on Adjacent Structures, and on temporary and permanent Works. Project Co shall be responsible for designing and implementing the program, augmenting baseline survey data, organizing, evaluating and preserving the data, and undertaking corrective actions if and as needed.

C. Permanent reference deep surveying benchmarks shall be established as required along the Project Alignment. The number of reference benchmarks established shall be sufficient to provide adequate sight distances to permit monitoring as specified in this Article. Benchmark coordinates and elevations shall thereafter be resurveyed annually.

D. Measurements of differential settlements of Existing Adjacent Structures shall be taken at least bi-monthly until Final Completion.

i. Establish measurable Trigger and Action Levels for monitoring movement, vibrations, and strain of the soil, rock and Existing Adjacent Structures during Construction. Establish measurable Trigger and Action levels for monitoring groundwater levels. Set Action Levels to values that shall ensure that impacts to Existing Adjacent Structures shall not exceed Acceptable levels. Action Levels values shall be confirmed by engineering analysis or by documented case histories appropriate to the Structures and types of Construction being considered. Set Trigger Levels to values less than fifty percent of the Action Level value, but not more than the anticipated value of Ground Movement

ii. Establish Trigger Levels and Action Levels for each Existing Adjacent Structure and each instrument. Establish protocols for modifying Construction means and methods, alerting the owners of Existing Adjacent Structures, and implementing contingency measures.

E. Define the instrument type, location and frequency of readings for each instrument. Assess the need for monitoring interior walls, columns, beam, and slabs.

F. Provide directions for installing and baselining instruments.

G. Establish reading accuracies for each instrument compatible with the Trigger and Action Levels.

H. Consider seasonal variations in groundwater levels and ambient ground movements when setting baseline values and interpreting instrumentation readings.

(v) Pre-and Post-Construction Condition Surveys

A. Perform pre-Construction condition surveys for the purpose of inspecting and documenting the existing condition of Existing Adjacent Structures prior to Construction. Record information about existing Structure damage or repairs, defects, unusual aspects of Construction, presence of sensitive equipment, and similar pertinent information. Perform this work in accordance with City of Ottawa Contract Specification F1011, except as modified in this Article. Survey information shall be submitted according to Schedule 10 – Review Procedure.

B. The surveys shall be performed no more than 60 calendar days prior to performing any work that may result in Ground Movements that may affect the Existing Adjacent Structure to be surveyed, otherwise a second pre-Construction survey shall be required to verify and update the earlier survey findings. At a minimum, where authorized by Existing Adjacent Structure owners, pre-Construction condition surveys shall be performed on all existing above grade Existing Adjacent Structures and major underground Existing Adjacent Structures and within the Zone of Influence. For blasting, perform surveys as required under Schedule 17.

C. Develop a standard form to be used in recording observations during the pre-Construction condition survey.

D. Prepare pre-Construction condition survey reports for each Existing Adjacent Structure consisting, at a minimum, of the completed standard form, photographs with photo description log sheet, and DVD of digital video and digital photographs. The report shall be stamped by the Professional Engineer responsible for performing the survey.

E. Perform a post-Construction condition survey for Existing Adjacent Structures where the limiting levels of Structure movement or deformation have been exceeded, or a damage claim has been received. Collect sufficient data to substantiate whether damage has occurred.

F. Perform a post-Construction condition survey for every Existing Adjacent Structure for which a pre-Construction condition survey was performed

after it has been determined that Ground Movements have stabilized and no further movements may reasonably be anticipated.

G. Develop plans for the survey of Utilities.

(vi) Design Reports

A. Prepare and submit Stage 1 Construction Impact Assessment Reports (CIAR-1) and Stage 2 Construction Impact Assessment Reports (CIAR-2) as part of the Works Submittals according to Schedule 10 – Review Procedure.

20.5 Construction Requirements

a) Project Co shall:

(i) General

A. Perform excavations and install temporary excavation support and initial support in a manner consistent with the requirements specified to minimize ground and Structure movement and deformation.

(ii) Geotechnical Instrumentation and Monitoring

A. Furnish and install geotechnical instrumentation intended for the protection of Existing Adjacent Structures as identified in CIAR-2. Document the installation of each instrument and submit to the City, at the City's request.

B. Collect instrumentation readings and store all data in a centralized data management system. Automate the collection and reporting of data to the extent practicable to permit real time remote monitoring of instrumentation. Make all instrumentation data accessible to the City via a secure website. Allow for the display of data in both raw and meaningful engineering units in real time.

C. Provide a demonstration of the features of the instrumentation data reporting website to the City prior to the start of Construction and afterwards as modifications are made to the website.

D. Meet with the City as needed to discuss instrumentation levels and necessary actions to protect Existing Adjacent Structures.

E. Replace damaged or malfunctioning instrumentation. The City may order a temporary work stoppage in areas where there is insufficient working instruments to ensure the protection of Existing Adjacent Structures.

F. Develop a Construction monitoring program incorporating surface, subsurface, and in-Tunnel instrumentation designed to measure movements and deformations of the ground, Existing Adjacent Structure, Utilities, temporary excavation support and initial support.

G. Accommodate the City in inspecting the installation of geotechnical instrumentation, related hardware, and in verifying the proper functioning of the instrumentation monitoring system including, but not limited to the collection, transmission, storage, backup, and reduction of data.

(iii) Remedy of Damages

A. When damage to Existing Adjacent Structures is due to Construction, as determined by a Post-Construction Condition Survey, develop and implement a plan to remedy the damage that the Structure owner is amenable to.

20.6 Existing Adjacent Structure Owner Interactions

a) Project Co shall:

(i) Follow all communication protocols established by Schedule 18 – Communications Protocol for interactions with Existing Adjacent Structure owners and other impacted or potentially impacted parties.

(ii) Work with owners of Existing Adjacent Structures, with the City acting as liaison, to perform Existing Adjacent Structure inspections, develop and implement where required acceptable mitigation measures and geotechnical instrumentation monitoring requirements, and perform pre- and post-Construction condition surveys.

(iii) The process of identifying impacts to Existing Adjacent Structures and developing monitoring and mitigation requirements shall generally be as follows once the Stage 1 CIAR is reviewed by the City:

A. Step 1. Owners of potentially affected Existing Adjacent Structures, as identified in the CIAR, shall be briefed of the Stage 1 CIAR findings by Project Co. The City will coordinate the interaction. Owners shall be given an opportunity to indicate whether they require a formal review of Design documentation and whether they require any special criteria in connection with developing monitoring and mitigation criteria;

B. Step 2. Stage 2 CIAR shall be prepared and provided to the City to provide to potentially affected Existing Adjacent Structures owners. Project Co shall brief potentially affected owners of the proposed mitigation measures and monitoring plans. The City will coordinate the

interaction. Owners will be requested to provide a letter of no objection in response to the proposed mitigation measures and monitoring plans; and

C. Provide supplemental documentation related to the implementation and performance of monitoring and mitigation works as directed by the City for specific Existing Adjacent Structures.

(iv) Project Co shall consider each of the above steps as iterative depending on specific requirements of individual Existing Adjacent Structure owners.

(v) Develop and maintain a schedule of assets to identify the Existing Adjacent Structure owner assets, and other stakeholder assets that rely on Existing Adjacent Structure owner assets. This document shall be updated monthly and shall be used to track the completion of the impact assessments and obtaining acceptances of the monitoring and mitigation plans.

(vi) Develop and implement a process for obtaining authorization for conducting pre- and post-Construction surveys from Structure owners and review of same by owners, Project Co and the City. At a minimum, this process shall include measures for documenting whether or not owners authorize pre- and post-Construction surveys and requirements for owners, Project Co and the City to review and accept completed pre- and post-Construction surveys.

ARTICLE 21 STRUCTURAL DESIGN CRITERIA AND REQUIREMENTS

21.1 Order of Precedence

a) All Project Structure work, except as explicitly indicated in other articles, shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of conflict between the criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) Specific obligations and Design Criteria identified in this Schedule;

(ii) CAN/CSA S6-06 – including Supplement No. 1, May 2010 and Exceptions to the Canadian Highway Bridge Design Code CAN/CSA S6-00 for Ontario – June 2002

(iii) City of Ottawa Standards

(iv) OPSS

(v) OPSD

(vi) CAN/CSA A23.3

(vii) CAN/CSA A16

(viii) AREMA Manual for Railway Engineering hereinafter referred to as the AREMA Manual

(ix) CAN/CSA A23.1

(x) CAN/CSA A23.2

(xi) CAN/CSA G40.20-04/G40.21-04

21.2 Design Codes and Standards

a) The following codes, standards, and references shall be utilized for the Design of Structures indicated in this article. If the criteria sources conflict, unless otherwise noted, the most conservative standards shall apply. Where no standard is noted for a particular item of the Works within this Schedule, then Project Co shall develop Project-specific procedures based on industry standards and recognized specifications.

(i) Codes and Standards

A. The structural Design shall conform to the most current edition of the following codes and standards. Designs shall be updated, as necessary, to conform to codes revisions through the start of Project Construction.

i. CAN/CSA S6 and Exceptions to the Canadian Highway Bridge Design Code CAN/CSA S6-00 for Ontario – June 2002

ii. CAN/CSA S6.1

iii. CAN/CSA A23.3

iv. CAN/CSA A16

v. AREMA Manual for Railway Engineering hereinafter referred to as the AREMA Manual

vi. CAN/CSA A23.1

vii. CAN/CSA A23.2

viii. AASHTO Manual for Condition Evaluation of Bridges

ix. AASHTO Guide Specifications for Strength Evaluation of Existing Steel and Concrete Bridges

x. AASHTO Guide Specifications – Thermal Effects in Concrete Bridge Structures

xi. TCRP Report 57 Track Design Handbook for Light Rail Transit

xii. ACI 358.1

xiii. AASHTO Guide Specifications for Design and Construction of Segmental Concrete Bridges.

xiv. AASHTO Guide Specifications for Structural Design of Sound Barriers.

xv. AASHTO Guide Specifications for Horizontally Curved Highway Bridges

xvi. ANSI/ASCE/T&DI 21 – Parts 1 – 4

xvii. MTO – Geometric Design Standards for Ontario Highways

xviii. NBCC

xix. C22.3 No. 7-06 Underground Systems

xx. CSA S448.1 – Repair of Reinforced Concrete in Buildings

xxi. CSA S478 – Guideline on Durability in Buildings

xxii. CSA S413 – Parking Structures

(ii) Design References

A. PTI Post-Tensioned Box Girder Bridge Manual

B. PTI Recommendations for Prestressed Rock and Soil Anchors

C. FHWA Post Tensioning Tendon Installation and Grouting Manual

D. Canadian Foundation Engineering Manual Third and Fourth Editions

E. FHWA-NHI-00-043 Mechanically stabilized earth walls and reinforced soil slopes Design & Construction guidelines

F. NCMA Segmental Retaining Wall Design Manual

G. SSPC-SP10 – Society for Protective Coatings – Surface Preparations

H. MTO – Aesthetic Guidelines for Bridges

I. MTO – Bailey Bridge Manual

J. MTO – Cathodic Protection Manual for Concrete Bridges

K. MTO – Class Environmental Assessment for Provincial Transportation Facilities (2000)

L. MTO – Concrete Culvert Design and Detailing Manual

M. MTO – Designated Sources for Materials

N. MTO – Drainage Management Manual – Volumes 1, 2, 3 and 4

O. MTO – Electrical Engineering Manual Volume 1 – Electrical Design

P. MTO – Electrical Engineering Manual Volume 2 – Electrical Maintenance

Q. MTO – Electrical Engineering Manual Volume 4 – FTMS C.D.E.D.

R. MTO – Environmental Guide for Contaminated Property Identification and Management (2006)

S. MTO – Environmental Guidelines for Structural Steel Coating (1996)

T. MTO – Environmental Protection Requirements for Transportation Planning and Highway Design, Construction, Operation and Maintenance (2006)

U. MTO – Formwork and Falsework Manual

V. MTO – Integral Abutment Bridges

W. MTO/DFO/OMNR – Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings (2006)

X. MTO/DFO/OMNR – Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings, User Field Guide (2006)

Y. MTO/MOE – Memorandum of Understanding on Permits-To-Take-Water (2006)

Z. MTO/MOE – Protocol for the Management of Excess Materials in Road Construction and Maintenance (1994)

AA. MTO – Lab Testing Manual

BB. MTO – Ontario Bikeways: Planning and Design Guidelines

CC. MTO – Ontario Heritage Bridge Guidelines for Provincially Owned Bridges

DD. MTO – OSIMS User's Guide

EE. MTO – Ontario Structure Inspection Manual

FF. MTO – OSIM Ontario Structure Inspection Manual

GG. MTO – Overcoating – Technical Assessment of Existing Coatings of Steel Bridges for Overcoating

HH. MTO – Performance of Integral Abutment Bridges Report

II. MTO – Pile Load and Extraction Tests, 1954 – 1992

JJ. MTO – Chapter 5 of Construction Manual

KK. MTO – Guide to the Design of Post-Tensioned Decks

LL. MTO – Pre-stressed Concrete Manual for Quality Assurance of Bridges During Construction

MM. MTO – RSS Guidelines (2007)

NN. MTO – Seismic Design Guidelines

OO. MTO – Semi-Integral Abutment Bridges Manual

PP. MTO – Structural Manual

QQ. MTO – Structural Steel Coating Manual

RR. MTO – Structural Rehabilitation Manual

SS. MTO – Guidelines for Conducting ½ Cell Survey and Covermeter Survey

TT. MTO – Guide for Preparing Hydrology Reports for Water Crossings

UU. City of Ottawa – Transit Technology Choice Report (October 2009)

21.3 General Requirements

a) Design

(i) Project Co shall include and/or engage a qualified designer to perform and be responsible for execution in the structural Design of the Project. Structural Design shall be performed under the responsible charge and drawings and Design shall be signed and sealed by a Professional Engineer.

(ii) Unless otherwise noted, all structural Design shall follow the method of Limit States Design and conform to the corresponding code and standard identified in Section 21.2 Design Codes and Standards.

(iii) The loading criteria to which the Structures are designed shall appear on the structural drawings. When required by design conditions, concrete placing sequence shall be indicated on the drawings or in the supplementary conditions.

b) Durability

(i) Project Structures shall be designed and detailed to attain durability ensuring the indicated Design Life without replacement of any major components. Time dependent Design calculations, including corrosion, creep and fatigue shall be based on indicated Design Life. Design life calculations shall be per CAN/CSA S6-06 including Supplement No. 1, May 2010.

(ii) Fatigue cycles for Train Structures shall be a minimum 15,000,000 cycles for peak period Trains of 120m to 150m length.

(iii) The durability of concrete Structures shall be assured through design and detailing, application of high performance materials, protection of reinforcing steel, and application of concrete sealers.

A. Foundations in corrosive soils shall be constructed with appropriate cement type and provided with protective coatings or such other mitigations to ensure required Design Live.

c) Rehabilitation and Maintenance

(i) Project Co shall be responsible for the Maintenance of existing Train Structures and shall carry out rehabilitation such as, but not limited to waterproofing, spalled concrete and crack repairs, of any Train Structure it intends to use for operations prior to implementation of the OLRT.

(ii) Project Co shall be responsible for the Maintenance of existing and new Structures and Train Structures where System features such as, but not limited to OCS appurtenances and protective barriers, attach to existing structures. This maintenance responsibility shall include any such attachments and further shall extend to the entire Structure for any consequential damage that results directly or indirectly from such attachment as determined by the City.. This responsibility may be further refined based on a baseline stray current survey before and after commencement of Revenue Service and any required mitigation measures. This provision shall not be considered to conflict with the requirements of Schedule 15-2 Part 4 Article 8.14 – Bridge, Overhead and Roof Structure Attachments.

21.4 Material

a) General

(i) All material for the Structures as identified in this article shall conform to OPSS.

b) Concrete

(i) Project concrete shall conform to OPSS 904.

(ii) Chloride Permeability

A. The 90-day for the superstructure mix shall not exceed 1000 coulombs.

c) Reinforcing Steel

(i) Project Co shall meet the requirements for reinforcement steel as defined in the OPSS 905 and OPSS 1440.

(ii) Minimum reinforcement designation shall be 15M.

(iii) Welded splices or joints in reinforcing steel shall not be permitted. Welding for purposes of bonding and grounding continuity is permitted.

(iv) Couplers shall not be used in plastic hinge zones.

(v) No splices allowed in plastic hinge zones for substructure components.

(vi) Reinforcing steel for Train Structures in the top surface of decks, top and bottom of cantilevers and Guideway plinths that may be subject to de-icing salts, such as adjacent to platforms, shall be stainless steel. Further, substructures of Train Structures within the splash zone of roadways treated with de-icing salts shall be stainless steel. Where electrical continuity is required for managing stray currents, weldable reinforcement and suitable welding shall be used.

(vii) Reinforcement in parapets and sidewalks shall be GFRP or stainless steel and shall match the reinforcing steel in the deck.

(viii) Reinforcing steel in substructure concrete within the splash zone of adjacent roadways treated with de-icing salts shall be stainless steel. Where electrical continuity is required for managing stray currents, weldable reinforcement and suitable welding procedure shall be used.

(ix) Corrosion Rates for Steel below Ground

A. For the surfaces of structural components exposed to soil, or below the water table, the sacrificial thickness shall be computed at 15 µm/year for first two (2) years plus 4 µm/year for subsequent years for galvanization loss and 12 µm/year after zinc depletion.

d) GFRP Reinforcement

(i) GFRP shall have a minimum modulus of elasticity of 40 GPa.

(ii) GFRP shall have a specified minimum tensile strength of 1000 MPa.

e) Prestressing Tendons

(i) Prestressing tendons shall meet the requirements of:

A. ASTM A421/421M grade 1665 MPa (240) for stressed relieved steel wire; and,

B. ASTM A416/416M grade 1860 MPa (270) low-relaxation seven-wire uncoated steel strand.

(ii) Internal unbounded post-tensioning tendons shall not be permitted.

(iii) External grouted post-tensioning tendons are permitted for segmental Construction and shall be corrosion protected.

f) Structural Steel

(i) Structural steel shall be designed in accordance with OPSS 906.

(ii) Steel for superstructure primary members shall comply 350 AT Category 3 for plates, girders; and rolled sections.

(iii) Primary steel members made from pipe sections shall meet the minimum Charpy Impact energy specified in Table 9 of CSA G40.21-04 for the similar yield strength of steel tested at a Category 3 temperature.

(iv) Secondary steel shall be grade 350W or 350A.

(v) Steel fabrication companies shall be CWB certified.

(vi) Project Co shall detail and protect the structural steel-to-concrete interface in a way that no rust staining of the concrete occurs.

(vii) Access to steel girders for inspection purposes shall be incorporated into the design, including devices to enable inspectors to walk along all girders and tie-off safely.

21.5 Loads and Forces

a) Structures or parts of Structures subject to Train and/or highway vehicle loadings shall be designed by Limit States Design method per the CHBDC. Such designs shall consider loads due to System-wide elements such as electrification, signalization and communication equipment.

b) Bridge Structures not subject to Train loadings shall be designed in conformance to Table 3.1 Load factors and load combinations indicated per the CHBDC.

c) Bridge Structures subject to Train loadings shall be designed in conformance to Table 3.1 Load factors and load combinations indicated per the CHBDC supplemented and modified as indicated below to recognize Train and rail loadings. Note nomenclature conforms to Legend for Table 3.1.

(i) Live Load (L)

A. Live load shall consist of any non-permanent loads including the weight of machinery, equipment, sorted materials, persons, Vehicles, work train, or other moving objects, Construction loads, and loads due to Maintenance operations.

B. All Bridge Structures, including Train Structures, shall also be designed to accommodate highway vehicular loading CL-625- ONT in accordance to CAN/CSA S6.

(ii) Impact (I)

A. Impact loads are statically equivalent dynamic loads resulting from vertical acceleration of the live load. Impact acts as part Transitory load L.

B. Impact Considerations

i. Impact considerations for aerial Train Structures and/or work train transit loading shall meet the requirements as follows:

1 Impact shall be applied to the superstructure and generally to those members of the Structure that extend down to the top of footings. The portion above the ground line of concrete or steel piles rigidly connected to the superstructure as in rigid frame or continuous design is included. Impact shall not be considered for abutments, retaining walls, wall-type piers, piles, footings and service walks, except for the portion of piles rigidly connected to the superstructure, underground Structures with 900mm or more of cover and base slabs supported by earth (either at-grade or in subways).

2 The impact force shall be applied at the top of low rail, distributed the same as outlined for the axle loads.

3 In addition to the vertical impact, a horizontal impact (or nosing) force (NF) equal to 10% of railroad train or Train Design load shall be applied. This force shall be equally distributed to the individual axles of the LRV and shall be assumed to act in either direction transverse to the Track at the top of the low rail.

(iii) Centrifugal Force (CF)

A. Centrifugal force shall be determined in accordance with AREMA and CHBDC for Train and highway loadings respectively. Centrifugal force acts as part Transitory load L.

(iv) Rolling (Rocking) Force (RF)

A. A force equal to 10% of the Train loading per Track shall be applied downwards on one rail and upwards on the other, on one or all Tracks. The rolling or rocking force is an impact load in addition to other vertical impact loads and shall be considered when detrimental to the Structure.

(v) Longitudinal Force (LF)

A. Longitudinal force shall be determined in accordance with AREMA and CHBDC for LRT and highway loadings respectively. Longitudinal force acts as part Transitory load L.

i. For Train Loading:

1 A longitudinal traction and braking force equal to 25% of the static vertical live load shall be applied on all loaded Tracks at the level of the uppermost rail. The force generated is offset by the resistive clamping force of the rail clip and the number of plinths on the Bridge. Typically, the clamping force per clip is 13.35 KN. The clip clamping force shall be checked and confirmed by the Project Co for each individual case prior to being used in the Design.

2 A longitudinal acceleration/deceleration force equal to 21% of the LRV Design load, without impact, per Track, shall be applied at the center of gravity of the LRV above the top of the rail. Consideration shall be given to combinations of acceleration and deceleration forces where there is more than one Track on the Structure.

(vi) Horizontal Earth Pressure (E)

A. Structures which retain earth shall be designed for side pressure due to earth abutting against the Structure and load surcharges resting on abutting earth. Consideration shall be given to multi-layered effects where substantial differences in soil properties occur over the depth of the Structures.

B. Train loading may be assumed as a uniform surcharge load equal to an additional 900mm of earth.

C. Live and dead loads from adjacent foundations of Structures shall be considered in computing horizontal pressures.

(vii) Hydrostatic Pressure and Buoyancy (B)

A. Hydrostatic pressure and buoyancy shall be determined in accordance with CHBDC.

(viii) Wind Load on Structure (W)

A. The Bridge Structures shall be designed to withstand wind loads of uniform pressure acting upon the superstructure and substructure as specified in this section.

B. Wind loading on catenary shall be considered in the Design of both superstructure and substructure elements. Loads (magnitude and location) shall be determined by Project Co.

C. The wind load on the superstructure shall be determined in accordance with CHBDC.

D. The wind load on the substructure shall be determined in accordance with CHBDC.

(ix) Wind Load on Live Load (WL)

A. WL is wind load acting on the LRV and shall be considered part of Transitory load V

B. Provision shall be made in the Design of the superstructure for a transverse and longitudinal horizontal wind load as specified in this section. These loads apply to the Design of substructure elements supporting a single Track. For the Design of substructure elements supporting two Tracks, these loads shall be increased by 30% when both Tracks are loaded. This factor accounts fully for shielding effect of Vehicle-on-Vehicle as the two Trains run alongside each other.

C. Design shall include a transverse horizontal wind load of 4.4 kN/m and a longitudinal horizontal wind load of 1.1 kN/m for the entire length of Track supported by the element being designed. The transverse load shall be applied to the Train as concentrated loads at the axle locations, in a plane 2.4m above the top of the low rail and normal to the Track. The longitudinal force shall be applied to the rails and superstructure as a uniformly distributed load in a horizontal plane at the top of low rail.

(x) Thermal Force (T)

A. Provision shall be made for stresses and deformations resulting from temperature changes described in this section. Indicated thermal forces act as part Transitory load K.

B. Expansion Coefficients

i. The expansion coefficients of the various Construction materials shall be in accordance with CHBDC.

C. Direct-Fixation Temperature Forces

i. For direct fixation Track, provision shall be made for transverse and longitudinal forces due to temperature variations in the rail. These forces shall be applied in a horizontal plane at the top of the low rail.

ii. Transverse Force

1 For equal adjacent spans, the transverse force in pounds per span of Structure per rail shall be determined by the following formula:

T = 2*E*A*C*T*sin(½)* (L/R) * (180/pi) (N)

Where:

E Young's modulus of rail (MPa)

A = rail cross-sectional area (mm2)

C = coefficient of expansion of rail

T = temperature differential (°C)

L = span length along curve (m)

R = curve radius (m)

pi = 3.14159

2 For unequal adjacent spans, the transverse force shall be resolved into components parallel and perpendicular to the pier at each rail fastener and then summed.

iii. Longitudinal Force

1 The longitudinal force per Structure per rail shall be determined by the following formula, in lieu of more exact coefficient of friction and breakaway load values for specific clips:

T = 0.65*P*L

Where:

P = vertical clamping force of rail fastener per linear metre

L = average span length of two adjacent spans (m)

For curved Track, L is measured along curve.

D. Overhead Catenary System Thermal Forces

i. Thermal forces resulting from the temperature variations in the OCS shall be considered. Loads shall be determined by Project Co.

(xi) Differential Settlement

A. Load(s) induced on the Structures by tolerable differential settlement shall be considered in the loading combination. Consider this load similar to

shrinkage and thermal forces. The tolerable differential settlement shall be established in accordance with these criteria. This is a Transitory load S in CHBDC Table 3.1.

(xii) Derailment Load (DR)

A. Potential derailment load effects shall be considered. In the absence of actual crash test data or the results of a detailed dynamic crash/impact analysis the load effect of a derailment event can be accounted for by applying concurrently vertical and horizontal (transverse) forces to the supporting Structure as follows:

B. DR shall be considered an Exceptional load case. CHBDC Table 3.1 shall be considered expanded with an additional ULS Combination 10 with Permanent loads all with an α coefficient conforming to CHBDC Table 3.2 and with a DR load factor of 1.00.

C. The vertical derailment load of LRV's shall consist of the LRV's maximum weight multiplied by an impact factor. A vertical impact factor of 100 percent of the LRV weight shall be used to compute the equivalent static derailment load.

D. Horizontal (transverse) load effect – equal to 20% of the LRV, distributed proportionately along the length of the Train in accordance with the axle load distribution along the length of the Train, acting perpendicular (transverse) to the Track Alignment at the top surface of the rail.

E. When checking any component of superstructure to substructure that supports two or more Tracks, only one Train on one Track shall be considered to have derailed, with the other Track being loaded with a stationary work train, including work train, cranes, flats, etc., or another Train, ready to receive Passengers from the derailed Train. The Design load used shall be the greatest of these loadings.

F. For derailment events that would cause LRV wheels to bear directly on the Structure slab, the wheel load distribution on the slab shall be established using a rational method. Location of derailed wheel excursion limited by guard rails or curbs shall be that location that achieves maximum loading condition.

G. All elements of the Train Structure shall be checked assuming simultaneous application of all derailed wheel loads. The reduction of positive moment in continuous slabs due to derailed wheel loads in adjacent spans shall not be allowed.

(xiii) Earthquake (EQ)

A. Earthquake load is an Exceptional load EQ in CHBDC Table 3.1. These seismic loads shall be in accordance with CAN/CSA S6-06 Section 4.

B. New Train Structures and portions of Station structural systems that carry or support Train loads shall be designed to meet Emergency route importance category.

C. Existing Structures are to be importance category Other.

21.6 Distribution of Loads (for applicable Structure type)

a) Distribution of Wheel Loads to Slab for Tie and Ballast Track

(i) For tie and ballast Track wheel loads are transmitted to the deck slab through the ballast. It can be assumed that the wheel loads are uniformly distributed longitudinally over a length of 900 mm, plus the depth of the Track Structure, plus twice the effective depth of slab, except as limited by wheel spacing. Wheel loads can be assumed to have uniform lateral distribution over a width equal to the length of the tie plus the depth of ballast under the tie, except as limited by the proximity of adjacent Tracks or the extent of the Structure.

b) Distribution of Wheel Loads to Slab for Direct Fixation Track

(i) For direct fixation Track, wheel loads are transmitted to the deck slab through the rail fastening system placed directly on the slab. It can be assumed that the wheel loads are uniformly distributed over a length of 900 mm along the rail. This load can be assumed to be distributed transversely (normal to the rail and centered on the rail) by the width of the rail fastener plus twice the depth of the deck and Track support Structure except as limited by the proximity of adjacent Tracks or the extent of the Structure.

21.7 Design Requirements

a) Seismic Design

(i) Existing overpasses proposed to carry the Train shall not be seismically retrofitted if found to be structurally satisfactory for all other loading combinations. In the exception that an existing overpass Bridge must be rehabilitated to satisfy service load requirements, then it shall be seismically retrofitted in conformance to an Emergency Route importance category.

(ii) Seismic retrofit of existing Train Structures shall conform to current standard practice for rail Structures. Retrofit is considered likely to include strengthening of substructures and installation of isolation bearings. Isolation bearing assemblies shall be configured and designed to accommodate service and thermal displacements without permanent deformations. Pendulum bearings with fusible links and/or dampers to restrain service displacements are acceptable. Lead core elastomeric bearings shall not be used for rail Bridges.

b) Collision Protection

(i) Piers or other Train Structure support elements that are situated less than three meters from the edge of an adjacent street or highway shall be designed to withstand a horizontal static force of 1,000 kN, unless protected with suitable barriers. This force is to be applied on the support element at an angle of 10 degrees from the direction of the road traffic and at a height of 1,200 mm above ground level. This condition occurs with the dead load of the Structure but need not be applied concurrently with other loadings. The provisions of this clause shall apply to existing and proposed Train Structures.

(ii) To limit damage by the redirection and deflection of equipment, piers supporting Bridges over the LRT and with a clear distance of less than six meters from the centerline of a Track shall be of heavy Construction or shall be protected by a reinforced concrete crash wall.

A. Crash wall shall have a minimum height of 1,200 mm above the top of rail. The crash wall shall be at least 600mm thick and at least 3.5 meters long. When two or more columns compose a pier, the crash wall shall connect the columns and extend at least 900mm beyond the outermost columns parallel to the Track. The crash wall shall be anchored to the footings and columns, if applicable, with adequate reinforcing steel and shall extend to at least 1,200mm below the lowest surrounding grade.

B. Piers shall be considered of heavy Construction if they have a cross-sectional area equal to or greater than that required for the crash wall and the larger of its dimensions is parallel to the Track.

C. Consideration may be given to providing protection for Bridge piers over six meters from the centerline of Track as conditions warrant. In making this determination, account shall be taken of such factors as horizontal and vertical Alignment of the Track, embankment height, and an assessment of the consequences of serious damage in the case of a collision.

c) Vibration and Deflection Control

(i) Indicated provision for vibration and deflection shall be incorporated into Design of new Project Structures. Vibration and deflection shall be reviewed for existing Structures and reasonable mitigations applied to meet criteria, but variances for vibration and deflection limits shall be allowed for existing Structures.

(ii) To limit vibration amplification due to the dynamic interaction between the superstructure and the LRV, the first-mode natural frequency of flexural vibration of each Guideway span shall generally be not less than 2.5 cycles per second and no more than one span in a series of three consecutive spans shall have a first-mode natural frequencies less than 2.5 cycles per second provided that due

consideration is given to possible vibration interactions between the Train Structure and the LRV, and their effect on vertical impact loading.

(iii) The deflection of longitudinal girders under normal live load shall not exceed 1/1000 of the span length. For main cantilever girders, the deflection under normal live load shall not exceed 1/350 of the cantilever span.

(iv) A special analysis shall be conducted for any Bridge or superstructures having a first mode of vibration, which is less than 2.5 hertz, or for the condition when more than one span in a series of three consecutive spans has the first mode of vibration, which is less than 3.0 hertz.

(v) This analysis shall model the proposed Train Structure and the proposed LRV. The analysis shall contain a sufficient number of degrees of freedom to allow modeling of the Train Structure, LRV truck spacing, LRV primary suspension, LRV secondary suspension, and the car body. It shall make provision for the placement of the LRV on the Train Structure in various locations in order to model the passage of the LRV. When the exact configuration of either the LRV or the Train Structure is not known, the study shall assume a reasonable range of parameters and shall model combinations of those parameters as deemed appropriate.

(vi) The analysis shall determine whether impact loads in excess of 30 percent of LRV are required for the Design of the Train Structure. The analysis shall also determine whether certain operational considerations such as speed restriction or other provisions are required in order to ensure the safe operation of the LRV over the Train Structure.

d) Track Support Transitions

(i) At all transitions between Track slab or Bridge decks with DFF and tie and ballast Track sections a depressed approach slab shall be provided to permit the Construction of tie and ballast Track up to the end of the DFF section without an abrupt change in rail support condition at that point.

21.8 Design and Construction of New Structures

a) Environmental, hydrology and channel hydraulic studies shall be performed to address all immediate and long-term impacts and issues for all bridges over water.

21.9 Design of Roadway Structures

a) Roadway Bridge Structures that do not receive LRV loadings shall be designed in accordance with CAN/CSA S6 per Article 21 Section 21.2.

21.10 Design of "U" Approach and Other Earth Retaining Structures

a) When Limit States Design methods are used for proportioning wall sections, the lateral earth pressure load factor to be used is 1.5.

b) Where Structures are design as drained, a drainage layer shall be provided behind the wall including abutments to mitigate the build-up of hydrostatic pressure. Both the water pressure and the lateral soil pressure shall be considered in the Design. Water from drainage layer shall be removed with drainage system acceptable to local Relevant Authority.

c) MSE walls shall not be utilized as the primary support load paths for Bridge beams and stringers.

d) Earth retaining Structures whether temporary or permanent greater than five meters in height shall be designed on the basis of specific soils information relating to the backfill material. Such walls shall be analyzed using a recognized numerical design method accounting for the rigidity or flexibility of the soil-structure interaction.

21.11 Description of Project Structures

a) Project Co shall:

(i) Twin-Cell Box Culvert under West Transitway

A. Ensure that structural capacity of the top slab not be exceeded with passage of work Trains (speed restriction). All transverse expansion joints shall be replaced.

(ii) Holland Avenue Bridge (SN 016240)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

B. Construct new pedestrian Bridges adjacent to existing Bridge with similar depth.

(iii) Parkdale Avenue Bridge (SN 016230)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(iv) Hinchey Avenue Bridge (SN 016220)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(v) Carruthers Avenue Bridge (SN 016210)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(vi) Bayview Avenue Bridge (SN 016200)

A. Rehabilitate and reconstruct as appropriate.

B. Address approach slab's bearing on Bridge.

C. Identify and remedy the cause of settlement in embankment behind approach MSE retaining walls. Repair any displacements

(vii) West Transitway CPR Overpass "O-Train" Bridge (SN 015040)

A. Remove and replace the existing Bridge Structure with a new Train Structure;

B. New Train Structure shall be configured so as to allow at least single Track operations during future Train Structure maintenance and rehabilitation, including total replacement of Train Structure. During major rehabilitation or replacement activities, limited weekend double track activities shall be permitted of no more than fifty-four hour durations. Project Co shall submit supporting documents describing compliance with this provision;

C. Provide vertical clearances to existing rails that, at a minimum, maintain existing clearances;

D. Design pier and abutment locations such that:

i. Future O-Train direct connection to OLRT downtown is not prohibited;

ii. Horizontal clearance, at a minimum, maintains the existing rail clearances at both existing rail lines;

iii. The extension of the existing O-Train spur rail to accommodate the new O-Train is provided for;

iv. Sufficient space and clearance is provided to allow for a future double-tracked electrified light rail line and platform which would replace the existing O-Train spur line; and

v. The design coordinates with the O-Train platform level LRT Station entry.

E. Meet Station Platform edges within required tolerances. Project Co shall note that additional structural provisions may be necessary to moderate

differential service displacements of Platform and Train Structure to accommodate AODA requirements.

F. Relative displacements between new Station and Platforms and the Train Structure shall be accommodated to limit damage during service and design seismic event.

(viii) New Booth Street Bridge

A. Design for "emergency-route" seismic performance.

B. Design to follow Lebreton Station architectural theme.

C. North approach design shall consider existing subsurface covered aqueduct crossing under Booth Street.

D. Bridge foundation design shall consider all existing subsurface utilities crossing under Booth Street including large brick sanitary sewer.

E. Design shall ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(ix) Mann Avenue Bridge (SN 016950)

A. Possible use of existing substructure.

(x) Nicholas Ramp Underpass Structure #401

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

B. Protect existing piers from errant LRT Vehicles.

(xi) Queensway Underpass Structure (SN 014010)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

B. Coordinate Work with roadway widening to be carried out by MTO.

(xii) Lees Avenue Underpass Structure (SN 016050)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(xiii) Rideau River Crossing (SN 013010)

A. Possible use of existing Structure. Resonance constraints shall be addressed. Project Co shall investigate and impose restrictions as necessary to limit work Train loading on existing Bridge, if utilized.

B. The Structure shall incorporate MUP's on both sides of the Bridge equal in width to the existing.

(xiv) Hurdman Station West Structure

A. Design to follow Hurdman Station architectural theme.

B. Note landfill area with potential bearing and corrosion issues for substructures.

C. Design concept shall incorporate Station concept and shall protect for future roadway configuration.

(xv) Hurdman Station East Structure

A. Design to follow Hurdman architectural theme.

(xvi) Riverside Drive Structure (SN 056650)

A. Possible use of existing Structure. Should this Structure be utilized for the LRT Project, Design for "other" seismic performance.

(xvii) West Ring Road Underpass (SN 056660)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

B. Protect existing piers from errant LRT Vehicles.

(xviii) New East Ring Road Underpass

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance as roadway above to remain. Two-way traffic on one side of D-Loop may be required to maintain existing station ingress and egress. Note close proximity to existing East Ring Road Bridge.

(xix) Tremblay Road Underpass (SN 056680)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

B. Protect existing piers from errant LRT Vehicles.

(xx) Belfast Road Underpass (SN 056690)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

B. Coordinate Construction with Schedule 40 – Highway Work.

(xxi) East Transitway Queensway Underpass (SN 056700)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(xxii) St. Laurent Station Tunnel Structure (SN 056710)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance. Should any trenches be opened up in front of walls to relocate existing large storm sewer directly beneath Transitway, apply stabilization measures to footings as required.

(xxiii) Combined East Transitway Structure 4 (SN 056720) & Structure 2K

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(xxiv) East Transitway Structure 3 (SN 056730)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(xxv) East Transitway Structure 8 (SN 056740)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(xxvi) East Transitway Structure 10 (SN 226720)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(xxvii) East Transitway Structure 5 (SN 226730)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(xxviii) Cyrville Road Underpass (SN 226740)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(xxix) Southbound East Parkway Bridge (SN 226750)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(xxx) Northbound East Parkway Bridge (SN 226760)

A. Ensure the passage of LRT Vehicle under this Structure with adequate clearance.

(xxxi) Cyrville Drain Culvert (SN 226770)

A. Structure current-code deficient, replacing existing structural Construction may be cost effective. Possible replacement with single span Train Structure. Design new Structure for "emergency-route" seismic performance.

b) New retaining wall drawings exist in the databank for information purposes. A list of retaining wall Structures and the anticipated works is shown below:

(i) Booth Street Bridge – North and South approaches

A. To protect for future development, the roadway approaches to the Booth Street Bridge, from the north and south, shall be constructed with retaining walls. No sloped embankments shall be permitted greater than 0.3m in height.

B. Retaining walls shall be constructed within the Lands.

(ii) East Portal to Campus Station Retaining Walls

A. Note hydrogeological concerns in this area. Further geotechnical study required including the bedrock. Sensitive subsoil conditions require careful Construction, monitoring and mitigation methods to ensure groundwater changes do not occur. Permanent secant wall socketed into bedrock proposed. Note property constraints.

B. Concrete shall be finished in accordance with Schedule 15-2 Part 5 Design and Construction – Stations clause 2.7(a) Architectural cast in place concrete. Exposed surfaces shall have a fenestration pattern of reveals with horizontal spacing 0.8 m (min.), 1.2 m (max.) and vertical spacing of 3.5 m (max.).

C. Top of vertical walls shall be detailed to accept the ornamental metal fencing as indicated in the Federally Mandated drawings. Modifications to the detail are permitted as follows:

i. Height of wall above adjacent grade may be increased as required to resist traffic loads where the U wall is directly adjacent to a public roadway. Height of concrete at such locations shall be

limited to the minimum required by Code. Temporary excavation support shall be removed to accommodate the minimum height of concrete.

ii. Width of concrete wall above grade adjacent to pedestrian walkway may be reduced to increase the available sidewalk width.

(iii) MSF North Portal West and East Retaining Walls

A. Proposed U-Boat type wall transitioning to piled L-wall as Tracks merge. Provide for adequate drainage behind wall if designed as a drained Structure.

(iv) MSF South Portal to Grade Retaining Walls

A. Note groundwater and property constraints. U-Boat type concrete section proposed. Provide for adequate drainage behind wall if designed as a drained Structure.

21.12 Construction

a) Concrete

(i) All concrete mixes shall be in accordance with CAN/CSA A23.1-04.

(ii) Concrete Constructions shall be in accordance with OPSS 904.

(iii) Exposed concrete subjected to salt splashing shall use stainless steel reinforcement.

(iv) Concrete under expansion joints such as ballast walls and bearing seat areas shall use stainless steel reinforcement.

b) Pre-cast Pre-stressed Concrete

(i) Pre-cast members shall not be erected until sample cylinders tested per OPSS 1350 achieve a design 28 day compressive strength.

(ii) Concrete Constructions shall be in accordance with OPSS 909.

c) Pre-Cast Segmental Concrete

(i) Pre-cast segmental Bridges shall be constructed in accordance with the requirements of AASHTO's Guide Specifications for the Design and Construction of Segmental Bridges (1999 Second Edition and 2003 Interim) except where it conflicts with CAN/CSA S6-06 including supplement No. 1, May 2010.

d) Structural Steel

(i) Structural steel shall be constructed in accordance with OPSS 906.

e) Drainage

(i) Deck Drainage shall be designed in accordance with the Highway Drainage Design Standards. A deck drainage discharge system shall include water collectors in accordance with OPSD 3340.153 with down pipes located at columns. Collectors shall be located to prevent drainage flow across expansion joints. A minimum crossfall of 0.5% shall be provided. Runoff water from the deck surface of the Structure shall be discharged in accordance with the drainage and environmental requirements of the Governmental Authority. Discharge flows shall not cause icing/overland flow in existing roadways.

(ii) Expansion joints shall be detailed to allow longitudinal conveyance of runoff without leaking at, or over, the joints.

(iii) Drain pipes shall be external to the concrete.

(iv) Drainage shall not discharge from the Guideway within the RVCA Regulated Flood Plain.

(v) Clean-outs shall be provided at the bases of Guideway drain pipes.

(vi) The drain pipes shall be galvanized steel at Stations and Booth Street Bridge.

(vii) Deck drains and other local details as per the MTO Structural Manual shall be utilized to prevent/minimize staining to substructure elements.

f) Deck Slabs shall be designed to the required loading of Section 21.5 above.

g) Structures supporting highway loads shall be outfitted with approach slabs as per OPSD.

h) Waterproofing – For all Structures deck waterproofing shall be required. The top of the existing and new concrete Structures shall be waterproofed as per OPSS or AREMA, as appropriate. For Train Structures where Direct Fixation is utilized, another technology such as epoxy base or methyl methacrylate concrete sealer shall be employed. In-situ testing and warranties shall be required.

i) Soffits shall be uncovered and without coatings.

j) Bearings shall be uncovered and without coatings.

k) At abutments access to Bridge bearings shall be electrically bonded with a 1.2m (nominal) standing room space to facilitate regular easy inspection.

l) Ducts in new Bridges shall only be incorporated within sidewalks.

m) Bolted connections shall have a minimum diameter of 22mm and A325M designation of weathering steel.

n) Welded connections – critical welds, such as over supports and midspan, shall be treated as tension splices subjected to more stringent tests (Non-Destructive Testing). Testing schemes shall be submitted by Project Co for review.

o) Barriers – only PL2 and PL3 shall be acceptable.

p) Long-term settlements of foundations shall be specified.

q) Earth Retaining Structures

(i) Project Co shall construct earth retaining Structures in accordance with MTO RSS Design Guidelines, September 2008 and CAN/CSA-S6-06 including Supplement No. 1, May 2010.

(ii) Long-term settlements of foundations shall be specified.

ARTICLE 22 IMPLEMENTATION CONSTRAINTS

22.1 General Requirements

a) The Construction planning for this Project shall consider the existing operations of the City, and the impacts to the street network within the City, as well as considering adjacent residences and businesses, with respect to pedestrian and property access and other environmental impacts. The Construction sequencing shall be performed in such a manner that the existing BRT is maintained at a service level similar to existing conditions for the maximum amount of time.

b) The intent of this Article is not to define or limit Project Co's approach to the Construction or the means and methods that may be chosen but to bring awareness to the Project constraints that are to be considered in the planning processes.

c) Construction storage on NCC or other Federal Lands shall be limited to the implementation of the OLRT project and shall be contained within the construction boundaries as per Hoarding Plans at all times.

d) Project Co shall reinstate to their original conditions, unless otherwise indicated in the on the Federally Mandated Station Drawings and at Project Co's expense, all Lands, roadways, pathways and assets affected by the implementation of the OLRT project.

e) For all Lands and Lands subject to FLUA Project Co shall:

   (i) Develop hoarding plans in accordance with the NCC hoarding specifications. The boundaries of the construction sites shall be fenced at all times. No use or access to adjacent NCC lands shall be permitted without the express approval by the NCC.

   (ii) Maintain the construction hoarding in a good condition of repair at all times.

f) No tree, shrub and brush clearing shall take place during the migratory bird nesting season between April 1st and August 15 of each year.

22.2 Construction Planning and Constraints

a) Preceding any full closure of any portion of the BRT, Project Co shall complete all temporary Stations and associated facilities for that portion of the BRT in accordance with Project Co's approved BRT Service Management Plan. Refer to Part 7 Article 7 – Traffic Management for Construction Access. In addition, all associated detours for the City bus circulation shall be in service by The City before this portion of the BRT is allowed to be closed.

b) The City is undertaking improvements to the O-Train at Bayview Station from May-September 2013, Project Co shall not be permitted to work in or around the O-Train platforms at Bayview station during this period unless the Project Co work is coordinated with and approved by the City in advance.

c) Project Co shall complete the restoration of the surface streets along the Alignment between and including the west and east portals, including restoration of all work sites including vertical shafts for Station entrances and ventilation structures, completion of all street and sidewalk paving, completion of permanent traffic control signage and street markings, removal of all temporary detours, temporary traffic controls, Construction fences and barricades. This work shall be completed no later than June 1, 2017.

d) NCC recreational pathways shall remain open to public use to the extent possible during construction. Temporary signage indicating detours shall be provided if pathway closures are required.

e) The existing BRT layby at Bayview Station shall be protected during construction and kept operational for OC Transpo use. Project Co shall coordinate with OC Transpo for operational implications and duration of use.

22.3 Access to Adjacent Properties

a) Project Co shall provide access to all adjacent properties, tenants, and residential drives and building entrances, including access points for fire department connections and for waste removal. Should an existing entrance or access have to be closed or reduced, Project Co shall coordinate with the impacted parties to provide an alternative solution to have continuous access.

22.4 Pedestrian Access

a) Project Co shall accommodate for pedestrian access throughout the Project providing safe passage for pedestrians impacted by the Work. Pedestrian access shall be in conformance with the AODA, CSA accessibility requirements, and the City of Ottawa Accessibility Guidelines, where applicable. Project Co shall prepare and implement a Pedestrian Access Plan detailing pathways, signage and Structures to accommodate pedestrian traffic nearby and through the Project site. The plan shall be submitted according to Schedule 10 – Review Procedure.

22.5 VIA Rail

a) VIA Rail Crossing: Project Co shall coordinate with CN Railroad and VIA Rail to construct yard leads from the mainline into the MSF. Any proposed work within CN right-of-way including any potential rail interruptions on the CN/VIA Rail tracks shall have been coordinated and final approval granted from CN/VIA Rail.

b) Rail scheduled service and patron access to all VIA Rail Station Platforms and Station facilities, including passenger pickup and drop-off facilities, shall be maintained throughout any Construction in the area. Any proposed work including any potential interruptions to vehicular and/or pedestrian access to the VIA Station shall have been coordinated and final approval granted from VIA Rail.

22.6 Coordination with Other Contracts

a) Project Co shall coordinate with Third Party Contractors who may be performing work which may connect, complement, interfere, or in any manner impact this Project. It is the responsibility of Project Co to work with these Third Party Contractors to fully coordinate interfaces and resolve any disputes or coordination problems that may arise.

b) A list of planned projects and projects currently underway can be found on the City of Ottawa Website www.ottawa.ca/devapps.

c)

22.7 Work Hours Limitations

a) Project Co shall abide by all federal, provincial, and municipal statutes regarding hours of work, except for the City of Ottawa's Noise By-law No. 2004-253, in which case Project Co shall follow the Noise By-law including the amendment provisions detailed in Table 22.1. Should Project Co need to work hours outside of the statutes or the amendment provisions provided in Table 1-22.1, Project Co shall provide a plan describing the work activities, Construction equipment required, proposed hours of work and mitigation efforts with respect to noise and other environmental considerations potentially impacted with the increased work hours. This plan shall be approved by the governing agency with authority to grant approvals to the specific statute.

b) Project Co shall be aware of the local community and political public events that may impact the work on the Project.

Table 1-22.1 - City of Ottawa Noise By-law No. 2004-253
Working Hour Restrictions and OLRT Amendments

By Law Section	By Law Provision	OLRT Amendment for Tunnel Construction
7. Construction		
7. (1)	Between **10 pm of one day and 7 am of the next day**, no person shall operate or cause to be operated, any construction vehicle or construction equipment in connection with the construction of any building or structure, highway, motor car, steam boiler or other engine or machine.	Despite sections 7. (1), excavation work shall be permitted after **10 pm and before 7 am** for work 3 metres and deeper below the immediate ground surface using tunnelling, sequential excavation or other similar tunnel construction techniques. The construction work at this time of the day shall also not exceed 60 dBA when measured at the point of reception.
7. (2)	Despite subsection (1), no person shall	Despite Subsection 7(2),

Table 1-22.1 - City of Ottawa Noise By-law No. 2004-253 Working Hour Restrictions and OLRT Amendments		
	operate or cause to be operated any construction vehicle or construction equipment before **9 am on any Sunday or statutory or public holiday**.	construction vehicles shall be permitted before 9:00 a.m. on any Sunday or Statutory or public holiday for work 3 metres or below the immediate ground surface using tunnelling, sequential excavation, or other similar tunnel construction techniques.
7. (3)	Despite subsections (1) and (2), no person shall operate or cause to be operated any construction vehicle or construction equipment between **10 am and 12 pm of the same day on the 11th day of November** in the area within the boundaries described in the by-law (generally areas lead to and are around war memorial)	No amendment recommended.
7. (4)	This is a recommended new Section of the By-law.	Despite the amendment to Section 7. (1), for the National Arts Centre (NAC), the construction work schedule will be coordinated between the NAC and the successful OLRT Proponent such that potential impacts during the performance schedule are managed and mitigated. Construction would be allowed on a 24/7, 365 da y a year basis, subject to the NAC/OLRT coordinated work schedule restrictions.
8. Loading & Unloading		
8. (1)	No person shall load or unload any transport truck, moving van or motor vehicle between **11 pm of one day and 7 am of the next day** so as to make or cause noises that disturb, or tend to disturb the quiet, peace, rest, enjoyment, comfort or convenience of the neighbourhood or of persons in the vicinity.	Despite Section 8. (1), trucks may be used between **11 pm of one day and 7 am of the next day** to remove excavated materials away from OLRT tunnel excavation site(s).
15. Power Equipment		
15. (1)	No person shall operate or cause to be operated any power equipment such as	Despite sections 15. (1), power equipment shall be

Table 1-22.1 - City of Ottawa Noise By-law No. 2004-253 Working Hour Restrictions and OLRT Amendments		
	chain saws, power lawn mowers, leaf blowers, power tools or other similar devices, between **9 pm of one day and 7 am of the next day** the noise from which disturbs or tends to disturb the inhabitants of the neighbourhood, or persons in the vicinity.	permitted to be operated between **9 pm of one day and 7 am of the next day** to support tunnel excavation work 3 metres and deeper below the immediate ground surface using tunnelling, sequential excavation or other similar tunnel construction techniques.
15. (2)	Despite subsection (1), no person shall operate or cause to be operated any power equipment before **9 am on any Saturday, Sunday, statutory or public holiday**.	Despite sections 15. (2), power equipment shall be permitted to be operated before **9 am on any Saturday, Sunday or statutory or public holiday.**

22.8 Noise and Vibration Mitigation

a) Project Co shall abide by all federal, provincial, and municipal statutes regarding noise levels and noise mitigation. Prior to commencement of Construction, Project Co shall prepare and implement a noise control plan in accordance with Schedule 17 prepared by a Professional Engineer describing the predicted Construction noise and mitigation measures required to meet the noise level limitations.

22.9 Construction Staging Areas

a) Properties that can be utilized as Construction staging areas are shown on the Reference Concept and included on the property matrix referenced in Schedule 1 Appendix 2 – Lands Schedule. Should Project Co require additional properties beyond those shown to be provided, it is the responsibility of Project Co to acquire any additional property.

ARTICLE 23 NEW MUNICIPAL INFRASTRUCTURE

23.1 Responsibility for New Municipal Infrastructure

a) Project Co is responsible for the Design and Construction, including completion, commissioning and testing, of any new Municipal Infrastructure. Design and Construction shall be carried out in strict accordance with this Project Agreement.

b) All Design and Construction in connection with the new Municipal Infrastructure to be constructed by Project Co shall incorporate the applicable design standards of the City.

23.2 Handover of New Municipal Infrastructure

a) From and after twelve (12) months following the Final Completion Date, Project Co shall have no further obligations to perform Maintenance Work in connection with the New Municipal Infrastructure. Handover of any new Municipal Infrastructure shall be done in accordance with the requirements of the City.

ARTICLE 24 EXISTING STRUCTURE SEISMIC UPGRADE

24.1 General

a) The provisions of this Article relate to RFP Schedule 3 Part 2 – Financial Submission – 3.9 Itemized Price for Seismic Upgrade to augment Article 21.7 (a) – Seismic Design, with additional requirements that apply to certain existing bridges that carry the proposed OLRT Transitway.

24.2 Scope of Work

a) The provisions of this article apply to the following existing bridge structures:

(i) Bayview Avenue Bridge

(ii) Mann Avenue Bridge

(iii) Rideau River Crossing

(iv) Riverside Drive Structure # 665

24.3 Design Requirements

a) In addition to the provisions of Article 21 Structures, the existing bridges identified by the scope of this Article shall be designed, constructed, and maintained in conformance to the seismic importance category for emergency route bridges as defined by the Canadian Highway Bridge Design Code.

ARTICLE 25 AS BUILT DRAWINGS

25.1 General

a) For the initial system to be designated/constructed, Project Co shall submit an initial set of As Built Drawings to the City for review in accordance with Schedule 10-Review Procedures

b) Initial As Built Drawings for all disciplines (architectural, civil, structural, electrical, mechanical, systems, etc.) shall be submitted by Project Co to the City no later than six (6) months prior to Substantial Completion.

c) The City will provide comments on the initial As Built Drawings within thirty (30) calendar days of receipt.

d) Project Co shall finalize the As Built Drawings (incorporating the comments from the City) and submit final As Built Drawings to the City no later than three (3) months prior to Substantial Completion.

e) Changes to the final As Built Drawings after Substantial Completion are to be submitted by Project Co as per Schedule 15-3.

ARTICLE 26 OPERATIONS TRAINING SCHEDULE

26.1 Operations Training Curriculum and Materials

a) The City shall be given an opportunity to review the curriculum and all training materials associated with any of the Operations Training Programs referenced in this Schedule. Project Co shall be responsible to submit all documentation associated with any of the training referenced in this Article to the City at a minimum three months prior to the specific training program's commencement.

b) Training programs shall be subject to review by the City, in accordance with Schedule 10. During the three (3) month interval between the submission of the training program and the commencement of training, the City shall review and suggest changes to any of the material that is submitted. Suggested changes to the training programs shall be incorporated prior to the training commencing. In addition, Project Co shall abide by the provisions of Schedule 14, 1.5 (d) Training. The review of the training curriculum and materials apply to programs provided by Project Co Trainers, in addition to those programs provided by OC Transpo Trainers. Project Co shall develop all training programs, including curriculum and materials, referenced in this Article.

26.2 Training Provided to Project Co Drivers

a) Trained and certified Project Co Drivers shall be responsible for vehicle operation as directed by the City. Project Co Drivers shall be permitted to operate Revenue Service Vehicles during commissioning, Trial Running and after the commencement of Revenue Service. However, Project Co Drivers shall only be allowed to operate Revenue Service Vehicles that are not in service (i.e. not carrying Passengers). Upon the commencement of Trial Running, they shall be responsible for vehicle operation as directed by the City.

b) Project Co Drivers shall be trained and certified by Project Co Trainers prior to operating Vehicles on the Alignment or within the confines of the MSF.

c) The Project Co Driver Training program shall utilize a fully developed curriculum, with all training materials, classroom and field training, testing, pass/fail criteria and certification.

d) The Project Co Driver Training program shall include a provision for verifying that all potential Project Co Driver candidates possess a valid Driver's License that allows for operating an automobile in the Province of Ontario.

e) Project Co shall be responsible for all costs associated with Project Co Drivers necessary to test and commission the system, as defined in Schedule 14 - Commissioning.

26.3 Training Provided to OC Transpo Trainers

a) Project Co shall be responsible for training the initial group of OLRT Trainers.

b) Project Co's Train the Trainer Program (provided by a Project Co Trainer) shall ensure that an OC Transpo Trainer has been trained and certified to instruct and certify employees who are assigned to or have any duties and responsibilities on the OLRT, excluding OLRT Controllers. The program shall utilize a fully developed curriculum, with all training materials, classroom and field training, testing, pass/fail criteria and certification.

c) Project Co's Train the Trainer Program (provided by a Project Co Trainer) shall ensure that an OC Transpo Trainer has been trained and certified to instruct Emergency Service Providers on all aspects of the System that they may be required to be knowledgeable of in the event of an emergency. The program shall utilize a fully developed curriculum, with all training materials, classroom and field training, testing, pass/fail criteria and credentialing.

d) Project Co shall be responsible for all costs associated with the Train The Trainer Program. The sole exception will be that the City will bear the cost of providing the employees being trained as OLRT Trainers.

e) Project Co shall be responsible for at least five(5) OLRT Trainers being fully trained and certified at least three(3) months prior to the anticipated commencement of Trial Running. Trial Running will commence when Project Co has demonstrated to the City that all Testing and Commissioning has been successfully completed.

26.4 OLRT Driver Training

a) The OLRT Driver Training program shall utilize a fully developed curriculum, with all training materials, classroom and field training, testing, pass/fail criteria and certification. The training curriculum and materials shall be developed by Project Co, and be subject to the review provisions of this Article.

b) Project Co shall not be responsible for any of the OC Transpo personnel costs associated with the OLRT Driver Training Program.

c) OLRT Driver Training shall occur commensurate with the Vehicles commencing to operate on the Alignment. It shall continue during commissioning until such time that the requisite number of OLRT Drivers have been trained and certified to support Commissioning and Revenue Service.

26.5 Training Provided to OC Transpo Controllers

a) Project Co shall be responsible to train the OLRT Controllers.

b) Project Co's OLRT Controller Training Program (provided by a Project Co Trainer) shall ensure that an OLRT Controller has been trained and certified to safely perform all dispatching functions associated with the System. The program shall utilize a fully developed curriculum, with all training materials, classroom and field training, testing, pass/fail criteria and certification.

c) Project Co shall be responsible for all costs associated with the OLRT Controller Training Program. The sole exception will be that the City will bear the cost of providing the employees being trained as OLRT Controllers.

d) Project Co shall be responsible to ensure that the number of Controllers necessary to operate the system are trained and certified prior to the commencement of Trial Running. Project Co shall commence the training of Controllers upon the issuance of the first "track protections" issued to Project Co employees or contractors.

26.6 Training Provided to Emergency Service Providers

a) The OLRT Training program for Emergency Service Providers shall utilize a fully developed curriculum, with all training materials, classroom and field training, testing, pass/fail criteria and certification. The training curriculum and materials shall be developed by Project Co, and be subject to Schedule 10 – Review Procedure.

ARTICLE 27 ALBERT STREET WORK

27.1 Scope of Work

a) Project Co will be provided with a complete design from the City of Ottawa for work including but not limited to roadwork, the separation of sewers, water main replacement and other underground utility work in the Albert Street area from approximately Preston Street to Bronson Avenue, including Empress Avenue, Perkins Street, Lorne Avenue and Booth Street from Albert Street to Primrose Avenue.

b) Project Co shall construct the work shown in the design and reinstate the roadway to the existing ROW configuration upon completion of the underground work.

c) Project Co shall coordinate the utility and roadway work with the utility and roadway work of the OLRT Project in this area.

27.2 Limits of Allowance Work

a) The limits of the construction that will be included in the allowance shall be the work shown in the City design within the limits of the existing Albert Street and the other roadways' curb lines and the storm water outfall connection to the Tailrace outfall.

b) All work associated with the new Booth Street Bridge including intersection improvements at Albert Street and the Booth Street Utility relocations are included in the OLRT project and are not part of this allowance.

c) All work associated with BRT detours shall be included in the OLRT Project and are not part of this allowance. Should Scott Street (from Smirle Avenue to Bayview Road) and Albert Street (from Bayview Road to Bronson Avenue) be used as a BRT detour, the widening for the detour shall be included in the OLRT Project except that the full width pavement overlay shall be part of this allowance.

d) The allowance shall be coordinated with the requirements of Project Agreement Section 20.13.

27.3 Mobility Matters Lane Closures

a) In accordance with the requirements of Schedule 37 Mobility Matters, Part B, the following Lane Closures for Albert Street shall be included in the draft Lane Closure Target Letter:

(i) Peak Hour Lane Closures – 1,700 hours.

(ii) Off Peak Lane Closures- 4,000 hours.

(iii) Night Lane Closures – 500 hours.

ARTICLE 28 QUEEN STREET WORK

28.1 Scope of Work

a) Project Co shall be provided with a complete design from the City of Ottawa for the separation of sewers and road rehabilitation work along Queen Street from approximately Bronson Avenue to Lyon Street, and water main replacement work along Queen Street from approximately Bronson Avenue to Elgin Street.

b) Project Co shall construct the work shown in the design and reinstate the roadway to the existing roadway configuration upon completion of the underground work.

c) Project Co shall coordinate the utility and roadway work with the utility and roadway work of the OLRT Project in this area.

28.2 Limits of Allowance Work

a) The limits of the construction that will be included in the allowance shall be the work shown in the City design within the limits of the existing Queen Street curb lines.

b) All work associated with the new Station entrances along Queen Street including utility relocations, are included in the OLRT Project and are not part of this allowance.

c) The allowance shall be coordinated with the requirements of Project Agreement Section 20.13.

28.3 Mobility Matters Lane Closures

a) In accordance with the requirements of Schedule 37 Mobility Matters, Part B, the following Lane Closures for Queen Street shall be included in the draft Lane Closure Target Letter:

(i) Peak Hour Lane Closures – 600 hours.

(ii) Off Peak Lane Closures- 1,400 hours.

(iii) Night Lane Closures – 200 hours.

ARTICLE 29 SYSTEMS COORDINATION

29.1 General Description

a) Notwithstanding the following coordination issues, Project Co shall be responsible for coordinating all aspects of the OLRT Design and the integration of OLRT infrastructure with all other system and subsystems as required. Infrastructure shall be inclusive of the design of the MSF and Tunnels.

b) This Article provides a listing of the systems elements, the coordination required between these elements and all the OLRT Infrastructure elements.

c) Revenue Vehicles

(i) Typical coordination elements between OLRT infrastructure and OLRT Systems are:

A. Vehicle dimensions shall be coordinated with the Guideway Design and selected Vehicle;

B. Vehicle weight shall be coordinated with the Guideway Design and selected Vehicle;

C. Wheel/rail interface criteria shall be coordinated with the Guideway Design and selected Vehicle;

D. Pantograph/contact wire interface criteria shall be coordinated with the Guideway Design, the OCS Design and selected Vehicle;

E. Vehicle dynamic and static envelopes for Guideway clearances shall be coordinated with the Guideway Design, Infrastructure Design and selected Vehicle;

F. Door height above top of rail for Platform edge shall be coordinated with facilities Design and selected Vehicle;

G. Project Co shall work with the Radio System Supplier to ensure that the antenna requirements within the Tunnel and along the Guideway for Vehicle voice /and high speed data radio communication shall be coordinated with Tunnel Design and communications;

H. High speed data radio data communication on the vehicle and associated vehicle and trackside antenna requirements within the Tunnel, or along the Guideway, shall be coordinated with Tunnel and Guideway Design and Communications; and

I. Antenna requirements within Tunnel or Guideway for Train Control communication shall be coordinated with Tunnel and Guideway Design and Communications and Radio Supplier.

d) Traction Power Supply System

(i) Coordination shall be required to route the cables to the Tunnel and Guideway segments, and provide pullboxes, switches and SCADA monitoring as follows:

A. Positive cable routing;

B. Negative cable routing;

C. Communication cable routing; and

D. Suitable electromagnetic segregation of cables in the ductlines and conduits.

e) Overhead Catenary System

(i) Coordination shall be required for wire support system hardware, messenger wire, contact wire, feeder wire termination points and appropriate switchboxes as follows:

A. OCS typical electrical clearance criteria;

B. Messenger wire installation arrangements;

C. Contact wire installation arrangements;

D. Disconnect/ bypass or isolation switches; and

E. Protection devices.

f) Train Control System

(i) Coordination shall be required for the location and mounting of the trackside radio antenna, the location and mounting of termination points, and the routing to the communications room as follows:

A. Location of Train Control antenna and interface to communication rooms;

B. Location and typical mounting of wayside transponders; and

C. Location of ductline and conduit interfaces to wayside transponders.

g) Communications Systems

(i) Coordination shall be required for locations and mounting of elements noted below, routing of cabling to each element, termination of cabling to each element, and routing to the communications room:

A. Locations of communication ductline and conduit interfaces to communication rooms including the TSCC, YCC and BCC;

B. Quantity and sizing of ducts within communications ductlines and conduits;

C. Location and quantity of pullboxes;

D. Location and arrangements of blue light stations;

E. Location and mounting arrangement of CCTV cameras;

F. Location and mounting arrangements of PIDS;

G. Location and mounting arrangement of telephones, intercoms and communications devices;

H. Location and mounting of IAC;

I. Location and mounting of Fare collection system; and

J. Location and conduit interface for SCADA and BMS.

h) Corrosion Control System

(i) Coordination shall be required with the following:

A. Location and typical arrangement for any corrosion control mitigation Equipment;

B. Locations of measuring points; and

C. Stray current monitoring system.

i) Non-Revenue Vehicles

(i) Coordination shall be required with the following:

A. Non-Revenue Vehicle dimensions shall be coordinated with the Guideway Design and selected Non-Revenue Vehicle type;

B. Non-Revenue Vehicle weight shall be coordinated with the Guideway Design and selected Non-Revenue Vehicle type;

C. Where applicable the wheel/rail interface criteria shall be coordinated with the Guideway Design and selected Non-Revenue Vehicle type;

D. Where applicable the Pantograph/contact wire interface criteria shall be coordinated with the Guideway Design, the OCS Design and selected Non-Revenue Vehicle type;

E. Non-Revenue Vehicle dynamic and static envelopes for Guideway clearances shall be coordinated with the Guideway Design selected Non-Revenue Vehicle type; and

F. Project Co shall work with the Radio System Supplier to ensure that the antenna requirements for within the Tunnel and along the Guideway for Non-Revenue Vehicle voice/ and high speed data radio communication and shall be coordinated with the Design of the Tunnel and Communications and the Radio Supplier.

ARTICLE 30 COMBINED SEWAGE STORAGE TUNNEL (CSST) WORK

30.1 Scope of Work

a) Project Co shall be provided with a complete design from the City of Ottawa for a CSST connection including:

(i) Cave Creek Collector pullback sewer consisting of:

A. New Chamber at the intersection of Lloyd Street and the Transitway with a connection to the existing Lloyd-Preston Regulator;

B. New Chamber at the intersection of Wellington Avenue and the Transitway with a connection to the existing live Interceptor Outfall Sewer; and

C. A pipe and duct bank connecting the two chambers noted in A and B above.

(ii) Booth Street Collector pullback sewer consisting of:

A. New chamber at the intersection of Lloyd Street and Wellington Avenue; and

B. A pipe connecting the new chamber at Lloyd/Wellington and the new chamber at Wellington/Transitway.

(iii) CSST north branch consisting of:

A. New chamber at the intersection of Albert Street and the Transitway; and

B. A pipe connection from the new chamber at Wellington/Transitway and the new chamber at Albert/Transitway.

(iv) CSST west branch consisting of:

A. New chamber at the intersection of Albert Street and Booth Street;

B. New chamber at the intersection of Wellington Avenue and Albert Street connecting to the existing live West Nepean Collector;

C. A pipe and duct bank connecting the chamber at Albert/Transitway to the chamber at Albert/Booth; and

D. A pipe and duct bank connecting the chamber at Albert/Booth to Albert/Wellington.

b) The Booth Street Collector pullback sewer, CSST north branch and CSST west branch are subject to the approval of the on-going Environmental Assessment.

c) Project Co shall construct the work shown in the design and reinstate the surface to the existing ROW configuration upon completion of the underground work.

d) Project Co shall coordinate the utility work with the utility work of the OLRT Project in this area.

30.2 Limits of Allowance Work

a) The limits of the construction that will be included in the allowance shall be the work shown in the City design within the limits of the existing Transitway, Wellington Avenue and Albert Street.

b) All work associated with the new OLRT including utility relocations, are included in the OLRT Project and are not part of this allowance.

c) The allowance shall be coordinated with the requirements of Project Agreement Section 20.13.

30.3 Mobility Matters Lane Closures

a) In accordance with the requirements of Schedule 37 Mobility Matters, Parts A and B, the following Lane Closures for CSST Work shall be included in the draft Lane Closure Target Letter:

(i) BRT Peak Lane Closures –1,500 hours.

(ii) BRT Off Peak Lane Closures-3,000 hours.

(iii) BRT Night Lane Closures – 1,500 hours.

(iv) Peak Hour Lane Closures –500 hours.

(v) Off Peak Lane Closures- 1,000 hours.

(vi) Night Lane Closures – 1,000 hours.

ARTICLE 31 ROCK STABILIZATION WORK

31.1 Scope of Work

a) Project Co shall be provided with a complete design from the City for the Construction of a new retaining wall to reinforce the weathered rock along the BRT in the west Transitway from Bayview to Tunney's Pasture.

31.2 Limits of Allowance Work

a) The limits of the construction that will be included in the allowance shall be the work shown in the City design.

(b) All work associated with the new Station and the Guideway are included in the OLRT Project and are not part of this allowance.

b) The allowance shall be coordinated with the requirements of Project Agreement Section 20.13.

31.3 Mobility Matters Lane Closures

a) In accordance with the requirements of Schedule 37 Mobility Matters, Part A, the following Lane Closures for rock stabilization work shall be included in the draft Lane Closure Target Letter:

(i) BRT Peak Hour Lane Closures – 760 hours.

(ii) BRT Off Peak Lane Closures- 1,800 hours.

(iii) BRT Night Lane Closures – 0 hours.

ARTICLE 32 COVENTRY BRIDGE WORK

32.1 Scope of Work

a) Project Co will be provided with a complete design from the City for a multi-use (pedestrian and cyclist) pathway structure from the Ottawa Baseball Stadium parking lot near Coventry Road to the south side of Highway 417 adjacent to Tremblay Road, including ramps, staircases, and multi-use pathway connections. Two of the three required support piers will be constructed in advance of this work by others; one in the Highway 417 median and one in the gore area on the north side of Hwy 417.

b) Project Co shall construct the remainder of the work shown in the design.

c) The work shall be completed such that substantial completion is on or before March 3, 2014.

32.2 Limits of Allowance Work

a) The limits of the construction that will be included in the allowance shall be the work shown in the City design.

b) Coordination of this work with the Highway Work and the utility and roadway work of the OLRT Project in this area is not part of this allowance.

c) All work associated with the new Highway Work and the OLRT project are not part of this allowance.

d) All work associated with BRT detours shall be included in the OLRT Project and are not part of this allowance.

e) The allowance shall be coordinated with the requirements of PA Section 20.13.

32.3 Mobility Matters Lane Closures

a) In accordance with the requirements of Schedule 37 Mobility Matters, Part B, the following Lane Closures for Coventry Road Bridge work shall be included in the draft Lane Closure Target Letter:

(i) Peak Hour Lane Closures –150 hours.

(ii) Off Peak Lane Closures- 400 hours.

(iii) Night Lane Closures – 0 hours.

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SCHEDULE 15-2
DESIGN AND CONSTRUCTION REQUIREMENTS

PART 2
DESIGN AND CONSTRUCTION REQUIREMENTS − GUIDEWAY

ARTICLE 1 INTRODUCTION

1.1 General Description of the Guideway and Guideway Requirements

(a) The Guideway shall:

(i) Provide for two Tracks for approximately 12.5km from Tunney's Pasture Station in the west to Blair Station in the east; between Train Station and St. Laurent Station provide two tracks that shall branch off the mainline for approximately 0.8km to provide connections to the proposed MSF;

(ii) Generally follow the existing BRT alignment between Tunney's Pasture Station and Blair Station, the exception being for approximately 2.7km through the Downtown Area between Lebreton Station and Campus Station where the Guideway will descend underground and be in a Tunnel below Queen Street, Rideau Street and Waller Street crossing under the Rideau Canal near the National Arts Centre and the Rideau Centre, the Alignment shall be within the right of way of Queen Street from Bronson Avenue to Metcalfe Street; and

(iii) Provide an MSF connection that shall branch off of the mainline west and east of Belfast Road crossing Tremblay Road at the intersection with Belfast Road. The two Tracks shall stay within the Lands of Belfast Road from Tremblay to the Bridge over the VIA railroad, then cross the VIA rail tracks adjacent to the Bridge Structure and connect to the yard Tracks in the MSF.

(b) The Guideway shall consist of:

(i) Track sections built on the existing BRT;

(ii) Track sections built off the existing BRT;

(iii) Track sections on Bridge Structures and Tunnel Structures; and

(iv) Track sections through Stations.

(c) The Guideway shall include components for:

(i) Traction Power;

(ii) OCS;

(iii) Communications ductbanks;

(iv) Signal and control Systems;

(v) Drainage systems and Stormwater Management; and

(vi) Other appurtenances as required by Project Co's design.

(d) The Guideway shall be fenced or otherwise enclosed for security.

(e) The Guideway shall not have continuous lighting. Lighting shall be limited to areas of Passenger interactions with buses and Stations and in other areas requiring lighting for Safety or operational needs.

(f) The property limits for the Guideway are defined as the Lands.

ARTICLE 2 ALIGNMENT AND GEOMETRIC DESIGN CRITERIA

2.1 Horizontal Alignment

(a) General

(i) The horizontal Track Alignment shall be designed in accordance with the requirements of Schedule 15 – Output Specifications, and shall be such that all of the Works is contained within the OLRT Lands.

(ii) The maximum Track design speed for the mainline and the MSF connection shall be 100km/h and 30km/h, respectively. Project Co shall Design the mainline Track so as to maximize the operating speed.

(iii) The horizontal alignment shall be tangent through station platform limits and for a minimum of 15m beyond the end of platforms. If site conditions do not provide sufficient length, then the spiral transition curve may begin closer to the platform provided sufficient running clearances between the selected LRV and Platform are achieved.

(iv) All non-track related construction details shall be related to or dimensioned from the centreline of the eastbound Track, unless otherwise noted.

(b) Track Centres

(i) The typical Track centre spacing is 4500mm. The mainline Track centre spacing may be reduced to an absolute minimum based on the selected LRV dynamic envelope and provided sufficient running clearances and tolerances under all operating conditions are maintained.

(c) Horizontal Curves

(i) Circular curves shall be defined by the arc definition of curvature and specified by their radius in metres to three decimal places.

(ii) For mainline Tracks, the curves shall be designed to maintain the maximum possible operating speed as dictated by existing topography, permanent physical features, property, and Alignment constraints. The absolute minimum radius used shall accommodate the turning capability of the selected LRV.

(d) Reverse Curves

(i) All locations that require a reversal in alignment shall be separated by a tangent.

(ii) The minimum tangent length between reversing curves shall be 25m.

(e) Compound Curves

(i) Compound curves may be used on the mainline Track Design.

(ii) Where two or more circular curves will be connected into a compound curve, the circular curves shall be joined by a spiral curve. The superelevation of each circular curve shall be adjusted to ensure that the maximum permissible speeds for all parts of the compound curve are identical.

(f) Spirals

(i) Spiral transition curves shall be used on all mainline and MSF connection Tracks to connect circular curves to tangents, with the exception that spirals are not required where both actual superelevation is zero and unbalanced superelevation is less than 50mm.

(ii) The minimum length of a spiral transition curve (L, m) shall be calculated using the actual superelevation (Ea, mm), unbalanced superelevation (Eu, mm), and design speed (V, km/h) and shall be determined by selecting the greater value of the following formulas:

A. $L = EaV/108$; and

B. $L = EuV/180$.

(iii) The absolute minimum length of spiral shall be 10m.

(g) Superelevation

(i) Superelevation shall be linearly attained throughout the full length of the spiral curve by raising the rail farthest from the curve centre, while maintaining the top of the inside rail at profile grade.

(ii) For mainline Tracks, the maximum actual superelevation shall be 150mm for ballasted Track and direct fixation or embedded Track. The maximum unbalanced superelevation shall be 115mm. These values may be modified for the selected LRV provided the 0.1g limit that passengers can tolerate comfortably is achieved. The total superelevation (E, mm) shall be based on the design speed (V, km/h) and equivalent radius (R, m), per the formula $E = 11.83V^2/R$.

2.2 Vertical Alignment

(a) General

(i) The vertical Track Alignment shall be set to respect constraints such as clearances over roads and fixed elevations such as at Station Platforms and other adjacent Infrastructure. The vertical Track Alignment shall be designed in accordance with the requirements of this Schedule 15 – Output Specifications. All references

to profile in the vertical Alignment shall represent the top of the low rail for a given Track.

(b) Grades

(i) The maximum allowable grade through Stations shall be 1.5%.

(ii) No changes in grade or vertical curves shall encroach within the limits of Station Platforms.

(iii) A minimum distance of 15m shall be maintained between Platform limits and any point of vertical curvature. If site conditions do not provide sufficient length, then the spiral transition curve may begin closer to the Platform provided sufficient running clearances between the selected LRV and Platform are achieved.

(iv) The maximum grade for mainline and MSF connection Tracks shall be 4.5%, where unachievable the absolute maximum grade for mainline and MSF connection Tracks shall be no greater than 6%.

(c) Vertical Curves

(i) Parabolic vertical curves shall be provided for all grade changes.

(ii) The length of a vertical curve shall be as long as practicable, but no less than shown below.

(iii) The minimum length of vertical curve (LVC, m) for mainline and connection Tracks shall be determined by the following equations:

A. $LVC = 0.005AV^2$, for crest curves; and

B. $LVC = 0.003AV^2$, for sag curves.

2.3 Special Trackwork

(a) Special trackwork shall conform to AREMA requirements.

(b) The horizontal Alignment shall be tangent through special trackwork and for a minimum of 5m ahead of the point of switch and beyond the last long ties. In constrained conditions, the tangent shall extend a minimum of 2m beyond the heel of frog.

(c) For profile Design, all turnouts shall be located on a constant grade that shall extend a minimum of 3m beyond the point of switch and beyond the last long ties.

(d) A minimum tangent length of 20m shall be inserted between the back to back switch points where the turnout arrangement may entail a reverse movement through turnouts.

(e) Special trackwork shall not be located within 15m from the end of the Station Platform and not within a Station Platform.

(f) Special trackwork shall not be located within 50m of the transition between ballasted and direct fixation Track as outlined in the TCRP Light Rail Handbook. Project Co shall provide for special accommodations to mitigate the effects of different Track modulus under various geometric conditions.

2.4 Other Alignment Requirements

(a) Combined horizontal and vertical curvature: Overlapping horizontal and vertical curvature shall be avoided where possible. Where this situation is unavoidable, Project Co shall include justification in its Trackwork Design Report with reference to alignment Safety at the design speed.

2.5 Clearances

(a) Vehicle Clearances

(i) Horizontal clearance dimensions shall always be measured perpendicular to the Track centreline accounting for any superelevation in the Track.

(ii) On tangent Track the typical side clearance shall be a minimum of 1690mm measured perpendicular from the Track centreline. The mainline Track side clearance me be reduced to an absolute minimum based on the selected LRV dynamic envelope and provided sufficient running clearances and tolerances under all operating conditions are maintained.

(iii) Where no walkway is present, a typical minimum side clearance of 1890mm from Track centreline to any physical feature shall be maintained on tangent at-grade and retained cut Track. The mainline Track side clearance may be reduced to an absolute minimum based on the selected LRV dynamic envelope and provided sufficient running clearances and tolerances under all operating conditions are maintained.

(iv) Under cut-and-cover conditions, a typical minimum side clearance of 2150mm shall be provided from Track centreline. The mainline Track side clearance may be reduced to an absolute minimum based on the selected LRV dynamic envelope and provided sufficient running clearances and tolerances under all operating conditions are maintained.

(v) Where emergency walkways are present, tangent Track shall maintain minimum typical side clearances of 2300mm from the Track centreline to an outbound curb, railing fence, or other physical feature. The mainline Track side clearance may be reduced to an absolute minimum based on the selected LRV dynamic envelope and provided sufficient running clearances and tolerances under all operating conditions are maintained.

(vi) Additional clearances shall be provided on the inside of curves due to superelevation effects at the rate of 18mm for every 10mm of superelevation, to provide clearance for tilt-in. On curved Track the Vehicle side clearance shall be

measured perpendicular to the superelevated Track centreline (axis of the Track measured perpendicular to the plan of the top of rails).

(vii) The typical horizontal clearance distance from the centreline of Track to the finished edge of Station Platform shall be 1405mm, or as otherwise required for the selected LRV such that a gap no greater than 75mm is maintained.

(viii) Vertical clearance dimensions shall always be measured in a vertical plane irrespective of any superelevation or profile grade. When superelevation is present, the top of low rail shall be used as the reference elevation when calculating vertical clearance.

(b) Other Clearance Requirements

(i) Signal and trackwork equipment mounted on Track slab along the Alignment shall be kept clear of the under car clearance envelope of the Vehicle.

(ii) Temporary clearance requirements for construction shall be assessed on an individual basis.

ARTICLE 3 TRACKWORK

3.1 Order of Precedence

(a) General

(i) The Design and Construction of trackwork shall be in accordance with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. If the event of a conflict between the criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

A. Requirements of this Article;

B. AREMA Track Standards, or equivalent; and

C. The criteria in TCRP Report 57.

3.2 General Requirements

(a) The scope of the trackwork includes all Works related to the Construction of a complete LRT System as specified herein.

(b) The scope of the special trackwork consists of all Works related to the complete Construction of special trackwork as described in this Schedule 15 – Output Specifications. This includes, but is not limited to, the Design, supply, installation, and testing of special trackwork, including all turnouts, crossover components, adjoining trackwork, fastening components, and all other Track materials.

(c) Project Co shall be responsible for control and any mitigation which may be a result of wheel-rail noise throughout the OLRT System in accordance with Schedule 17-Environmental Obligations.

3.3 Track Types

(a) General

(i) The Track structure shall be built to 1435mm Track gauge. Direct fixation Track shall be used in Tunnels, on aerial structures. Ballasted Track or direct fixation Track shall be permissible through Station Platforms and at all other locations on the Alignment where performance is not compromised and maintenance can be achieved.

(ii) The running rails of all mainline Track, including special trackwork, shall be electrically isolated from the ground.

(b) Ballasted Track

(i) Ballasted Track shall utilize timber or precast concrete crossties with a resilient rail fastening system.

(ii) Crushed stone or other material shall conform to AREMA ballast specifications.

(iii) The particle size requirements shall conform to AREMA requirements in relation to the crushed stone ballast, class number 4A.

(iv) Minimum depth of ballast below the bottom of ties under the running rail shall be 225mm. Shoulder ballast shall extend a minimum of 300mm beyond the ends of ties before sloping at 2:1 to the sub-ballast.

(v) Ballast shall be well drained and shall not contact the running rails for mitigation of stray current and loss of shunting or calibration with signal systems.

(vi) Track bed shall be of sufficient stability to permit operation of track circuits under all climatic conditions.

(c) Direct Fixation Track

(i) Direct Fixation Track

A. Direct fixation Track shall consist of a resilient direct fixation rail fastener system anchored or embedded into a concrete plinth or base slab.

B. The direct fixation Track fastening system shall be designed to support required loading and avoid accumulation of runoff in the rail support areas.

(ii) Track Transition Area

A. Transitions from ballasted Track sections to direct fixation Track shall use a 6m long variable-depth reinforced concrete approach slab to accommodate the change from the solid support of the Track slab to the semi-solid support of the change in Track modulus of the ballast.

3.4 Track Materials

(a) General

(i) Materials identified in the following sections shall be used for all Track Construction.

(b) Rail/115 lb RE

(i) Supply rail that meets:

A. AREMA Volume 1, Chapter 4, Part 2; and

B. ASTM A1.

(ii) Rail Lengths

A. Standard rail lengths shall be used wherever possible.

B. All rail shall be CWR.

(c) Restraining Rails

(i) Project Co shall install restraining rails along the gauge side of the low rail for all mainline horizontal curves with a radius of 145m or less.

(ii) Restraining rail shall be electrically isolated from running rail in order to maintain broken rail protection.

(d) Direct Fixation Fasteners

(i) Project Co shall provide DFF that shall meet the requirements of this Schedule 15 – Output Specification.

(ii) The DFF shall be part of an engineered direct fixation system and shall be designed to meet the required rail loading.

(iii) Project Co shall design the DFF system to resist all slip forces as determined by design.

(iv) The DFF shall:

A. Provide vertical and lateral stability to the rail;

B. Restrain the rail movement during rail break incidents limiting the rail break gap to 50mm;

C. Distribute rail loadings to the concrete support structures;

D. Electrically insulate the rail from the Guideway;

E. Accommodate CWR and structural interface forces;

F. Prevent rail buckling under high temperature conditions; and

G. Provide means for achieving a minimum of 12mm rail lateral adjustment in 3mm maximum increments.

(e) Rail Joints

(i) Project Co shall supply insulated glued joints for 115lb RE rail manufactured to AREMA standards.

(ii) Rail joints shall be electrically tested prior to and after placement in Track.

(f) Rail Bonding

(i) Project Co shall supply and install rail bonds that meet AREMA specifications in Volume 3, Chapter 33, Part 7 and 12.

(ii) Rails shall be welded in continuous lengths and bolted joints shall be electrically bonded.

(iii) At locations requiring insulated joints, the Traction Power direct current continuity of negative rails shall be maintained by use of impedance bonds.

(g) Switch Clearing Device

(i) Switch clearing devices shall be supplied and installed by Project Co at special trackwork locations. Project Co shall also provide conduits and junction boxes and other supporting Infrastructure for these devices.

(ii) Project Co shall provide switch clearing devices that are proven in similar climatic conditions and meet accepted industry standards and do not compromise safety.

(iii) No gas powered switch heaters shall be permitted in tunnels or enclosed areas.

(h) Switch Machines and other Turnout Appliances

(i) Switch machines and other associated equipment shall be provided and installed by Project Co.

(ii) Project Co shall provide for the location of trackside terminal boxes, which shall be located near the switch machine. Terminal boxes shall not be located within a position that would constrict the ability of Maintenance personnel to maintain or manually throw the switch.

(iii) Switch machines shall be able to be manually operated with minimal physical effort, as a backup to powered operation.

(i) End-of-Track Devices (Buffer Stops)

(i) End-of-Track shock-absorbing devices for use at terminal station Tracks shall be included in the Trackwork Design Report and be which shall be submitted as part of the Works Submittals according to Schedule 10 – Review Procedure. These devices shall be mounted near the end of Track on both Station Platform Tracks. Project Co shall procure and install the approved end-of-Track devices as part of the Works.

(j) Rail Expansion Joints

(i) The anticipated rail movement within the full range of rail temperatures shall be handled by the direct fixation assembly.

(k) Noise and Vibration Mitigation

(i) Project Co shall install a site-specific Track structure where it is required to control levels of noise and vibration, as described in Schedule 17 – Environmental Obligations.

3.5 Special Trackwork

(a) General

(i) All special trackwork shall be supplied and installed by Project Co. Special trackwork assemblages include all materials necessary for Construction.

(ii) All special trackwork joints shall be butt welded in-field except where Project Co can demonstrate that space does not permit. At these locations thermite welds performed in accordance with manufacturer's weld procedures are acceptable. Compromise welds shall be considered part of the mainline Track conditions and installation. No holes, for temporary joint installation, or otherwise, shall be permitted within 150mm of the weld location. All thermite welds shall be tested ultrasonically.

(iii) All turnouts shall utilize tangential geometry with curved switch points. All mainline special trackwork shall be configured with 115lb RE rail.

(iv) Special trackwork components shall be based on AREMA specifications for turnout.

(v) All components shall be designed so that the specified tolerances can be maintained throughout the operating life of the special trackwork with minimal Maintenance.

(vi) Crossover locations shall be integrated with signaling and OCS system designs.

(vii) All mainline turnouts and crossovers shall be optimized to meet or exceed the Operations Performance Requirements outlined in Schedule 15-2 Part 1 Article 2.

(viii) Locations for OCS poles shall be provided at all crossover locations.

(ix) Tail Tracks and pocket Tracks shall be maximized to accommodate at least a minimum length consistent with additional length to improve approach speeds where feasible.

(b) Project Co shall undertake the Design of the OLRT Project and systems and shall provide the following minimum required operational Track facilities:

(i) Tail Tracks west of Tunney's Pasture Station sufficient to facilitate the reversing of trains and to maximize approach speeds into the Terminal Station;

(ii) Optimized crossovers adjacent to the MSF west and MSF east connecting tracks that maximize operational flexibility into and out of the yard and minimize operational impacts to mainline revenue operations during loading and unloading of the line;

(iii) Tail Tracks east of Blair Station sufficient to facilitate the reversing of trains and to maximize approach speeds into the Terminal Station; and

(iv) Interlockings and special trackwork at locations necessary to meet or exceed the requirements of the Operations Performance Requirements (Schedule 15-2 Part 1, Article 2).

3.6 Track Construction Tolerances

(a) Verification of the Track installation shall include a Trackstar Geometry Test (or equivalent).

(b) Clearances shall be verified by laser measurement using an L-Kopia vehicle (or equivalent).

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SCHEDULE 15-2
DESIGN AND CONSTRUCTION

PART 3
DESIGN AND CONSTRUCTION REQUIREMENTS - TUNNEL

ARTICLE 1 INTRODUCTION

(a) This article describes the Design and Construction requirements related to Tunnels.

(b) Tunnels comprise the following:

(i) Tunnels constructed using a TBM, hereinafter referred to as bored Tunnels;

(ii) Tunnels and Stations constructed using SEM that involve mechanized excavation or controlled blasting methods, hereinafter referred to as mined Tunnels, and Stations, as the case may be; and

(iii) Tunnels, Stations and shafts constructed by cut-and-cover methods, hereinafter referred to as cut-and-cover Tunnels, cut-and-cover Stations and shafts, as the case may be;

(iv) Temporary decking and support of excavations for cut-and-cover Tunnels, cut-and-cover Stations, shafts, and retaining walls;

(v) Cross passages between Tunnels, niches, sumps and other excavations within or adjacent to the Tunnels; and

(vi) Initial support and permanent support and lining for bored and mined Tunnels, and mined Stations.

(c) The scope comprises the downtown OLRT Tunnels and associated underground Structures, and the Tunnel and approaches between the Guideway and the MSF.

(d) Project Co shall determine the specific means and methods for Tunnel Construction consistent with the Design and Construction criteria specified herein, except as may be otherwise specified in the remaining articles in this Part 3.

1.1 Scope

(a) Part 3 describes the requirements for Design, Construction, the relevant standards, Design Criteria, and other technical requirements that apply to Tunnel elements.

(b) Specific Design and Construction requirements that shall be integrated with other contract requirements, shall include but are not limited to the following:

(i) Spaceproofing

A. Track Alignment - refer to Part 1 Article 1 – Physical Layout, Part 1 Article 2 – Operational Performance Requirements and Part 2 Article 2 – Alignment and Geometric Design Criteria.

B. Opening size relative to minimum clearance envelopes and required Infrastructure - refer to Part 1 – General Requirements, Part 2 – Design and Construction Requirements – Guideway and Part 5 – Design and Construction - Stations;

(ii) Permanent retained earth structures other than Tunnels – Refer to Part 1 Article 21 – Civil Structural Design Criteria;

(iii) Protection of Existing Adjacent Structures during Construction – refer to Part 1 Article 20 – Protection of Existing Adjacent Structures;

(iv) Corrosion control and stray current protection - refer to Part 1 Article 14 – Corrosion Control;

(v) Requirements associated with future developments – refer to Part 1 Article 19 – Future Adjacent Construction Requirements;

(vi) Geotechnical Requirements – refer to Part 1 Article 12 – Geotechnical/Foundation Design Criteria; and

(vii) Environmental requirements – refer to Schedule 17 – Environmental Obligations.

(c) Construction shall be sequenced to mitigate impacts to the surrounding Infrastructure, including vehicular and pedestrian circulation, access to and egress from adjacent structures, and disruption to existing Utilities. Such Construction sequencing shall consider the order of prosecution of the Work, including the need for multiple shifts, night-time or weekend Work and material deliveries and removal of excavated materials. Refer to Part 1 Article 22 – Implementation Constraints, and Part 7 – Traffic and Transit Management and Construction Access.

ARTICLE 2 GENERAL STRUCTURAL DESIGN CRITERIA

2.1 Scope

(a) This article specifies structural Design parameters and criteria that are common to structural linings for Tunnel structures. Design and performance criteria for temporary excavation support for cut-and-cover structures, initial ground support for bored and mined Structures and permanent Structures are discussed separately.

2.2 Performance Criteria

(a) Selection of Tunneling Method

(i) The selection of the tunneling methods to be employed shall be based on such factors as geology, the dimensions of the Tunnel, the stability of the opening during excavation and prior to placement of the initial support, minimization of ground movements and detrimental impacts of groundwater flow into excavations, and protection of Existing Adjacent Structures.

(ii) Tunneling methods shall be selected so that adequate regard is given to avoiding hazards and mitigating foreseeable risks to those carrying out the Works and others that may be affected.

(b) The temporary excavation support and initial support shall be designed and constructed to support all applicable ground, groundwater, Construction and temporary loads per applicable Design Criteria and standards during Tunnel excavation and until installation of the permanent lining. Maintain the integrity of Existing Adjacent Structures during Construction and limit their deformation within acceptable limits.

(c) Minimum Tunnel Design requirements shall consider:

(i) Durability of permanent lining to support applicable internal and external loads over the structure's Design Life;

(ii) Permanent support and preservation of Existing Adjacent Structures;

(iii) Collection, treatment and disposal of all drainage and intercepted water, where applicable;

(iv) Protection against degradation of permanent lining, for whatever reason, including the presence of gas and soil, rock, and groundwater contaminants; and

(v) Serviceability requirements during operations over the Tunnel Design Life.

2.3 Temporary Excavation Support and Initial Support

(a) Codes, Standards and Manuals

(i) The Design and Construction of the Works shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

A. Codes

i. CAN/CSA A23.3 - Design of Concrete Structures.

ii. CAN/CSA S16 - Design of Steel Structures.

iii. CAN/CSA S6 - Canadian Highway Bridge Design Code.

iv. CAN/CSA G30.18 - Carbon Steel Bars for Concrete Reinforcement.

v. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

vi. AREMA – Manual for Railway Engineering.

vii. CN Guidelines for Design of Railway Structures, Canadian National Railway, Edmonton, Alberta.

B. Design References

i. ASCE Technical Committee on Tunnel Lining Design, Guidelines for Tunnel Lining Design, edited by T. O'Rourke, 1984.

ii. John M. and Mattle B. (2003), Shotcrete Lining Design: Factors of Influence, RETC 2003 Proceedings, 726-734.

iii. Technical Report No. 63, Guidance for the Design of Steel-Fibre-Reinforced Concrete, The Concrete Society, CCIP-017, March 2007.

iv. Specification for Tunnelling, British Tunnelling Society and Institution of Civil Engineers.

v. Tunnel Lining Design Guide, British Tunnelling Society and Institution of Civil Engineers.

vi. Canadian Foundation Engineering Manual, Canadian Geotechnical Society.

(b) Materials

(i) Materials shall be selected by Project Co for strength, geometry, initial set, toughness, and other qualities required for the means and methods selected to perform the Work and in accordance with requirements, standards, and information specified herein.

(ii) Temporary ground anchoring systems used for temporary excavation support or initial support shall consider the location of Utilities and comply with right of way restrictions.

(c) Loads: The potential for unsymmetrical vertical loads or unbalanced horizontal loads due to variations in ground conditions or properties shall be accounted for as follows:

(i) Soil loading on temporary excavation support for cut-and-cover Structures and shafts: Lateral soil loading shall be based on the soil properties as determined by Project Co and type of support proposed;

(ii) Rock loading on temporary excavation support for cut-and-cover Structures and shafts: Lateral rock loading shall be determined through analysis of the rock mass as a continuum and failure of rock wedges;

(iii) Rock and ground loading on initial support for bored and mined Tunnels: Rock and ground loads on the initial support and the interaction between the support measures and the ground shall be evaluated with methods which consider the following modes of failure of the rock or ground mass and corresponding analysis procedures:

A. Failure of discrete rock blocks shall be analyzed using the wedge and discrete block analysis method;

B. The rock or ground mass shall be modeled as a continuum considering potential failure modes. Such analysis procedures shall consider effects of in-situ stresses and stress re-distribution, the strength of the rock mass including the effect of discontinuities on rock mass strength, and stress re-distribution ahead of the Tunnel face. This analysis shall be done using numerical analysis methods;

C. Potential failure of the Tunnel face shall be analyzed by three-dimensional discrete block/wedge stability analysis, and numerical analysis; and

D. Time dependent deformation (swelling) of the shale bedrock with numerical methods where applicable;

(iv) Structural Dead Loads

A. Structural dead loads of the initial support for mined Tunnels can be ignored since shotcrete, rock dowels, steel lattice girders, and other support elements form a composite structure with the surrounding rock mass.

B. Dead loads of structural and non-structural elements for all temporary structures shall be based on unit weights and computed volume of the materials;

(v) Live Loads

A. Live loads on the initial support of bored and mined Tunnels need not be considered except at low cover areas where access to the area above the bored or mined Tunnels by Construction Equipment traffic or other live loads is possible.

B. Design live load for temporary structures shall consist of any non-permanent load placed on or in the temporary structure.

C. Temporary Bridges to provide access for vehicles above the cut-and-cover sections of underground structures shall be designed for traffic loading.

D. Temporary surcharge loads due to Construction Equipment or traffic adjacent to cut-and-cover structures or shafts shall be considered;

(vi) Hydrostatic Pressure

A. Hydrostatic pressure shall be applied to temporary excavation support and initial support systems as appropriate if water-tight support systems are required based upon Project Cos approach to hydrogeology; and

(vii) Thermal Forces

A. Thermal loads shall be considered for temporary excavation support and initial support systems where applicable.

(d) Monitoring Requirements: Project Co shall integrate the following monitoring requirements with other monitoring requirements outlined in this Schedule 15-2:

(i) A systematic monitoring program shall be implemented to monitor the performance of all temporary excavation support and initial support installations;

(ii) The monitoring systems shall be capable of: detecting ground movement and settlement, movement of Existing Adjacent Structures and Utilities, and providing data necessary to assess the structural performance of initial support and temporary excavation support systems;

(iii) The logs and survey notes shall include the following information:

A. Measurements of in-tunnel or other deformations;

B. Construction loading or other activities in the vicinity of instrumentation; and

C. Any cracks in or damage to any in-tunnel, other structures, or other events;

(iv) Temporary excavation support and initial support shall be monitored using a management system based on Trigger Levels and Action Levels, as specified elsewhere; and

(v) To ensure that the excavation and support for Tunnels are proceeding as planned, review procedures shall be developed that will allow all relevant factors to be considered when evaluating the performance of the temporary excavation support and initial support. Project Co shall develop contingency plans to address temporary or initial support that fails to meet the performance requirements developed by Project Co.

2.4 Permanent Support and Lining

(a) General

(i) Mined structures shall utilize a double shell lining system consisting of both initial support and a permanent lining separated by a sheet waterproofing membrane system except as noted in this article. The permanent lining of mined structures shall be constructed of cast-in-place reinforced concrete or reinforced shotcrete after the initial support and waterproofing have been placed.

(ii) The permanent lining for cut-and-cover Tunnels and cut-and-cover Stations, and vertical circulation shafts at Stations shall be constructed of cast-in-place reinforced concrete.

(iii) For emergency ventilation shafts and emergency ventilation Tunnels, the permanent lining may be cast-in-place reinforced concrete or reinforced shotcrete.

(iv) Bored Tunnels shall utilize a permanent lining comprising either bolted-and-gasketed precast concrete segments, or a cast-in-place reinforced concrete lining with a sheet waterproofing membrane system.

(v) Permanent ground anchoring systems shall only be used for resisting uplift forces.

(b) Allowable Post-Construction Groundwater Seepage

(i) Permanent treatments shall be employed as required to ensure that any water present on internal surfaces does not affect the Safety, durability and function of the Tunnels.

(ii) Project Co shall ensure that any groundwater seepage into the completed Tunnels does not drip or flow onto or over Tracks, walkways, egress passages and plant and Equipment rooms.

(iii) To prevent groundwater seepage from entering onto specified Tunnel features, a collection system shall be implemented that collects any seepage from the Tunnel roof, invert and walls and directs it to the drainage system.

(iv) Notwithstanding groundwater seepage and waterproofing requirements, water ingress through permanent linings during the Maintenance Term shall not exceed the following inflow criteria:

A. 0.8 liters per square meter of Tunnel perimeter per day for segmental linings; and

B. 0.2 liters per square meter of Tunnel perimeter per day for other permanent linings.

(v) The specified degree of watertightness shall be achieved prior to Final Completion, and shall be maintained throughout the Maintenance Term.

(c) Codes, Standards and Manuals

(i) The Design and Construction of the Works shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

A. Codes

i. NBC

ii. OBC

iii. CAN/CSA A23.1 Concrete Materials and Methods of Concrete Construction

iv. CAN/CSA A23.2 Methods of Test and Standard Practices for Concrete

v. CAN/CSA A23.3 Design of Concrete Structures

vi. CAN/CSA S6 Canadian Highway Bridge Design Code

vii. CAN/CSA S6.1 Commentary on Canadian Highway Bridge Design Code

viii. CAN/CSA A16 Design of Steel Structures

ix. AREMA – Manual for Railway Engineering

x. ACI 365 -- Service-Life Prediction

B. Design References

i. ITA Fire Guidelines.

ii. Specification for Tunnelling, British Tunnelling Society and Institution of Civil Engineers.

iii. Tunnel Lining Design Guide, British Tunnelling Society and Institution of Civil Engineers

iv. Proctor, R.V. and White, T.L., *Rock Tunneling with Steel Supports*. Youngstown, Ohio: Commercial Shearing, Inc., 1988

v. Hashash, Y.M.A. et al., 2001, *Seismic Design and Analysis of Underground Structures*, Tunneling and Underground Space Technology 16, pp. 247-293,

(d) Federally Mandated Stations shall meet or exceed the requirements of both the OBC and the NBC. Non-Federally Mandated Station need only meet the requirements of the OBC.

(e) Materials

(i) Concrete

A. The minimum 28 day strength of structural concrete shall be 40MPa, except for working slabs, and mass or unreinforced concrete.

B. The concrete mix Design shall include measures to provide the durability and density required to attain the Design Life and for the prevention of the deleterious effects of erosion, groundwater attack, acid attack and sulfate attack as applicable.

C. Special measures shall be taken to minimize the possible deleterious effects of excessive heat of hydration in thick concrete sections.

(ii) Shotcrete

A. The minimum 28 day strength of shotcrete shall be 40 MPa.

B. The shotcrete mix Design shall include measures to provide the durability and density required to attain the Design Life.

(iii) Reinforcement

A. Reinforcement shall comply with CAN/CSA G30.18.

B. Welded wire fabric shall comply with ASTM A185.

C. Steel fibres may be used for reinforcing of bolted and gasketed segmental pre-cast concrete linings provided all Design requirements of this article are met.

D. Steel or macro synthetic fibres may be considered for reinforcing of the permanent linings of emergency ventilation structures only.

(iv) Structural Steel

A. Structural steel shall conform to CAN/CSA G40.21.

(f) Durability

(i) General

A. In the Design of Tunnels for durability, reliance must not be placed solely on the recommendation of Design codes and standards. In selecting materials and measures for durability, due account must be taken of the environment in which the Tunnels are situated and to the monitoring and maintenance Work required to achieve the Design Life. Project Co shall make its own assessment of the performance criteria for Tunnels in terms of:

i. the micro-environment;

ii. potential deterioration mechanisms in this micro-environment;

iii. the likely material life;

iv. the feasibility and cost of in-situ monitoring, maintenance and/or repair and replacement;

v. the necessity of providing additional protection (e.g. coatings); and

vi. the consequences of failure.

B. Results of testing of representative samples of soil and groundwater for various formations encountered on the Project are outlined in the Reference Documents. Project Co shall evaluate these results and assess the need for additional testing to comply with the following requirements in this article.

i. Project Co shall perform sufficient exploration and chemical testing for ground soil and water samples that are potentially harmful to permanent materials in the vicinity of underground Structures so that a rational assessment of the environment can be made and considered in the durability assessment. Types of cement and aggregate and the type and quality of concrete suitable for permanent Works below ground shall be designed to achieve the required Design Life. Project Co shall demonstrate how their Design achieves the Design Life through an analysis such as that set forth in ACI 365.

ii. Project Co shall perform sufficient exploration and chemical testing for groundwater samples that have the potential to cause blockage of drainage systems through the precipitation of insoluble salts in the vicinity of Tunnels. The drainage system suitable for Tunnels shall be designed to achieve the required Design Life.

(g) Waterproofing of Tunnels

(i) The full perimeter of Undrained Structures shall be protected with a sheet waterproofing membrane system except as indicated in this article.

(ii) The arch and sidewalls of Drained Structures shall be protected with a sheet waterproofing membrane system except as indicated in this article.

(iii) Waterproofing membrane systems provided for underground structures that incorporate a permanent cast in-situ concrete or shotcrete lining shall be:

A. Installed in accordance with the manufacturer's specifications;

B. Classified as self-extinguishing;

C. Compatible with the type of waterstops used;

D. Certified by the manufacturer that no components of the waterproofing system shall leach out over the Design Life of the Project and deleteriously affect the durability of any of the following:

i. the waterproofing membrane;

ii. the geotextile drainage/protective layer; and

iii. other plastic materials or PVC materials such as waterstops; and

E. Protected from damage at all times. With the exception of blind forming techniques (i.e single sided forming) or where shotcrete is placed as the final lining, in conjunction with the use of fully-adhered membranes, a protective layer shall be provided over the waterproofing membrane immediately after testing is completed to prevent rupture or damage during subsequent Construction Activities.

(iv) For mined and cut-and-cover emergency ventilation Structures that incorporate a permanent cast in-situ concrete or shotcrete lining, the use of a spray-on waterproofing membrane may be considered subject to the applicable performance criteria being met. Where steel fibres are utilized, the waterproofing membrane shall be protected from punctures.

(v) For bored Tunnels that incorporate a permanent pre-cast concrete segmental lining or similar, Project Co must provide a water sealing system consisting of an elastomeric gasket designed for all anticipated combinations of offsets and gaps with a minimum sealing pressure of two times the maximum anticipated hydrostatic or grouting pressure, whichever is greater.

(h) Fire Resistance

(i) Structural integrity of Tunnels subjected to the Project defined Design fire outlined in Part 3 Article 8 – Tunnel and Station Ventilation Design Criteria, shall not be compromised during the fire event. Explosive spalling of concrete shall be mitigated by methods such as the inclusion of micro polypropylene fibres to the concrete mix for permanent linings or providing a fire resistant interior lining. The development of gas temperature shall correspond to the temperature versus time curves shown in the ITA Fire Guidelines Figure 2.4 unless Project-specific curves are developed by Project Co. The integrity of a Tunnel following exposure to a fire shall be checked, taking into account degradation in material properties due to temperature; Tunnels may require repair but shall not collapse. Guidelines in the ITA Fire Guidelines shall be used for evaluating fire resistance.

(ii) All structural steel members shall be protected from direct fire exposure based on the specified fire intensity and duration outlined herein. If steel members are protected with concrete encasement, the minimum concrete cover shall be 50mm.

(i) Loads and load combinations

(i) Loads and Load combinations are based on the nomenclature and combinations stipulated in Annex C of the CAN/CSA A23.3 Design of Concrete Structures.

(ii) Temporary excavation support and initial support including but not limited to rock dowels, lattice girders, canopy tubes, and spiles must not be used as measures to relieve loads on a permanent structural lining. Where permanent

shotcrete linings are installed load sharing will be allowed if it is substantiated through analysis by Project Co.

(iii) Permanent linings for Tunnels between a point 60m east of the eastern limits of Metcalfe Street and Campus Station shall be designed and constructed as Undrained. Other Tunnel reaches may be designed and constructed as drained or undrained at the discretion of Project Co subject to the determination that Drained Tunnels shall not cause detrimental impacts to groundwater levels as detailed in the hydrogeological impact assessment and associated risk assessment to be completed by Project Co.

(iv) Structural Dead Loads (D)

A. Dead loads of structural and non-structural elements shall be based on unit weights and computed volume of the materials.

(v) Live Loads (L)

A. Design live load shall consist of any non-permanent load placed on or in the Tunnel. Where vehicles can gain access above the Tunnel, the Tunnel shall be designed for traffic loading.

B. Train Loads

i. Structures shall be designed to support the loads from the LRV where applicable.

ii. Structures shall be designed to prevent collapse and minimize damage from derailment. Track guard rails for derailment prevention shall be provided at the locations where primary structural elements, such as columns, cannot be otherwise protected by benches, crash barriers or similar structures. Where emergency guard rails cannot be provided or are ineffective in preventing impact, columns situated within 7.5m as measured from the centerline of a Track and not protected by reinforced concrete benches, platforms or crash barriers, shall be designed to withstand derailment forces. For individual columns, this load shall be considered to be a point load in the most critical direction and for wall piers or crash barriers, the load may be distributed over an area not greater than 1.5m wide by 0.6m high. Derailment shall be considered an extreme case event, and the load factor associated with it may be taken as 1.0. The derailment load shall be taken in combination with the permanent dead and live loads, and 50% of non-permanent live loads of the structure. Alternatively, a redundant load path shall be provided. Where a group of columns is found to be vulnerable to derailment, the effect of any single column being removed shall be investigated with the intent of

checking that progressive collapse will not occur with the failure of one column. This condition shall also be analyzed with a load factor of 1.0.

iii. Vent shaft damper supports, ancillary walls and doors located within or adjacent to the running Tunnels and the divider walls within the running Tunnels shall be designed to withstand the air pressures generated by moving Trains. The maximum values of these reversible air pressures shall be calculated by a Tunnel ventilation Professional Engineer. These elements shall also be designed for cyclic loading and the cyclic loading shall correspond to a minimum of 4 million cycles, and its magnitude shall be obtained from the Tunnel ventilation Professional Engineer. For cross passages provided with one or a pair of doors on each trackside, the extreme loading condition of simultaneous pressure and suction on a single door from Trains moving on both Tracks shall also be considered. This loading condition relates to the unlikely event of a door left open on the opposite side, and need not be considered to be a cyclic application. Load factors shall be appropriately reduced for extreme loading conditions. Walls, doors and damper supports in fan and vent shafts not located adjacent to Stations or portals shall be designed to withstand the pressure transient of running Trains and for air pressures due to ventilation operations, as determined by Project Co.

(vi) Rock and Earth Loads (H)

A. Rock and earth loads on permanent linings shall be evaluated with state-of-the-practice numerical analysis methods used for determining the requirements for temporary excavation support and/or initial support. Rock loads may be checked using the methodology developed by Terzaghi and described in Proctor & White (Proctor, 1977). Rock wedge loads on the permanent lining due to deterioration of the temporary excavation support and/or initial support shall be determined using key block analyses and empirical methods using rock mass classification indices. Time dependent deformation (swelling) shall be evaluated numerically. A load factor of 1.5 shall be applied to these loads.

B. The Tunnel Design shall consider the effects of potential settlement of the Tunnel, Existing Adjacent Structures, and the surrounding ground during the Design Life.

(vii) Hydrostatic Loads (F)

A. No hydrostatic pressure shall be applied to Drained Tunnels. The Design shall consider the effects of blockage of the drainage system.

B. Undrained Tunnels shall be designed for the 100 year ground water table as established in the detailed hydrogeological impact assessment and associated risk assessment prepared by Project Co with a load factor of 1.25. Alternatively, the water table shall be assumed to be at ground level and a load factor of 1.1 shall be used.

(viii) Construction Loads (S)

A. Construction loading due to Equipment located on or adjacent to Tunnels shall be accounted for in the Design.

(ix) Wind Loads (W)

A. Wind loads shall be applied to facade walls where applicable.

(x) Seismic Demands (E)

A. Refer to Section 2.5 in this article for seismic loading.

(xi) Thermal and Shrinkage Loads (T)

A. Minimum reinforcing for temperature and shrinkage stresses shall be provided according to CAN/CSA A23.03. The spacing of this reinforcement shall be less than 3 times the member thickness or 500mm, whichever is less.

B. The minimum reinforcing ratio for the permanent linings of Tunnels shall be 0.25% of the gross concrete section.

(xii) Load Factors and Load Combinations

A. Load factors and load combinations for temporary and permanent Design of Tunnels are provided in the Table below. These load combinations are considered a minimum requirement and any additional critical load combinations shall be considered by Project Co.

	Permanent Loads				Transitory Loads		Exceptional Loads	
	1	2	3	4	5	6	7	8
	D	H	F	S	L	T	E	
Service Limit State, (SLS)								
I Uplift Check (FS > 1.10)[Note 1]	0.9	0.9	1.0					
II Construction[Note 2]	1.0	1.0	1.0	1.0				
III In-Service[Note 3]	1.0	1.0	1.0	1.0				
Ultimate Limit State, (ULS)								
IV Construction[Notes 2,4,5,6,7]	αD	αH	αF	1.5	1.5	1.25		
V In-Service[Notes 3,4,5,6,7]	αD	αH	αF	1.5	1.5	1.25		
VI Earthquake[Note 8]	αD	1.0	1.0	1.0	0.5		1.0	

	α Max LF	α Min LF	Definition
D Dead	1.25	0.9	self-weight as applicable
H Earth (At-rest or Active)	1.5	0.85	
F Fluid (Hydrostatic)	1.25	0.85	NLW, NHW, 100 Yr Flood; use NLW & NHW for Construction related LC's
S Surcharge (Existing or Future)	1.5	0.0	from existing or future structures within a given zone of influence
L Live	1.5	0.0	inlcudes pedestrian, construction, traffic, train (VIA) & LRV
T Temperature, Shrinkage & Creep Effects	1.25	0.0	
E Earthquake	1.0	0.0	

Notes:

1 applies to construction and in-service; for construction, assume no earth cover for cut & cover, assume F at NHW for construction and at 100 Yr for in-service
2 assume no earth cover for cut & cover, consider F at NLW & NHW, only consider existing S if present.
3 consider F at 100 Yr, consider existing S if present, and future S.
4 consider with maximum vertical and maximum horizontal loading, consider with and without L, consider with and without T.
5 consider with maximum vertical and minimum horizontal loading.
6 consider unbalanced from left to right considering maximum vertical and horizontal loading on left and minimum vertical and horizontal on right.
7 consider unbalanced from right to left considering maximum vertical and horizontal loading on right and minimum vertical and horizontal on left.
8 assume 0.9 for earth cover, consider F at NLW & NHW, consider existing S if present, and with and without future S, consider with and without L.

2.5 Seismic Design and Analysis

(a) Performance requirements

(i) The seismic evaluation of Tunnels shall be based on a two-level Design approach which is summarized as follows. Consideration shall be given to both the ODE, which has a mean return period of 475 years, and the higher level MDE, which has a mean return period of 2,475 years. The performance requirements for these two levels of ground motion are as follows:

A. ODE: The Tunnels shall remain fully operational, shall be returned to operations after an inspection, and have experienced only minimal damage. Minimal damage is defined as not allowing yielding in reinforcement and ensuring that the structural response is essentially elastic during this level of event; and

B. MDE: Tunnels shall provide life Safety and not collapse under this event. The Design shall ensure no structural failure of any elements of the Tunnels. Inelastic response of the permanent linings could occur and yielding of reinforcement, cracking and spalling of concrete is expected under this event. The maximum strain under service load combinations, including seismic demands, shall be limited to:

i. Concrete compressive strain: 0.003; and

ii. Reinforcing steel tensile strain: 0.006.

(b) Seismic Analysis

(i) During seismic events, the Tunnels shall remain in intimate contact with the ground.

(ii) The procedure for seismic Design of Tunnels shall be based on the ground deformation approach. The Tunnel shall be designed to accommodate the deformations imposed by the ground before, during and after a seismic event, and the effects of soil structure interaction shall be taken into consideration.

(iii) For Tunnels, three methods may be used for seismic analysis: closed-form solutions, racking analysis, and dynamic analysis. The suitability of each of these methods depends on the geometry of the Tunnel and the complexity of the surrounding ground.

(iv) The appropriate level and scope of the seismic analyses for each type of Tunnel shall be determined by Project Co. The results of the closed-form solutions or racking analyses shall be used as a basis for determining the need and scope of the more detailed dynamic analyses, and whether two-dimensional or three-dimensional analyses may be required.

ARTICLE 3 CUT-AND-COVER STRUCTURES

3.1 Scope

(a) The scope of work includes Designing, furnishing, and constructing, cut-and-cover Structures, including:

(i) Tunnels not constructed by SEM or TBM methods;

(ii) Subsurface entry and exit shaft enclosures, emergency ventilation Structures, and cross passageways not constructed by SEM or TBM methods;

(iii) Temporary excavation support and underpinning systems; and

(iv) Temporary traffic support, including pedestrian, vehicular and rail traffic, as applicable.

3.2 Design and Construction Criteria

(a) Project Co shall design for temporary excavation support, underpinning, and temporary traffic support, including pedestrian, vehicular and rail traffic systems that, in conjunction with the selected means and methods for excavation and Construction of the cut-and-cover structures is in compliance with the requirements of this Project and Environmental Laws.

(b) Project Co shall design permanent cut-and-cover Structures that are durable and structurally sound. Project Co shall ensure that the components are compatible with its selected Construction Equipment, means, methods, procedures, and minimum Design and performance criteria.

(c) For the purpose of underground construction equipment design and operation, the cut-and-cover tunnels shall be classified as 'potentially gassy' in accordance with the US Department of Labor OSHA Part 1926.800.

(d) Project Co shall provide continued undisrupted service and access to all VIA Rail Platforms at Train Station as indicated in Part 1 Article 22 – Implementation Constraints.

(e) Blasting shall be performed in accordance with Schedule 17 – Environmental Obligations and City of Ottawa Standard Tender Documents for Unit Price Contracts Special Provision F-1201 Use of Explosives.

(f) Where exterior water proofing of Existing Adjacent Structures, adjacent to cut-and-cover excavations, is required to be removed to facilitate Construction or is otherwise damaged during Construction, it shall be repaired or replaced in-kind by Project Co to insure future leakage into Existing Adjacent Structures is less than or equal to pre-construction conditions.

(g) Qualifications:

(i) Design of excavation support systems and temporary traffic support, including pedestrian, vehicular and rail traffic support systems shall be performed by a Professional Engineer; and

(ii) Staff for Design and Construction of cut-and-cover structures shall include personnel who have verifiable Design and Construction experience in cut-and-cover structures Work.

3.3 Limitations on Means and Methods

(a) Cut-and-cover construction methods shall not be permitted from 30m west of to 30m east of the Rideau Canal walls inclusive.

(b) Cut-and-cover construction methods shall not be used from the escarpment face at the west portal to Bronson Avenue (i.e. through or adjacent to the NCC owned Bronson Park).

(c) Temporary excavation support wall systems used in the soil over burden in the East Portal area shall be rigid, impervious systems such as secant pile walls. Due consideration shall be given to limiting groundwater movement into the excavation from any location.

(d) Temporary excavation support wall systems used below elevation 60 in the soil overburden along Rideau Street, between Colonel By Drive and William Street, shall be rigid and impervious systems such as secant pile walls. Due consideration shall be given to limiting groundwater movement into the excavation from any location.

(e) Temporary ground anchoring systems in overburden soils shall not be used in the East Portal Area.

(f) At the MSF, CN/VIA Rail Tracks shall be restored on the permanent cut-and-cover structure by use of a ballasted system. A direct fixation Track system shall not be used.

ARTICLE 4 BORED TUNNELS

4.1 Scope

(a) The scope of work includes Designing, furnishing, and constructing, bored Tunnels using a TBM.

4.2 Design and Construction Criteria

(a) Project Co shall provide a TBM capable of excavating and supporting the ground while complying with the requirements of this Schedule 15-2. Project Co shall be responsible for the Design of the TBM system, including backup Equipment, guidance systems, gas detection and monitoring systems, auxiliary systems, support Equipment, and other items necessary for the safe and sustained operation of the TBM including TBM mobilization and launching, TBM retrieval and disassembly, Tunnel muck and water handling, muck volume and backfill grout metering, initial support and permanent lining installation (including tail void grouting), maintenance of the TBM, ventilation, and water treatment and disposal systems, all in accordance with the requirements of this Project and Environmental Law. The TBM system shall be new or refurbished, and designed specifically to meet Project Co requirements for this Project.

(b) Project Co shall Design permanent linings which shall provide a durable, water-tight, structurally sound permanent lining meeting the requirements of this Project. Permanent linings shall be bolted and gasketed segmental pre-cast concrete or two-pass lining system comprising initial support, waterproofing, and a cast-in-place concrete or shotcrete permanent lining. In case of local enlargements and junctions with cut-and-cover Tunnels and mined structures, waterproofing and a cast-in-place concrete or shotcrete permanent lining may be used.

(c) If a bolted and gasketed segmental permanent lining is selected, the following additional criteria shall be met, in addition to other requirements of this Schedule 15-2.

(i) Project Co shall determine the configuration of individual segments erected to form a continuous reach of segment rings in accordance with the following criteria:

A. Tapered rings shall be used as the sole means for negotiating curves and correcting alignment. Packing shall not be used to negotiate curves or correct alignment;

B. Radial joints in adjacent rings shall be staggered so that there are no cruciform joints; and

C. Fabrication and erection tolerances shall be selected to assure that groundwater inflow criteria are met.

(ii) Project Co shall determine requirements for casting, curing, tail void grouting, handling, installation and TBM-induced loads, and repair procedures. Quality

control procedures shall be developed to assure consistent casting dimensions and quality throughout fabrication.

(d) Construction of Tunnels through the bedrock valley just east of Colonel By Drive shall consider the mixed faced conditions at the valley walls and highly variable soil and groundwater conditions within the valley. The following are acceptable options for excavation through this valley:

(i) Pre-excavation stabilization of the soil and mixed face conditions to allow non-pressurized face support; and

(ii) TBM excavation with pressurized face support.

(e) For the purpose of underground construction equipment design and operation, the bored tunnels shall be classified as 'potentially gassy' in accordance with the US Department of Labour OSHA Part 1926.800.

(f) Special Procedures for TBM excavation operations:

(i) Project Co shall develop and implement daily review meeting procedures to evaluate TBM excavation and support efficacy. These procedures shall include a review of the following and any additional issues determined necessary by Project Co:

A. General performance of the TBM and the initial support systems;

B. Convergence and settlement monitoring results;

C. Muck volume and backfill grout metering; and

D. Any corrective actions that are required.

(ii) Details of the process shall be outlined fully in a Support Management Controls Plan and daily review meeting plan.

ARTICLE 5 MINED STRUCTURES

5.1 Scope

(a) The scope of work includes Designing, furnishing, and constructing, mined Structures, as follows:

(i) Running Tunnels not constructed by TBM or cut-and-cover methods;

(ii) Local enlargements and niches, cross passages and sumps;

(iii) mined Stations; and

(iv) Underground parts of entry and exit shaft enclosures, emergency ventilation structures, and connecting Tunnels not otherwise constructed by cut-and-cover methods.

5.2 Design and Construction Criteria

(a) Project Co shall design for the initial support and permanent lining for mined structures, in conjunction with the selected means and methods for excavation and in compliance with specified Design and Construction criteria. Project Co shall be responsible for elements of Design and Construction in accordance with the requirements of this Project and Environmental Law.

(b) Initial support and permanent lining shall be designed for the anticipated load conditions on the completed Tunnel. Project Co shall ensure that the selected Construction Equipment, means, methods, and procedures meet the Design and performance criteria.

(c) For the purpose of underground construction equipment design and operation, the mined tunnels shall be classified as ‘potentially gassy’ in accordance with the US Department of Labor OSHA Part 1926.800.

(d) Blasting shall be performed in accordance with Schedule 17 – Environmental Obligations and City of Ottawa Standard Tender Documents for Unit Price Contracts Special Provision F-1201 Use of Explosives.

(e) Construction of mined Structures through the bedrock valley east of Colonel By Drive shall consider the mixed faced conditions at the valley walls and highly variable soil and groundwater conditions within the valley.

(f) Special Procedures for Determining Initial Support Requirements

(i) Project Co shall develop and implement daily review meeting procedures to evaluate the excavation and support measure requirements and efficacy. These procedures shall be established to authorize the excavation and initial support of a specific reach of the Project, and to confirm the combined behavior of the ground

and the initial support system for prior excavated reaches conform to the Design intent.

(ii) The procedures shall include review of:

A. General performance;

B. Convergence monitoring results;

C. Ground and groundwater monitoring and blast monitoring results;

D. Lining quality – profile, thickness and shotcrete strength results; and

E. Geological mapping.

(iii) Details of the process shall be outlined fully in a Support Management Controls Plan and daily review meeting plan.

(iv) The daily review meeting shall consider the review procedures and any corrective actions will be discussed.

ARTICLE 6 MECHANICAL DESIGN CRITERIA

(a) This article contains mechanical criteria developed for the OLRT above ground, at grade, and running structures and Tunnels, and where applicable the stations. These criteria govern the functional requirements for water and sewage systems, drainage facilities (except at-grade sections), and fire protection systems.

(b) These criteria are intended to promote uniformity of Design and standardization of Equipment, and its location throughout the OLRT System and are not intended to conflict with the minimum requirements of the current codes and standards adopted by the OBC. If a conflict is found, the most stringent shall apply.

6.2 Codes, Standards and Manuals

(a) The Design and Construction of the Works shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) OBC;

(ii) OFC;

(iii) OESC;

(iv) CSA;

(v) CEC;

(vi) OHSA;

(vii) ARI;

(viii) AMCA Standard 210, Laboratory Methods of Testing Fans for Rating Purposes;

(ix) AMCA Standard 300, Test Code for Sound Rating Air Moving Devices;

(x) AMCA Standard 301, Methods for Calculating Fan Sound Ratings from Laboratory Test Data;

(xi) ANSI;

(xii) ASHRAE Handbooks;

(xiii) Standard 90.1-2010 – Energy Standard for Buildings Except Low-Rise Residential Buildings ASHRAE – permitted for Construction after December 31, 2011;

(xiv) Standard 62.1- 2010 – Ventilation for Acceptable Indoor Air Quality - ASHRAE;

(xv) MNECB;

(xvi) Green Energy Act, 2009;

(xvii) ASPE;

(xviii) ASME;

(xix) ASTM;

(xx) APTA, Rail Transit Committee, "Guidelines for Design of Rapid Transit Facilities";

(xxi) DOT, "Recommended Emergency Preparedness Guidelines for Rail Transit Systems";

(xxii) NEMA;

(xxiii) SMACNA;

(xxiv) TIAC;

(xxv) PDI;

(xxvi) UL;

(xxvii) ULC; and

(xxviii) NFPA – Particular references shall be made to the following sections of NFPA:

A. NFPA Standard 10, Portable Fire Extinguishers;

B. NFPA Standard 13, Installation of Sprinkler Systems;

C. NFPA Standard 14, Standpipe, Private Hydrant, and Hose Systems;

D. NFPA Standard 20, Installation of Stationary Pumps;

E. NFPA Standard 70, National Electrical Code;

F. NFPA Standard 90A,lnstallation of Air-conditioning and Ventilating Systems;

G. NFPA Standard 101, Life Safety Code;

H. NFPA Standard 130, Fixed Guideway Transit and Passenger Rail Systems;

I. NFPA Standard 204, Smoke and Heat Venting;

J. NFPA Standard 502, Standard for Road Tunnels, Bridges and Other Limited Access Highways;

K. NFPA Standard 1963, Fire Hose Connections; and

L. NFPA Standard 2001, Clean Agent Fire Extinguishing Systems.

6.3 General Requirements

(a) The requirements include mechanical systems located in the running Structures and Tunnels, and where applicable the Stations. Mechanical Design, Equipment, and installation shall comply with local Relevant Authority including but not limited to the following:

(i) No sanitary waste shall be permitted to enter the storm drainage system;

(ii) All valves and accessories shall be arranged in systemic manner in places accessible for operation;

(iii) Sleeves complete with waterproof seals shall be provided wherever pipes pass through structures, foundation walls, walls that are buried, or wherever a penetration requires a watertight seal;

(iv) All piping accessories shall be sized for trouble free balancing and operation;

(v) Drainage pipes shall not be routed through areas containing electrical, communication, or signalling Equipment;

(vi) Where flow of sanitary drainage systems to municipal sanitary sewer systems cannot be achieved by gravity, systems shall be complete with pumping stations;

(vii) All priming lines shall be insulated and heat traced;

(viii) Pumps located in sumps or pits shall be provided with extended grease lines terminating above the floor level at the top of the sump or pit;

(ix) Pumps located in sumps, pits or tanks shall be provided with a disconnect location outside the sump, pit or tank, with a second waterproof manual quick disconnect in the power line to the pump, to facilitate removal of the pump;

(x) Place floor-mounted Equipment on heavy-weight reinforced concrete housekeeping pads with chamfered edges;

(xi) All mechanical Equipment, piping, control valves, shut off valves, instruments, shall be permanently identified;

(xii) Provide electric disconnect switches for each mechanical Equipment; and

(xiii) All Equipment, pipes, supports, accessories, and their connections to the Structure, must be designed to resist seismic force and to accommodate building seismic deflection in accordance with OBC 4.1.8.17.

6.4 Sanitary Drainage

(a) The water collection system shall accommodate sanitary wastewater from the following sources:

(i) Elevator pits and elevator machine rooms;

(ii) Station public Areas (Platforms, Mezzanine and Street Level Floor Space);

(iii) Staircases;

(iv) Escalator Lower Pits;

(v) Station Room Areas;

(vi) Station sprinkler and standpipe Fire Protection Systems including associated Valve Rooms; and

(vii) Additional areas as required.

(b) Drainage Pump Stations

(i) Pump stations shall be provided for drainage from elevator pits, elevator machine rooms, and escalator lower pits.

(ii) The pump station shall consist of one pump, and concrete sump pit or steel tank ejector, with a gas tight cover.

(iii) Pumps shall be sized for hydraulic requirements based upon the Hazen and Williams formula using a “C” wet factor of 100.

(iv) Pump shall be automatic by the float controls and through a local on-off automatic switch.

(c) Sewage Pump Stations

(i) Sewage pump stations shall consist of two pumps located in a concrete sump, or a steel tank with a gas tight cover, served by 2-pumps floor mounted outside, adjacent to the tanks.

(ii) Pump shall be automatic by the float controls and through a local on-off automatic switch.

(d) Vent Systems

(i) Sections of horizontal vent pipework shall be constructed with a minimum 2% slope toward the soil and waste pipe being served.

6.5 Standpipe System

(a) Two separate water supply lines to each Station shall be utilized. One line shall serve domestic use, and the other line fire protection use.

(b) A manual, dry, Class I, standpipe system conforming to NFPA 14 shall be provided throughout each Tunnel section.

(c) The dry standpipe system including fire valves shall be located on the service way side of the Tunnel Track way.

(d) Components of the standpipe system shall include the following:

(i) Fire department connections at stations and emergency exit/service buildings;

(ii) Air release valve assemblies to accelerate the charging of the standpipe lines; and

(iii) Fire valves located at 76.2m intervals along the Tunnel.

(e) Fire department connections for standpipe systems shall be located so that the distance from a fire department connection to a hydrant is not more than 45m and is unobstructed.

(f) Fire valve sites shall incorporate a 65mm fire hose valve positioned to discharge perpendicular to the Track Alignment.

(g) Standpipe system shall incorporate manual drain valves.

ARTICLE 7 ELECTRICAL DESIGN CRITERIA

7.1 Introduction

(a) Electrical spaces shall be properly located and sized to facilitate the installation and maintenance of Equipment.

(b) Accessibility shall be provided to permit removal and replacement of major Equipment. These requirements are intended to promote uniformity in the Design approach and to standardize the type of Equipment and its location throughout the System.

(c) Electrical power distribution Equipment shall be heavy duty Construction, selected to provide Equipment longevity and be designed to provide lower arc flash potential during Maintenance, high arc flash energy dispersion.

(d) All electrical Equipment shall be individually identified by unique number matching Equipment schedule Designation. The label shape, letter size, color coding and background color shall be standardized for the Project. Project identifying labels shall be designated for: cable trays, conduits, junction boxes, cables/wires and all electrical and electronic Equipment. In addition to identification labels, approval labels shall be provided as required per CSA, ULC, or HOL.

7.2 Codes, Standards and Manuals

(a) The Design and Construction of the Works shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) Refer to Part 5 Article 5 – Electrical Design Criteria for Design codes, standards and guidelines.

7.3 Basis for Design

(a) Electrical Load Classification

(i) Refer to the Station electrical Design Criteria outlined in Part 5, Article 5 – Electrical Design Criteria for electrical load classifications.

(b) Calculations

(i) Refer to Part 5 Article 5 – Electrical Design Criteria for calculations as follows:

A. Short-circuit;

B. Voltage drop; and

C. Lighting illumination level.

(ii) Arc flash hazard calculations shall be extended to the high energy low voltage Equipment with expected high arc fault current and/or protected by instantaneous only or time delayed protection settings.

(c) Protection for future growth for all major electrical Equipment feeders shall be provided. Before determining the size of service an economic analysis shall be made to determine the most feasible way of protecting for the future growth. Special consideration shall be given to requirements for load growth, for anticipated usage and life expectancy.

(d) Electrical Safety Provisions

(i) Equipment ground fault "annunciation only" shall be provided where EGFP is required by code or standard engineering practice for Equipment or feeders serving Level 2 Emergency Systems.

(ii) Personal ground fault protection shall be provided on branch circuits that have equipment or outlets for which personal protection is required by either code or standard engineering practice.

7.4 Functional Requirements

(a) Electrical Service

(i) For Tunnel services, Project Co shall distribute the required power from the HOL switchgear to provide safe and reliable power to satisfy operational and Emergency requirements. All related Tunnel electrical distribution shall comply with applicable codes and standards, in particular related to Emergency and safety critical systems including and not limited to.

(ii) Primary switching rooms for incoming service, including any underground TPSS, shall be:

A. designed in partnership with HOL and in accordance to HOL Specification GCS0002: Primary Voltage Service Specification;

B. at grade or within five (5) meters below grade with two walls on the outside to allow ease of access for HOL incoming feeders and designed for a three (3) hour fire envelope;

C. a minimum of 5.5m wide, 9.5m long and a ceiling height of 3.2m; and

D. coordinated with HOL in terms of switchgear location and placement within the rooms.

(b) Metering and Monitoring

(i) Remote monitoring system shall be provided for:

A. Tunnels main panelboards breakers position; and

B. Voltage availability at the main buses.

(c) Duct banks and Handholes

(i) Duct banks and Handholes shall be designed in accordance with the seismic criteria defined for the Project. Duct banks shall be designed to include at least 25% spare capacity to protect for future growth and expansion. In addition there shall be space allowance for a 24 way fibre to be installed for a separate highways IT network, the duct size for this fibre shall be a minimum of 102mm (4 inch) diameter. Smaller sizes shall be approved by the City Highway Operations department. All ducts to be roped.

(d) Grounding and Bonding

(i) All non-current-carrying metal enclosures and all alternating current Equipment enclosures shall be securely connected/bonded to the grounding system.

(e) Emergency and Standby Power Sources

(i) Refer to Part 5 Article 5 – Electrical Design Criteria for emergency power services.

(f) General Purpose Receptacles

(i) General purpose receptacles shall be GFI. No more than two outlets shall be connected to a branch circuit.

(g) Lighting

(i) Lighting Design shall be consistent across all Tunnels. Standardization of lighting system components shall be provided.

(ii) Lighting levels shall define and differentiate between task areas, decision and transition points, and areas of potential hazard. Lighting shall be designed to minimize glare and provide uniform distribution. Luminaires shall be selected, located, and/or aimed to accomplish their primary purpose while producing a minimum glare and interference with task accuracy for Train Driver.

(iii) Emergency power shall be available at stable system voltage within 10 seconds or less. All batteries shall be sized to continuously carry the rated illumination for the greater of the following; the minimum time required for evacuation or as required by applicable code.

(iv) Lighting system shall be designed so that the failure of any single luminaire or lighting circuit does not leave an area in total darkness.

(v) Project Co shall Design and Construct transitional lighting from underground to surface sections of the Project. The length of threshold/transition lighting shall be based on operating speeds and the corresponding safe stopping distance. Project Co shall review and take into account the given criteria in the last edition of the American National Standard Practice for Tunnel Lighting – ANSI/IESNA RP-22 and TC – RTD 10 Transport Canada Road/Railway Grade Crossing Technical Manual: Guide for the Design of Roadway Lighting Transportation Association of Canada.

A. Lighting control systems shall be monitored and controlled through a facility BAS system. Where Facility remote control system is not provided central-key/timer control system including override switches for controls in service areas.

(vi) Lighting for exterior access to Tunnel areas shall be designed to consider security, CPTED and CCTV requirements.

(vii) Minimum illumination levels are outlined in Tables 3-7.1.

Table-3-7.1: Tunnels

Location	Average Minimum Lux	Emergency
Tracks, Cross-Overs and Catwalks	20	10
Track Switches	40	10
Tunnel	20	10
Tunnel Transition Zones	*Refer to 7.4 (g) (v)	

ARTICLE 8 TUNNEL AND STATION VENTILATION DESIGN CRITERIA

8.1 Scope

(a) The scope includes the requirements for the operation and control of the emergency ventilation systems for the Tunnels and for the Stations.

8.2 Codes, Standards and Manuals

(a) The Design and Construction of the Works shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents, In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) OBC;

(ii) OFC;

(iii) OESC;

(iv) CSA;

(v) CEC;

(vi) OHSA;

(vii) AMCA Standard 210, Laboratory Methods of Testing Fans for Rating Purposes;

(viii) AMCA Standard 300, Test Code for Sound Rating Air Moving Devices;

(ix) AMCA Standard 301, Methods for Calculating Fan Sound Ratings from Laboratory Test Data;

(x) ANSI;

(xi) ASHRAE Handbooks ;

(xii) MNECB;

(xiii) ASME;

(xiv) ASTM;

(xv) APTA, Rail Transit Committee, Guidelines for Design of Rapid Transit Facilities;

(xvi) DOT Recommended Emergency Preparedness Guidelines for Rail Transit Systems;

(xvii) NEMA;

(xviii) SMACNA;

(xix) ULC; and

(xx) NFPA - Particular references shall be made to the following sections of NFPA:

A. NFPA Standard 70, National Electrical Code;

B. NFPA Standard 90A,lnstallation of Air-conditioning and Ventilating Systems;

C. NFPA Standard 101, Life Safety Code;

D. NFPA Standard 130, Fixed Guideway Transit and Passenger Rail Systems;

E. NFPA Standard 204, Smoke and Heat Venting; and

F. NFPA Standard 502, Standard for Road Tunnels, Bridges and Other Limited Access Highways.

8.3 Emergency Ventilation

(a) System Operation

(i) Normal Operation

A. Ventilation during normal operation is provided by the "piston effect" of the Trains moving through the Tunnels. In order to facilitate this effect, emergency ventilation shafts are located near the ends of the Station Platforms and fan bypass dampers are in the normally open position.

B. If not operating in a fire Emergency scenario, the emergency ventilation fans shall be used to maintain air temperature Design Criteria.

(ii) Emergency Operation

A. The modes of operation shall be initiated from the TSCC through the SCADA system.

B. The SCADA system shall include a schematic display of the Tunnel system indicating all of the ventilation elements to be activated and their mode of operation. Upon examination of the display by the Driver to

assure the proper response by the emergency ventilation system, the Driver will energize the designated sequence which in turn will control each of the displayed ventilation elements to function in the manner indicated. The SCADA system shall provide a means of detection of noxious or flammable gases.

C. Local controls shall be permitted to override the TSCC in all modes in the event the operations control center becomes inoperative or where the operation of the emergency ventilation system components is specifically redirected to another site.

(b) Emergency Ventilation Fans for Stations and Tunnels

(i) Axial-Flow Fans - Station Emergency Ventilation Fans

A. Fans shall be of the axial-flow type, with internally mounted, directly driven motor. Fans shall be reversible, to one or both Tunnels.

B. Fans shall have adjustable-pitch blades, or variable frequency drive united fitted to permit changes in fan-operating characteristics to protect for either system or future system modification.

C. The minimum acceptable reverse (supply) flow capacity shall be 90 percent of the forward (exhaust) flow capacity.

D. Fans shall be selected to have a total efficiency of not less than 60 percent in the forward (exhaust) flow mode.

E. Each fan shall be provided with modular sound attenuators on both the inlet and discharge sides of the fan. Additional sound lining shall be provided as required so that maximum noise levels from ventilation systems do not exceed allowable limits.

F. Emergency ventilation fans and motors shall be capable of operating in an ambient temperature of 250ºC for a minimum of one hour

(ii) Jet Fans – Tunnel Emergency Ventilation Fans

A. Jet fans shall be of the vane-axial type, and shall have at least 95% capacity in reverse mode.

B. Jet fans shall be provided with appropriate sound attenuators. Jet fans and motors shall be capable of operating in an ambient temperature of 250ºC for a minimum of one hour.

C. Fan power curve shall not exceed 100 percent of the motor rating at any point. The brake horsepower for reverse (supply) flow shall not exceed the brake horsepower for (exhaust) flow.

(iii) Emergency Ventilation Dampers

A. Emergency ventilation dampers shall be heavy duty, industrial type with parallel blade Design. The dampers shall be capable of operating in ambient temperature of 250°C for a minimum of one-hour and a static pressure reversal from plus 0.747 kPa to minus 0.747 kPa occurring during a maximum 30-second time interval. Any damper component shall be capable of operating in an ambient temperature of 250°C for a minimum of one hour and a static pressure reversal from plus 0.996 kPa to minus 0.996 kPa occurring during a maximum of a 30 second time interval. End/limit switches shall be provided for each fan damper section to allow remote monitoring of the "closed" and "open" damper positions.

8.4 Smoke Dispersion/Recirculation Study

(a) Project Co shall undertake a smoke dispersion analysis for emergency ventilation systems to demonstrate the following:

(i) Smoke discharged from emergency ventilation shafts is not drawn into the Station entrances or other Station air intakes; and

(ii) Smoke discharged from emergency ventilation shafts is not drawn into entrances or air intake shafts of adjacent buildings.

(iii) Smoke re-circulation studies shall meet the requirements of NFPA 130;

(b) Based on the study, the location of the Station facilities shall be adjusted to minimize recirculation impacts or other mitigating measures shall be identified and implemented.

8.5 Fire Life Safety Protocols

(a) Project Co shall be responsible for developing, in consultation with the City, fire life Safety protocols for the safe operation of the LRT System as follows:

(i) The development of the protocols shall involve a collaborative process involving Project Co, the City and the Relevant Authority over fire life Safety issues. This process shall be led and managed by Project Co;

(ii) The protocols shall include fan ventilation protocols for the Emergency evacuation and ventilation of Stations and Tunnels in response to all potential fire life Safety risks including but not limited to risks identified as a result of risk analysis;

(iii) Fan ventilation protocols to outline the responsibilities of Project Co, the City (including the TSCC) and first responders;

(iv) The role of fire control panels in Stations is to be defined as part of the overall fire life Safety system;

(v) Standard operating procedures (SOP) are to be developed and agreed upon by all parties; and

(vi) The development of SOPs and fire life Safety protocols shall be in full compliance with Part 1 Article 9 – Safety and Security Certification and this article.

8.6 Design Criteria

(a) The Design Criteria outlined in Tables 3-8.1, 3-8.2, 3-8.3 and 3-8.4 shall apply to the Tunnel and Station emergency ventilation systems including the associated Tunnel ventilation shaft structures and Equipment.

Table 3-8.1: Outside Ambient Design Conditions (Ottawa, ON)

Description	Data	Source	Comment
Summer dry bulb Design temperature	28.7ºC	ASHRAE Fundamentals	1% occurrence
Summer wet bulb Design temperature	20.5ºC	ASHRAE Fundamentals	1% occurrence
Winter dry bulb Design temperature	-23.5ºC	ASHRAE Fundamentals	99.6% Design value

Table 3-8.2: Air Temperature Design Criteria

Tunnel – Normal Operation	
Preferred Maximum Temperature	35ºC
Maximum Average Temperature	40ºC
Maximum Peak Temperature	45ºC
Tunnel – Congested Operation	
Maximum Temperature for Train A/C and electrical Equipment	38.9ºC
Maximum Local Peak Temperature	45ºC
Tunnel – Emergency Operation	
Maximum 6 min average Temperature in Evacuation Pathways	48.9ºC

Table 3-8.3: Air Velocity Criteria

Location	Description	Velocity
Public Areas of Station	Maximum velocity	5.08 m/s

Location	Description	Velocity
Exterior inlets and outlets	Emergency Operation	10.16 m/s based on net free area of terminal gratings
Emergency ventilation shafts and ducts	Emergency Operation	9.14 m/s max
Tunnels	Emergency Operation – Smoke Control	Critical velocity – varies for each Tunnel section
	Emergency Operation - Maximum	11.18 m/s in areas where Passengers may be present

Table 3-8.4: Design Fire Data

Location	Max. Fire Size
Tunnels/Stations (LRT)	13.1 MW

(b) Noise Criteria

(i) Noise criteria shall comply with the Guidelines for Design of Rapid Transit Facilities as listed by the Rail Transit Committee, APTA as outlined in Table 3-8.5.

Table 3-8.5: Ventilation Equipment Noise Limits

Area	Target Noise Level (NC)
Platforms	45
Mezzanines	45
Station Booths	40
Retail	45
Emergency Operation	70

(ii) During Emergency operations, the Tunnel ventilation noise shall not exceed Lmax 85 dB(A) within the Tunnel, and combined with the ventilation noise must not exceed NC 70 as measured within the Station.

(iii) Refer to Schedule 17 – Environmental Obligations for information on external noise level restrictions.

(c) Pressure Wave Criteria at Stations

(i) Criteria for pressure wave at Stations resulting from Train movements are outlined in Table 3-8.6.

Table 3-8.6: Normal and Congested Operation

Normal and Congested Operation	
Maximum Isolated Pressure Pulse Not to Exceed Within a Period of 4 seconds	2.99 kPa
Maximum Repeated Pressure Pulses Not to Exceed Within a Period of 1.7 seconds	0.697 kPa

(d) Smoke ventilation shaft locations

(i) Four (4) ventilation shafts shall be provided at each Underground Station. To alleviate the air pressure effects of the column of air in front of an approaching train on passengers on Station Platform areas (draught relief), the shafts shall be located at the extremities of the Station Platforms i.e. one at each end of the Platforms for side Platform Station arrangement, or at each corner of the Station box for a centre Platform Station arrangement;

(ii) Openings for emergency smoke ventilation shafts on the surface shall be separated by a minimum horizontal distance of 32 m from the closest Station entrance or exit and air intakes operating in supply mode serving the Station. Modification to this minimum separation distance may be accepted where it is supported by a detailed smoke dispersion/recirculation study in accordance with Section 8.4 of this schedule;

(iii) Openings for emergency smoke ventilation shafts on the surface shall be separated by a minimum horizontal distance of 12 m from unprotected outside air intake or other openings of all other adjacent structures;

(iv) Where the above distance is not practical, the minimum distance shall be 4.5 m if the closest shaft exit is raised a minimum of 2.5 m above the Station entrance or exit, unprotected outside air intake or other openings;

(v) The minimum distance at grade between the edges of adjacent openings for outside air intakes, protected by smoke dampers, and ventilation shafts shall be as follows:

$$d = 0.25 \times (L1 + L2)$$

Where: d = minimum distance between the edges of the adjacent openings, in meters,
L1 + L2 = lengths of the adjacent parallel sides of the openings, in meters

(vi) Ventilation shaft openings on the surface shall be located to provide as direct a route to atmosphere as possible, so as to facilitate ease of airflow to and from the underground sections;

(vii) Ventilation shafts shall not terminate in driveway surfaces at parking garage entrances or other surfaces utilized for daily vehicular access;

(viii) Where not located in a sidewalk, vent shafts shall terminate a minimum 150 mm higher than any adjacent surface to exclude run-off drainage into the shaft; and

(ix) Gratings and louvers shall be of high security and tamper proof construction.

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SCHEDULE 15-2
DESIGN AND CONSTRUCTION

PART 4
DESIGN AND CONSTRUCTION REQUIREMENTS – VEHICLES AND SYSTEMS

ARTICLE 1 INTRODUCTION

1.1 General Overview

(a) Schedule 15-2, Part 4, Design and Construction Requirements – Vehicles and Systems is written using design standards typical of North America. Project Co may use comparable European standards as the basis for their LRT vehicle and systems design. Project Co shall declare and apply the selected standard consistently throughout the full range of their LRT vehicles and systems designs. The Work shall be performed in accordance with the Project Agreement and major deviations or variances to the application of the selected standard shall be approved by the City.

(b) This section provides a description of the elements contained within the general heading of systems. Systems include the following functional elements:

(i) Light Rail Vehicles;

(ii) Non-Revenue Vehicles;

(iii) Traction Power Supply System;

(iv) Overhead Catenary System;

(v) Train Control System; and

(vi) Communications Systems.

(c) Vehicles and systemsfor the OLRT and where applicable, associated Bus facilities, shall be designed and constructed in accordance with Transport Canada rules and regulations, including but not limited to the following Canadian Transportation Agency Codes of Practice:

(i) Passenger Rail Car Accessibility and Terms and Conditions of Carriage by Rail of Persons with Disabilities

(ii) Removing Communication Barriers for Travelers with Disabilities

(iii) Passenger Terminal Accessibility

(iv) Intercity Bus

1.2 LRVs and MSF

(a) Low floor LRV's, capable of operating in multi-vehicle train consists, are the preferred and modeled means of transportation and shall provide sufficient passenger capacity to allow the City to achieve its expected ridership targets as detailed in Part 1 Article 2 – Operational Performance Requirements. The LRV Design shall be suitable for the City, meet the branding requirements of the City. The LRV selection shall be based upon its ability to meet operational targets and its flexibility to automatically operate within a fully segregated Alignment as well as operate under manual control in partially segregated rights-of-ways with level crossings. The Design of the LRV shall ensure that its systems and subsystems have a high availability, is easily maintainable and that the passengers experience a high quality comfortable ride and commuting ambience described in Part 4 Article 3 – Revenue Vehicles.

(b) An MSF shall be located at Belfast Road where the LRVs shall be maintained and stored.

1.3 Non-Revenue Vehicles

(a) A fleet of support Non-Revenue Vehicles shall be procured by Project Co to operate and maintain the OLRT System.

(b) The fleet of Non-Revenue Vehicles required for sufficient operational and maintenance support of the OLRT System is defined in this Part 4 Article 4.

1.4 Traction Power System

(a) The Traction Power supplies shall provide a dual end fed DC voltage into the OCS. The TPSS shall be placed alongside the Alignment at locations dictated by the Train performance criteria, available property and availability of utility power connection. The Traction Power System shall be modular in Design and shall be easily accessible for performing Maintenance Services for the largest piece of Equipment within the TPSS. The Design and positioning of the TPSS shall take into account any environmental, political and aesthetic constraints resulting from their chosen locations. The TPSS shall also conform to modern EMI & EMC practice and ensure that the Traction Power negative rail return system minimizes stray current through compliance with the corrosion standards set forth in the Part 1 Article 14 – Corrosion Control.

1.5 Overhead Catenary System

(a) The OCS Design shall accommodate running in the Guideway, Tunnel and the MSF. The OCS shall be designed to have a low visual impact, high reliability, provide safe operation and maintenance and operate within the climatic performance constraints described in Part 4 Article 8 – Overhead Catenary System and Pantograph.

1.6 Train Control System

(a) The Train Control System shall be based around a proven CBTC architecture which allows automatic operation of the LRV under manual supervision in a segregated

Guideway at 80 to 90 second Headways. The Train Control System shall provide the ability to also operate the Vehicle manually (Line of Sight). The Train shall bi-directionally communicate to the wayside Equipment through a high availability communications medium. The Design of the Train Control System shall be failsafe to maximize the Safety and security of all personnel and Passengers.

(b) The Train Control System is a safety critical computer based control system for:

(i) Vehicle identification;

(ii) Vehicle location control and monitoring;

(iii) Maintaining safe headway between vehicles;

(iv) Vehicle speed control;

(v) Maintaining safe brake rates;

(vi) Vehicle route selection and fleet management;

(vii) Interlocking control; and

(viii) Power consumption optimization.

1.7 Communications Systems

(a) The communications systems comprise all of the elements utilized for communications from the TSCC and BCC to the Stations, TPSS, CIH and security and safety systems along the wayside and includes but is not limited to the following:

(i) Passenger Station PA system communicating public announcements;

(ii) PIDS visually displaying informational announcements;

(iii) CCTV providing operational and security visual observation;

(iv) IAC providing security control and monitoring;

(v) Telephone and intercom system providing voice communications;

(vi) SCADA providing remote monitoring and control of power and signal facilities to/from the TSCC;

(vii) System-wide radio communications providing voice communications to mobile radios through use of the Public Safety Service Radio System as provided by others;

(viii) BMS, BAS providing remote monitoring and control of facility functions within Stations, station electrical rooms, fan rooms and pump rooms along the Alignment;

(ix) Fare collection system provided by Operator and any communication and control requirements as described in Part 4 Article 7 – Fare Collection;

(x) Advertising media provisioning space and Infrastructure for future advertising in Station areas;

(xi) TSCC providing the integrated command, reporting and control of all operations functions along the Alignment to a central location;

(xii) CTS providing the Infrastructure for all devices and elements to report and be controlled by the TSCC; and

(xiii) Train-to-wayside wireless systems providing wireless data transmission for CBTC and Train diagnostics.

(b) Each subsystem Design shall be configured to maximize reliability and availability, have common interfaces, and meet common standards. Project Co shall ensure that Equipment chosen can be easily replaced or upgraded.

(c) Operations, security, Safety and maintenance functions are provided through the communication systems. The Design of the communication systems shall allow additional expansion of the OLRT System to accommodate and support the expected ridership capacity detailed in Part 1 Article 2 – Operational Performance Requirements.

(d) The objective of the communications systems shall be to facilitate the interchange of data and voice communications and security between the following OLRT facilities and subsystems:

(i) Stations, Platform Equipment and supporting station facilities;

(ii) TPSS;

(iii) CIH;

(iv) Trackside Equipment;

(v) BCC;

(vi) YCC and MSF;

(vii) Existing Bus system OCC also known as TSCC;

(viii) The City's secure data facility;

(ix) LRV; and

(x) The City's IT Infrastructure, fare collection and back office.

ARTICLE 2 TRACTION POWER SUPPLY

2.1 Introduction

(a) The Traction Power supply system shall consist of a network of TPSS and all Equipment between the interface point with HOL and the interface point with the catenary and the negative return systems. This section provides the performance objectives for the Traction Power system. The Traction Power system shall be designed to be an integrated system for supplying power to the Vehicles, switch heaters, and related equipment in order to meet the OLRT Project Operational Performance Requirements provided in Part 1 Article 2 – Operational Performance Requirements. These criteria govern the Design, performance, and installation requirements of the Traction Power. The system shall provide safe, efficient and continuous operation of the LRT System in all operational and environmental conditions. The Traction Power system and associated components shall perform to the environmental characteristics defined in Schedule 15-2 Part 1 Article 4. In areas where the Traction Power equipment presents high risk of visual intrusion Project Co shall provide design enhancements to minimise or mitigate visual impact. In all other areas, the equipment shall be of a style and appearance similar to that used by comparable transit systems.

(b) The Equipment includes, but is not limited to the following: AC cables and raceway systems, AC switchgear, transformer-rectifier unit, DC switchgear, positive and negative raceway systems, positive and negative cables, negative drainage panel and cables, rail to ground monitoring Equipment, prefabricated substation housing (or dedicated space in or adjacent to a station facility) and foundation, grounding system, protective device systems, communications interface systems, auxiliary power supply system, climate, control, UPS system, intrusion access control system, MV lightning arresters, high voltage protection, alarm, control, and monitoring health and safety equipment, and SCADA Equipment.

2.2 Code, Standards and Manuals

(a) The Design and Construction of the Works shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) ANSI;

(ii) NEMA;

(iii) CSA;

(iv) City of Ottawa Codes and By-Laws;

(v) IEEE;

(vi) IEC;

(vii) UL and ULC;

(viii) IBC;

(ix) ICEA;

(x) EIA;

(xi) ASTM;

(xii) NETA;

(xiii) NECA;

(xiv) OEC;

(xv) AREMA;

(xvi) APTA; and

(xvii) NFPA.

2.3 Traction Power System Requirements

(a) The Traction Power system for the OLRT Project shall be a fully integrated system of TPSSs which shall support normal and contingency operations with no degradation of performance. Normal and contingency operation shall be defined as:

(i) Normal: The Traction Power supply system is in full operation with all feeder breakers in closed positions. All scheduled service is running in accordance with the Headway and consist with all civil speeds applied; and

(ii) Contingency: The Traction Power supply system shall maintain full performance service with any one TPSS rectification power completely out of operation and the DC breakers remain closed or the DC disconnect switches are closed thereby utilizing the substation as a DC tie station.

(b) The Traction Power system shall be designed and constructed to perform satisfactorily under the environmental conditions identified in Schedule 15-2 Part 1 Article 4.

(c) The Traction Power system for the OLRT shall be a high resistance grounded system, meaning the running rails are insulated from ground and there is no intentional connection to ground (earth potential).

(d) The traction return shall be through both running rails cross-bonded as necessary and include appropriately sized negative cables between the running rails and the TPSS.

(e) The basis of the Design and analysis of the TPSS locations and ratings and voltage shall be confirmed by load flow studies performed by Project Co. The studies shall be real time computer generated simulations of the electrical system utilizing validated traction system software and performance based upon the operational performance requirements in Operational Performance Requirements. The study shall utilize the final LRT Alignment, LRV and operating plan (consist sizes, Headways and Passenger loadings). The load flow study shall be performed for normal and contingency operation scenarios and be based upon worst case DC system loading. The load flow shall analyze negative rail potentials for the entire Alignment focusing on touch potentials for areas in within 2m of the track. Regenerative braking shall be a function supported by the OLRT Traction Power system but not utilized during the performance of the simulation. Regeneration, natural receptivity and wayside based energy storage may be utilized during contingency operation simulation scenarios.

(f) The Traction Power system for the MSF shall be electrically separate and isolated under normal operations from the remainder of the Traction Power system. This shall apply to both the positive and negative sides of the Traction Power systems. However, provision shall be made to tie the MSF together with the remainder of the Traction Power system to allow backup power supply between the two sections and provisions to power the shop DC supply during an outage.

(g) The electrical limits of the Traction Power system (excluding OCS) shall be the OLRT side of the HOL disconnect switch on the Utility side and up to and including the OCS disconnect switches on the OCS distribution side. The installation limits shall include the HOL switch foundation and Infrastructure in compliance with utility standards.

(h) All TPSS Equipment shall be CSA or UL/ULC approved.

(i) The Traction Power system shall meet the requirements set out in IEEE 519 for harmonic disturbance and any requirement outlined by HOL.

(j) Project Co shall develop a protective device coordination plan and relay settings for the Traction Power system.

(k) The supply voltage selected by Project Co shall be supported by a complete computer simulation and engineering analysis.

(l) Significant effort has been made during Preliminary Engineering in working with HOL and in capacity and planning delivery of power feeders to supply points (X – Y coordinates) across the Alignment. Project Co shall make every effort to utilize these power supply points during Detailed Design. Any changes in HOL supply points locations as a result of Detailed Design shall be borne by Project Co.

2.4 Traction Power Substations

(a) The TPSS shall be located as close to Passenger Stations and the Guideway as possible.

(b) Negative rail voltage rise shall be limited to 50V under normal operation and 70V under outage conditions. Rail to ground sensing devices shall be implemented to monitor the negative voltage to ground and "clamp" the rails to ground upon exceeding preset limits.

(c) Minimum Train voltage shall be coordinated with the Vehicle manufacturer.

(d) All TPSS Equipment shall be standardized, and allow for interchanging of Equipment and spare parts and shall be the sole responsibility of one manufacturer.

(e) Each TPSS shall be furnished internally with emergency trip stations adjacent to each entrance. The emergency trip station shall, upon activation, de-energize the entire TPSS and its associated line sections and the DC sections at adjacent TPSS backfeeding into the TPSS.

(f) Mass trip function shall be provided through TPSS SCADA which will remove power from the overhead catenary system for the entire alignment. The human machine interface shall be operated from the TSCC.

(g) Building Structures and Foundations

(i) The TPSS shall be completely factory assembled, pre-wired, pre-tested, and installed in a compact, climate controlled, self-supporting, transportable enclosures or provided in Passenger Station rooms designed for the application. The TPSS shall be ready for connection to the Utility interface and outgoing DC feeders prior to shipment. The TPSSs shall include all elements necessary to provide Traction Power including the following:

A. TPSSs shall be designed to minimize their impact on the areas where they will be installed. Architectural treatment, to provide an acceptable appearance, may be required for TPSS located in sensitive areas such as those located on or adjacent to Federal Lands;

B. The TPSS enclosure shall at a minimum consist of a structural steel frame, double sided walls and thermal /acoustic insulation;

C. Removal of all large Equipment (rectifier transformer, circuit breakers) shall be accommodated without structural modifications;

D. Interior and exterior lighting shall be provided. Generator connection point shall be provided on the exterior of the TPSS enclosure; and

E. Intrusion access control shall be provided to selectively limit access to the TPSS.

(ii) TPSS located in Station facilities shall contain identical manufacturer switchgear to pre-fabricated TPSS. Performance, testing and environmental requirements for TPSSs located in Station facilities or other areas shall match those indicated for pre-manufactured TPSSs indicated in Part (i) above.

(iii) Foundations shall be designed and constructed based upon local, national and international standards and codes and the structural loading (live and dead loads) of the TPSS during installation, normal operation, maintenance and faults. The foundation shall be coordinated with the TPSS and distribution elements.

(iv) Maintenance access, both pedestrian and vehicular, shall be provided.

(h) Hydro Ottawa Limited Switchgear

(i) Project Co shall be responsible for all permanent connection works in coordination with HOL from the supply point as described in HOL Condition of Service specification ECS0012. Project Co shall provide the foundations for a pad mounted system, and terminate a pad mounted switch (switch and metering to be provided by HOL through Project Co) in accordance with HOL codes and standards.(HOL Drawing Reference 92006563 E1 / E2).

(ii) Controlled access and security fencing shall be provided to limit access to the pad mounted switch.

2.5 Traction Power Rectifier Units

(a) The Traction Power transformer and associated traction rectifier shall be Designed and production tested as an integral unit.

(i) TPSS shall have a silicon diode type, 12 pulse rectifier unit (ANSI C34.2).

(ii) The TPSS locations have been coordinated with and made available to HOL in determining the power feed requirements based on a 3MW TPRU. Project Co shall evaluate and confirm through a load flow study the suitability of these assumptions and coordinate with HOL. The displacement power factor of the TPRU shall be 95% or greater.

(iii) The TPRU shall be protected from damage due to surges and transients transmitted through the utility network with MV surge protection.

(iv) The overall efficiency of the TPRU shall be greater than 97.5%.

(v) The TPRU shall comply with ANSI C57.12.10.

(vi) The noise generated by the TPRU shall not exceed 55dBA at full load inside the substation through the use of rectifier load balance, coupling, or interphase transformer, or other alternative method to reduce audible noise.

(vii) The rectifier transformer shall be dry type, vacuum pressure impregnation or cast coil construction, convection cooled with no forced cooling necessary to meet the extra-heavy duty operations requirement and two-stage temperature monitoring.

(viii) The rectifier transformer shall be equipped with a no-load tap changer and 5 taps, +/- 2.5%.

(ix) The TPRU shall be designed for extra-heavy duty operation with no damage or degradation of performance. Extra-heavy duty is defined in IEEE 1635.2-2009:

A. Imbalance in the rectifier caused by loss of one diode per phase shall not reduce the overload capability of the TPRU.

(x) The rectifier shall be furnished with a negative disconnect switch, two-stage temperature monitoring, two-stage diode monitoring, two-stage enclosure monitoring as a minimum.

(xi) Each rectifier shall be furnished with a NGD which shall monitor the potential between the negative bus and the TPSS ground grid.

(xii) The TPRU shall be furnished with digital metering for:

A. DC rectifier current;

B. DC Voltage; and

C. Winding and rectifier over-temperatures.

(xiii) Rectifier enclosure energized/grounded protection shall be provided which shall detect when the enclosure has a positive to frame fault or when grounded. Upon detection of a positive to frame fault the substation shall be automatically shut down. There shall be a local audio – visual warning which will be communicated along the SCADA to the TSCC.

(b) TPSS AC Switchgear shall meet the following requirements:

(i) Drawout, metal clad (as defined by ANSI C37) switchgear which prevents the accidental contact of live parts by maintenance personnel;

(ii) Circuit interrupting devices which do not have load- break capabilities and doors equipped with interlocks to prevent unsafe operations;

(iii) Adequate space for removal and maintenance of both AC and DC circuit breakers;

(iv) Multifunction protective devices for phase imbalance, overcurrent, undervoltage, diagnostics, alarming, monitoring, data storage and power metering;

(v) Equipment to test the AC and DC breakers in the TPSS after it has been removed from its cubicle;

(vi) Digital metering for:

A. AC voltage;

B. AC current; and

C. Power; and

(vii) AC switchgear shall also contain the auxiliary power transformer supplying "house" power for the TPSS building, with appropriate protection and disconnect devices on the primary and secondary. The auxiliary transformer shall supply power to the AC distribution panel.

(c) DC Switchgear shall meet the following requirements:

(i) DC switchgear shall be metal enclosed single pole, draw-out type feeder breakers equipped with load measuring auto-reclosing systems, rated to interrupt maximum available fault current;

(ii) The major elements of the TPSS DC switchgear shall consist of a main cathode circuit breaker, high speed DC feeder circuit breakers, and PLC based controller with protection functions;

(iii) PLC based protection and data storage devices shall be provided for the DC circuit breakers. These devices shall perform all the functions of overcurrent protection, breaker control, breaker monitoring, data storage, transfer trip, alarm summary storage, event summary storage, ammeter, voltmeter, SCADA interface, HMI interface for establishing and adjusting breaker protective parameters and visual display of metering.

A. Main Cathode Circuit Breaker shall meet the following requirements:

i. Protect against reverse current;

ii. Include a DC enclosure device to detect enclosure faults;

iii. Provide an interlock to the AC breaker; and

iv. Include a lockout device.

B. Feeder Circuit Breakers shall meet the following requirements:

i. PLC based circuit breaker protection with instantaneous, long time and rate of rise overcurrent protection;

ii. A transfer trip scheme to ensure all feeder circuit breakers supplying power to a faulted section shall trip and de-energize the faulted section; and

iii. Equipment shall be metal clad as defined by the C37 series of ANSI specifications and shall prevent the accidental contact of live parts by maintenance personnel.

(iv) Digital metering shall be provided for:

A. DC bus voltage; and

B. On each feeder circuit breaker through the PLC based protective device and controller displaying DC feeder voltage, and feeder current.

(v) Each TPSS shall be furnished with a negative grounding device which shall monitor the potential between the negative bus and the substation ground grid. The NGD shall provide an open circuit when the potential is at an acceptable level. The NGD shall close if the pre-set potential is exceeded. Once the potential has decreased below the pre-set level the NGD will automatically open. Status points will be provided from the NGD to the SCADA system.

(vi) DC enclosure energized/grounded protection shall be provided which shall detect when the switchgear has a positive to frame fault or when grounded. Upon detection of a positive to frame fault the substation shall be automatically shut down. There shall be a local audio – visual warning which will be communicated along the SCADA to the TSCC.

(vii) Equipment shall be metal clad as defined by the C37 series of ANSI specifications and shall prevent the accidental contact of live parts by maintenance personnel.

(viii) The main cathode circuit breaker and the negative disconnect switch shall be interlocked such that the cathode circuit breaker cannot be closed when the negative disconnect switch is open and the negative disconnect switch cannot be opened when the cathode circuit breaker is closed.

(d) Utility Power

(i) HOL have identified Supply Points across the Alignment to supply power, both traction and facility. HOL shall terminate MV power supply feed at the pad mounted switchgear.

(ii) Utility power needs, codes and requirements shall be coordinated with HOL.

(iii) Revenue metering shall be provided by HOL at each pad mounted switchgear.

(iv) All Infrastructure and cabling elements (duct banks, foundations, grounding, maintenance holes) to facilitate the HOL supply point switchgear, serving the TPSS and/or facilities shall be by Project Co and shall be constructed to meet HOL standards and require HOL approval.

Utility power from HOL supply point switchgear to the TPSS shall be configured such that no two electrically adjacent TPSS are supplied from a feeder sourced from the same bus at a HOL substation.

(e) Control Power

(i) Control power in the TPSS shall be used for TPSS controls, relaying, SCADA and other functions. The system shall consist of a step down transformer, battery bank, battery charger, DC distribution panels and all necessary Equipment to provide a complete control power system.

A. The battery shall be capable of supplying TPSS demand to support control power for 8 hours and to support duration as identified in a failure mode analysis.

B. The battery shall be sized based upon a load calculation incorporating TPSS switching operations and all static TPSS loads during normal and contingency operation.

C. The battery charger shall include a ground detection system and alarm function reporting to the SCADA system.

(f) Control Requirements

(i) The TPSS shall be designed for unattended operation with remote supervision and control from all control centres through the SCADA system.

(ii) Local control shall be provided for all elements of the TPSS through a HMI and computer based TPSS control unit (PLC). Remote control shall be disabled when in local control. Local control shall be enabled by means of a “local/remote” switch. This switch shall enable and disable local control of the entire TPSS excepting circuit breaker trip functions. All TPSS indication and alarms shall be provided to the HMI.

(iii) HMI located in each TPSS shall be the local TPSS status screen annunciator. The HMI/PLC shall provide all information to SCADA at the TSCC. This includes alarms, Equipment status and real-time metering values. The default screen shall be a representation of the TPSS single line indicating the current status.

(g) SCADA Requirements

(i) TPSSs shall be provided with a TPSS SCADA monitored and controlled reporting directly to TSCC.

(ii) The TPSS shall be provided with a TPSS SCADA RTU that shall interface with the SCADA systems specified in Part 4 Article 6 – Communications for the purposes of transmitting the information and control to TSCC.

(iii) The following status and control points, at a minimum, shall be incorporated into the TPSS SCADA system functionality:

A. AC switchgear – Status and control:

i. Protective devices – Status; and

ii. Lockout device – Status;

B. Loss of utility power – Status;

C. Rectifier transformer:

i. Winding over temperature – Status;

D. Rectifier:

i. Over temperature – Status;

ii. Negative disconnect switch position – Status;

iii. Negative overvoltage – Status;

iv. Diode failure – Status;

v. Surge suppressor failure – Status;

vi. Reverse current trip – Status;

vii. Enclosure energized alarm – Status; and

viii. Enclosure grounded alarm – Status;

E. DC Switchgear:

i. Cathode (main) breaker – Status and control;

ii. Feeder breakers – Status and control;

iii. Transfer trip trouble/failure – Status;

iv. Feeder breaker reclosure failure – Status;

v. Feeder breaker protective relay trouble/failure – Status;

vi. Lockout relay trip – Status;

vii. Enclosure energized alarm – Status;

viii. Enclosure grounded alarm – Status; and

ix. OCS section energized – Status;

F. Negative Grounding Device:

i. Closed – Status;

ii. High Current – Status; and

iii. Failure – Status;

G. TPSS Local Control Enabled – Status;

H. Loss of station auxiliary power – Status;

I. Intrusion Detection – Status; and

J. Fire alarm:

i. Trouble – Status;

ii. Power Supply – Status; and

iii. Alarm – Status;

K. Loss of control power – Status;

L. Battery charger trouble/failure – Status;

M. Climate Control – Status;

N. TPSS air temperature – Status;

O. Emergency trip activated – Status; and

P. Mass trip control – Status.

(iv) 25% additional status and control point spare capacity shall be provided at each TPSS.

(v) Communication between the local SCADA system and the TSCC shall be redundant via the CTS.

(h) Climate Control

(i) All TPSS shall include a climate control system which shall maintain indoor temperature and humidity to allow for PLC and SCADA Equipment operational performance to be maintained throughout all expected external temperature variations. The climate control system shall be designed to continuously maintain the temperature within the TPSS and provide status to the TPSS SCADA system.

(i) Communications

(i) Connection panel to the CTS for redundant data and telecommunication shall be provided.

(ii) Telephone connection to TSCC shall be provided for local control and emergency functions.

(j) Intrusion Detection

(i) Each substation shall be equipped with an intrusion detection system which shall allow keyed and keyless access and upon unauthorized access provide a local audible and visual alarm as well as remote notification. The IAC system shall be compatible with the IAC system provided for in Schedule 15-2 Part 4 Article 6

(k) Fire/Smoke Detection System

(i) Each TPSS shall be equipped with a fire alarm system which shall detect and alarm upon detection of a smoke or fire event and report to TSCC through SCADA. Activation of the fire alarm system shall trip and lockout the TPSS.

(l) TPSS Grounding

(i) A TPSS grounding system shall be provided for life Safety and fault detection purposes. The grounding system shall be designed in accordance with IEEE Standard 80 or IEC equivalent specification.

(ii) Any metallic structures exterior to the TPSS shall be connected to the ground grid.

(iii) Surge protection shall be provided for all cables entering and exiting the TPSSs as follows:

A. All non-current carrying parts of the TPSS shall be isolated from ground and connected to the ground grid through a ground fault detection system. The ground fault detection system shall, upon detection of a grounded condition, disconnect the substation from sources of power and annunciate an alarm locally and at the TSCC; and

B. Security fencing, lamp stanchions shall be connected to the ground grid. This includes any conductive hardware where public can inadvertently come in contact with high voltages.

(m) DC Feeder System

(i) The DC feeder system shall be provided and consists of all raceways, cabling and switching Equipment necessary to connect the TPSS to the OCS and rail returns. All cable ampacity ratings shall be based upon the worst case maximum RMS currents indicated in the load flow studies with any necessary de-rating due to duct bank/raceway routing and appropriate temperature rise. The positive DC feeder system shall be designed to provide adequate ampacity and to maintain the electrification voltage within acceptable limits. The DC negative feeder system shall include any necessary Equipment to interface with the running rail traction return so as not to interfere with the Train control system. The negative feeder system shall be designed to maintain a low rail to ground voltage and provide sufficient ampacity. The negative feeder system shall be designed to be continuous through the four running rails including interlockings at all locations.

(n) A stray current monitoring system shall be provided.

(o) Drainage Feeder System

(i) Provision shall be made for the monitoring and control of stray current through the use of drainage panels. The drainage panels shall provide a means of permitting metallic utilities to connect to the substation negative bus. Provisions shall be made to provide a raceway system to a demarcation pullbox for utility company drainage cables to be connected to the drainage system.

(p) AC Feeder System

(i) The medium voltage AC feeder system shall be provided and consist of all raceways, cabling maintenance holes, foundations, ground rods and switching Equipment necessary to connect the TPSS to the HOL utility supply switchgear in accordance with utility requirements.

(q) Duct banks and Raceways

(i) Duct banks shall be provided from the TPSS exiting point to the intersect point of the distribution system and constructed of non-conductive material encased in concrete.

(ii) All underground raceways shall have a utility marking tape (with magnetic tracer) installed 0.33 meters above the raceways.

(iii) Positive and negative feeders shall not be installed in the same raceway, pullbox or maintenance hole.

(iv) Ten percent (10%) spare duct shall be included in each duct run.

(r) Communication Raceway System

(i) Duct banks shall be provided from the TPSS exiting point to the intersect point of the communication CTS system and constructed of non-conductive material encased in concrete.

(s) Sectionalization

(i) The Traction Power distribution system (OCS) shall be circuited into manageable electric sections. These sections are redundantly fed from two adjacent TPSSs to maintain reliability, continuity of service, fault discrimination and distribution of loading.

(t) Yard TPSS(s)

(i) TPSS(s) shall be provided in the MSF yard to provide DC power to support the operation of the yard. The TPSS(s) shall be sized to satisfy all traction loading for Train movements to storage Tracks, storage, yard lead Tracks operation and Train movements to car wash facilities and movements into and out of the shop.

(ii) Yard TPSS and TPSS Equipment shall be of the same arrangement and Design and manufacturer as the mainline TPSS.

(iii) Yard Traction Power positive circuits and negative rail returns shall be electrically isolated from the mainline Traction Power positive circuits and mainline negative rail returns.

(iv) Yard Traction Power positive circuits and negative rail returns shall be electrically isolated from the shop Traction Power positive circuits and shop negative rail returns.

(v) Yard Traction Power ductwork and cabling shall be installed to the respective demark maintenance hole system provided.

(vi) Yard TPSS shall have sufficient quantity and size DC circuit breakers to service the sectionalizing requirements and provide sufficient quantity and size circuit breakers for growth of the yard to the ultimate build out.

(vii) Yard TPSS shall be controlled and monitored through TPSS SCADA by TSCC.

(viii) Yard negative rail system shall be electrically continuous through and be directly connected to the Yard TPSS negative return.

(u) Shop TPSS

(i) TPSS shall be provided in the MSF shop to provide DC power to support the operation and sectionalization of the shop Tracks. The TPSS(s) shall be sized to satisfy the traction loading for Train movements to, into and out of each Track,

and Train loads during repair, testing and maintenance through an auxiliary quick connect system to interface with the Vehicle auxiliary power receptacle.

(ii) Shop TPSS and TPSS Equipment shall be of the same Design and manufacturer as the mainline TPSS and shall provide an interlocked contactor system for circuiting each Track and respective auxiliary quick connect distribution system.

(iii) Shop Traction Power system to each Track contact wire shall be through an isolation switch, wall-mounted for manual operation, and be interlocked for Safety through any crane, lifting jacking or maintenance device (wheel truing) or other device that may cause serious injury or damage if Traction Power remains energized.

(iv) Shop Traction Power system shall be interlocked throughout the shop through a resettable visual and audible emergency trip system reporting directly to the YCC and resettable only by YCC.

(v) Shop TPSS shall be provided with a SCADA system reportable and controllably only through YCC through the MSF BMS SCADA.

(vi) Shop negative rail system shall be continuous throughout and grounded.

(v) Cabling Identification System

(i) All cables shall be identifiable at each end including type, size and function.

ARTICLE 3 REVENUE VEHICLES

3.1 Introduction

(a) The LRV shall be a minimum 70% low floor LRV, 2.65m to 3m wide, no less than 28m long, with low floor heights of 356mm to 550mm above top of rail (see Section 3.6 Vehicle Dimensions) and shall be in accordance with the following criteria:

(i) The LRV (and resulting train consist) is fully compliant with the ridership and capacity requirements outlined in Schedule 15-2, Part 1 Article 2 – Operational Performance Requirements;

(ii) The vehicle characteristics (weight, width, length and floor height), its dynamic envelope and the required station platform widths shall fit within the limitations of the right of way;

(iii) The vehicle characteristics (weight, width, length and floor height) shall be consistent with the City's decision for the OLRT Project to protect for a future unified low-floor rail network;

(iv) An existing Service Proven Vehicle design suitable for the OLRT Project; and

(v) Project Co shall be responsible for coordinating Platform width and height with LRV dimensions to meet the ridership requirements and comply with all applicable building and safety codes.

(vi) Project Co shall ensure that vehicle weight, axle loads and resonant frequency are compatible with new and existing infrastructure.

(vii) Percent low floor shall be based on the linear vehicle length of the Passenger compartment, from cab wall to cab wall. If a single cab per LRV is provided, the additional length of the non-cab end shall not reduce the low floor percentage.

(b) 30 metre Vehicles shall be fitted with a cab in one or both ends of the Vehicle. The non-cab end shall include a hostler panel for limited operation, including yard moves. If vehicles longer than 40 metres are proposed, cabs shall be provided on both ends.

(c) Foldable or retractable couplers shall allow the use of coupler covers at the extreme ends of the consists while still affording quick coupling and uncoupling. The coupler cover movement and coupler extension shall be manually operated. Coupling (mechanical and electrical) shall be automatic.

(d) The Vehicles shall utilize CBTC for ATO with ATP. Drivers shall be able to manually control the opening and closing of the doors. The Driver may pull back on the master controller at any time to decelerate the Train. Emergency braking shall also be available through the emergency brake pushbutton on the drivers control panel and from the TSCC.

(e) Future expansions of the System could involve operation in a partially segregated right-of-way with level crossings. Manually controlled ATP operation shall be utilized in these sections of the Alignment and the Vehicles shall be capable of operating in such conditions.

3.2 Vehicle Capacity

(a) The design of the vehicle in conjunction with other system elements shall support the requirements outlined in Article 2 Operational Performance Requirements.

(b) Doorways shall be located such that all doors of the consist align with the Platform at all times without undue tolerance restrictions on consist position at any Station.

(c) Vehicles shall be designed with features to limit dwell time and maximize Passenger capacity. Wide double leaf doors and seats arranged for maximum aisle width shall accelerate boarding and alighting times.

3.3 Operating Environment

(a) The Vehicle shall be compatible with and designed to operate safely and reliably over the OLRT Alignment. Project Co shall ensure that the requirements and interfaces of the System are adhered to with specific emphasis on the following articles:

(i) Part 2 – Guideway;

(ii) Part 3 – Tunnels;

(iii) Part 4 Article 2 – Traction Power;

(iv) Part 4 Article 5 – Train Control;

(v) Part 4 Article 6 – Communications;

(vi) Part 4 Article 8 – Overhead Catenary System;

(vii) Part 5 – Stations; and

(viii) Part 6 – Maintenance and Storage Facility.

(b) Any conflicts between these documents shall be brought to the attention of the City for resolution.

3.4 Environmental Conditions

(a) The Vehicle shall be capable of operation at the performance levels stated in this Article under the following environmental conditions and the requirements of Schedule 15-2 Part 1 Article 4:

(i)	Thermal shock temperature change	58°C;
(ii)	Humidity	10 to 100%;
(iii)	Continuous rain fall rate	60mm/hr;
(iv)	Continuous snowfall rate	55mm/hr;
(v)	Freezing rain accretion	5mm/hr;
(vi)	Maximum daily freezing rain accretion	30mm; and
(vii)	Fording	
	A. Water	75mm above top of rail; and
	B. Snow	40cm above top of rail.

(b) The Vehicle shall be resistant to water intrusion under any combination of wind, rain or snow and any Vehicle speed. This shall include passage of the Vehicle through the car wash facility.

3.5 Vehicle Design Requirements

(a) Vehicles shall be equipped with automatic couplers on each end. To couple Vehicles together, the Driver shall manually raise the front bumper of the Vehicle to expose the coupler. Once the cover is raised, manual unfolding of the coupler may be followed by automatic coupling. The raised position of the front bumper/coupler cover shall not obstruct the driver's vision to accomplish safe coupling or foul the body during turns on super elevated Track. In the closed position, the coupler cover shall blend seamlessly with the cab side skirts.

(i) If Project Co elects to operate pairs, or triplets, as coupled consists, at all times during Revenue Service, coupled ends of Vehicles may be fitted with standard automatic couplers and the requirement for a coupler cover may be omitted. Exposed ends of the consist shall always be fitted with a folded coupler and coupler cover.

(b) Vehicles shall include intra-car barriers between coupled ends to prevent inadvertent access between cars. Alternatively, platforms may be arranged with barriers located at all intra-car locations of all consist arrangements for Revenue Service.

(c) LRVs shall be arranged in articulating body sections supported by independent trucks. Brake discs shall be provided on all axles. The vehicles shall be fitted with Track brakes.

(d) In order to meet the Operational Performance Requirements, the seating shall be arranged with longitudinal seating throughout the length of the low floor section of the LRV, to the maximum extent possible.

(e) Flip seats shall be provided adjacent to all vestibules to provide clear floor space to accommodate wheelchairs, baby carriages, bicycles and the other passenger requirements. Flip seats shall be arranged to revert to the stowed position with less than 20N of force. Lowering the flip seats into position shall require not more than 40N.

(f) Hand holds, grab bars and stanchions shall be arranged to provide comfort for standees.

(g) The door design shall be supported by passenger flow calculations, schedule and dwell times. A minimum of eight dual leaf, electrically operated sliding plug doors shall be provided for every 30 metres of Vehicle length.

(h) Each LRV shall include load levelling. Project Co shall ensure the height and Platform gap are within the limits of the ADA, as referenced in the AODA. Project Co shall provide a method to adjust Vehicle height for wheel and rail wear. The height adjustment device shall provide clear indication of the level of adjustment provided on both sides of the truck.

(i) Each LRV shall be powered from an OCS by a pantograph.

(j) The LRV shall be designed for maximum availability, be capable of operating reliably for a minimum of 100,000km per year and provide a minimum service life of 30 years.

3.6 Vehicle Dimensions

(a) Vehicle dimensions shall be in accordance with the requirements of Table 4-3.1.

Table 4-3.1

Description	OLRT LRV
Width at threshold	2,650mm to 3,000mm
Vehicle maximum width (not including side mounted lights, cameras, etc)	3,000mm
Height over roof shrouds, maximum. ATOR	3,600mm
Height over roof Equipment, maximum. ATOR	3,800mm
Height to top of low floor (with new wheels) ATOR	356mm to 550mm
Minimum Aisle width at articulation joints	1,200mm
Minimum Aisle width	600mm
Aisle width at accessible areas, minimum (AODA/ADA requirement)	813mm
Side door width with doors open, minimum	1,220mm
Height – floor to top of door opening, minimum	2m

Description	OLRT LRV
Height floor to ceiling, low floor, minimum	2,200mm
Height floor to ceiling, high floor, minimum	2,000mm
Door protrusion from Vehicle when open, maximum	75mm
Maximum Truck wheel base	2,000mm
Wheel Diameter new	600mm to 700mm
Wheel wear allowable, minimum diameter reduction	50mm

Note: The Vehicle dimensions (length, width and floor height), its dynamic envelope and platform widths required by code shall fit within the limitations of the right of way.

3.7 Clearance Requirements

(a) Clearance dimensions shall be in accordance with the requirements of Table 4-3.2.

Table 4-3.2

Description	OLRT LRV
Underfloor Equipment, minimum	120mm
Truck clearance, minimum (except sand nozzles)	50mm
Truck to carbody clearance, minimum	15mm
Coupler cover in the closed position	No greater than 250mm TOR

3.8 Vehicle Weight Definition

(a) Project Co shall consider options for weight reduction during the Design phase to maximize the energy efficiency of the LRT System and shall determine the Vehicle weight for the Vehicle in accordance with the definitions outlined in Table 4-3.3.

Table 4-3.3

Description(1)	Definition
AW0	LRV empty weight (Tare) + dry sand
AW1	Fully seated Passenger load and one Driver + AW0
AW2	Standees at 4 Passengers/m^2 of

Description(1)	Definition
	suitable standing space + AW1
AW3	Standees at 6 Passengers/m^2 of suitable standing space + AW1
AW4	Standees at 8 Passengers/m^2 of suitable standing space + AW1 (Structural design load, not expected for Revenue Service)

(1) Note: 70 kg/passenger shall be utilized in all weight calculations.

(b) The Vehicles shall be designed to balance weight per powered axle.

(c) The maximum allowed lateral imbalance shall be 2700Nm:

(i) The maximum allowed weight deviation supported by each truck shall be 910kg.

(ii) For 30 metre Vehicles, the center truck shall support a minimum of ¼ of the total empty Vehicle weight. For longer Vehicles, each truck shall support no less than 12,000kg of empty Vehicle weight.

A. Centre Truck(s) loading requirements shall be maintained under all conditions of acceleration and deceleration.

3.9 Noise, Shock and Vibration Requirements

(a) Noise internal to the Vehicle shall be less than:

(i) 68dBA with the Vehicle stationary and all Equipment running in Revenue Service conditions;

(ii) 78dBA at Vehicle speeds up to 100km/hr; and

(iii) 80dBA in the Tunnel sections of the right of way, at Vehicle speeds up to 65km/hr.

(b) All measurements of exterior noise levels shall be made with the Train on or operating on level, tangent track in a free-field environment, such as outdoors, away from any reflecting surfaces. Noise external to the Vehicle, shall not exceed:

(i) 70dBA, when measured 20m from a stationary LRV; and

(ii) 80dBA, when measured 20m from a Train traveling at 100km/hr, and braking.

(c) Vibration shall not exceed:

(i) Levels required to successfully pass the Ride Quality Test conducted per ISO2631 in Vehicles traveling at speeds from 0km/hr to 100km/hr. Testing shall take into account Track conditions when determining ride quality.

(d) Carbody mounted Equipment shall resist shock loads of:

(i) 2g lateral, 3g vertical, and 5g longitudinal.

3.10 System Voltage

(a) All Equipment shall function at the nominal OCS voltage as per IEC 60850 and subsystems shall function throughout voltage ranges allowed by EN 50155.

3.11 Electrical Equipment Environmental Conditions

(a) All Vehicle electronic Equipment shall function reliably under power quality conditions detailed in EN 50155, unless otherwise specified. Where environmental conditions listed in this section are more severe, those conditions shall take precedence over EN 50155.

3.12 Performance Requirements

(a) Performance shall be in accordance with the requirements of Table 4-3.4.

Table 4-3.4

Parameter(1)	**Specification**
Maximum speed	≥100km/hr
Acceleration	
Initial Maximum Vehicle Acceleration, OCS voltage ≥ nominal OCS voltage, AW2 loading	≥1.34m/s^2 ± 5%
Speed for Initial Tractive Effort for OCS voltage ≥ nominal OCS voltage	≥32km/hr(2)
Electric Braking	
Electric brake type	Regenerative/rheostatic with line voltage control
Full service electric brake rate at AW3 loading	1.34m/s^2 from 64km/hr to 5km/hr with electric brake fade below 5km/hr and taper

Parameter(1)	Specification
	above 64km/hr
Blended Braking	
Full service blended electric + friction brake rate at AW3 loading	1.34m/s^2 from 80km/hr to standstill
Maximum service brake rate (electric/friction blended + Track brakes) at loads up to AW3	≥2m/s^2 from 88km/hr to standstill
Friction Brakes	
Friction brake type	Hydraulic Apply Disc Brakes with spring apply Parking Brake
Full service brake rate (friction only) at loads up to AW3	1.34m/s^2 +/- 10% from 80km/hr to standstill
Emergency Brakes	
Friction only at loads up to AW3 (with sanding as required)	1.78m/s^2 +20%/-10% starting from 80km/hr to standstill
Emergency Brake from irretrievable emergency brake switch	
Initiated by emergency pushbutton (friction + Track brakes) at loads up to AW3	≥2.5m/s^2 – 0.006m/s^2 per km/h, starting above 48 km/hr and > 2.24m/s^2 starting from less than 48 km/hr (standing to no motion)
Parking Brake	
Parking brake capacity	Shall hold an AW3 Vehicle on a 6% grade, indefinitely.
Jerk Rates and Transition Dead Time Limits	
Jerk rate limit	Adjustable 0.44m/s^3 to 1.34m/s^3

(1) Note: Acceleration and braking rates assume that adhesion is not the limiting factor.

(2) Note: Alternative knee points may be considered if an analysis of operational performance indicates that the proposed reduction in acceleration rate will have an insignificant impact on trip time.

(b) Propulsion Thermal Normal Duty Cycle Requirements

(i) With an AW3 loading, maximum ambient temperature, maximum variation in wheel diameters and a line voltage between nominal OCS voltage and nominal OCS voltage less 16.7%, an LRV Train shall be able to operate continuously over

the entire length of the OLRT. The Train shall accelerate at the maximum rate up to maximum CBTC controlled speeds and decelerate at 0.89m/s2 for Station stops. No part of the propulsion system shall exceed the manufacturer's recommended temperature limits for a 30 year life.

(c) Propulsion Thermal Degraded Continuous Duty Requirements

(i) With an AW2 average loading, maximum ambient temperature, maximum allowed variation in truck wheel diameters and a line voltage between nominal OCS voltage and nominal OCS voltage less 16.7%, an LRV Train shall be able to operate continuously over the entire length of the OLRT line with 25% of the propulsion systems cut-out. The Train shall accelerate with the maximum remaining tractive effort and decelerate at 0.89m/s2 for Station stops. No part of the propulsion system shall exceed the manufacturer's recommended temperature limits for a 30 year life.

(d) Towing Duty Requirements

(i) At AW3, maximum ambient temperature, maximum allowed variation in truck wheel diameters and a line voltage between nominal OCS voltage and nominal OCS voltage less 16.7%, any LRV Train shall be able to tow an equal length, equal weight, dead LRV Train between any two Stations. No over temperature shut down shall occur and no part of the propulsion system shall exceed the manufacturer's limits for a 30 year life.

(ii) At AW0, maximum ambient temperature, maximum allowed variation in truck wheel diameters and a line voltage between nominal OCS voltage and nominal OCS voltage less 16.7%, any LRV Train shall be able to tow an equal length dead LRV Train the entire length of the line. The speed through Stations shall be limited to 16km/h. No over temperature shut down shall occur and no part of the propulsion system shall exceed the manufacturer's limits for a 30 year life.

3.13 Maintenance Based Requirements

(a) Project Co shall provide, at a minimum, LRVs with the following:

(i) All major Vehicle systems shall be provided with diagnostic and fault logging capability with central fault data storage in each Vehicle. Faults shall be reported to a central maintenance computer. Fault and maintenance records shall be available to the City for inspection and review, at the City's request.

3.14 Safety

(a) FMECA

(i) Project Co shall perform a FMECA to identify weaknesses in system-wide hardware and software Design, and to analyze the modes and effects of failures whenever these details are not established by historical records of Equipment

operation. The FMECA shall provide input to system Designs and to the Safety analyses for theoretical circuit behaviour, random component failures, electrical interference, systematic component failures, and software errors in software-based logic. The FMECA shall be updated throughout the system design development and throughout the operational life of the OLRT system.

(b) Hazard Analysis

(i) A PHL, a SSHL and a SHL shall be prepared and submitted as part of the Works Submittals according to Schedule 10 – Review Procedure.

(ii) Project Co shall identify failure-induced and normal operating (non-failure condition) hazards falling into severity Categories I, II and III (as defined in MIL-STD-882) Hazards shall be compiled into a PHL, SSHL, and SHL. The following hazards shall be included in the listings and shall be considered hazards of Category I or II severity:

A. Emergency brakes fail to apply when requested;

B. Service brakes fail to apply when requested;

C. Propulsion fails to cease when requested;

D. Propulsion fails to cease when Emergency Brake is requested.

E. No-motion detection system indicates no-motion when Train is moving;

F. Door opens spontaneously when not commanded;

G. Door opens on wrong side of car;

H. Door closes on person’s object and indicates door closed and locked to the control system;

I. Door interlocks erroneously indicate door is closed and locked;

J. Excessive currents or overheated equipment cause fire hazard;

K. Indication of uncoupled when not uncoupled;

L. Train moves in wrong direction;

M. Slide control does not reapply brakes after slide correction;

N. Cars in Train separate when not commanded; and

O. Train regenerates into dead section of catenary.

(c) Project Co shall perform a hazard analysis on all hazards identified above, in accordance with the requirements of Part 1 Article 10 – Safety and Security Certification.

3.15 Electromagnetic Compatibility

(a) All LRVs and related equipment shall comply with the EMC management plan described in Part 4 Article 9 – EMI/EMC.

(b) An analysis shall be provided showing that no Safety or signal Equipment shall be affected by Vehicle emissions.

3.16 Fire Safety

(a) Fire Safety shall be achieved through adherence to the following requirements or equivalent specifications:

(i) All non-metallic components used on the Vehicle shall be smoke, flame and toxicity tested to NFPA 130, 49 CFR part 238 and BSS 7239. Maximum smoke developed, flame spread indices and toxicity limits are outlined in Section 3.31 of this Article;

(ii) Project Co shall retain a list of materials (flammability matrix) used in the Vehicles showing location of material, weight (density and total weight), heat value per kg and per Vehicle, flame spread, flashpoint, smoke generation, and toxicity. Project Co shall retain and manage test results for each component for the operating life of the Vehicle.

(iii) All heat sources on the Vehicle shall be protected with redundant levels of protection so that circuits are open before unsafe temperatures exist;

(iv) Smoke detectors shall be located in fresh air intake section of each unit;

(v) Automatic dampers shall prevent the introduction of external smoke from entering the Vehicle;

(vi) Protection from smoke and fire originating under the Vehicle floor or through the roof shall be proven through test reports documenting successful completion of a 30 minute roof and floor fire test in accordance with ASTM E119, NFPA 130, and 49 CFR part 238;

(vii) Two fire extinguishers shall be located in each cab;

(viii) An interior manual door release shall be provided for each side door; and

(ix) An exterior manual door release shall be provided for each side door.

3.17 Carbody

(a) Carbody General Requirements

(i) The front and rear ends of the Vehicle shall meet the structural and crashworthiness requirements of all the related standard and requirements outlined in this Article.

(ii) The car shall be constructed of the following materials:

A. Stainless steel utilizing AISI type 301LN or approved equivalent (non-corrugated);

B. HSLA per ASTM A588 or approved equivalent;

C. Stainless steel, HSLA or FRP sidewalls; and

D. Aluminum, in the following alloys: 6061-T6, 5083-H111, 6082, 6005A, 6008, 6106 T6, 5454 H24 and 5754 H26. 2000 and 7000 series alloys shall not be used. Vehicles which offer aluminum carbodies shall include a full analysis of the effects of salt. Analyses shall prove compliance with the required life expectancy below.

(iii) The carbody shall have a 40 year expected life.

(b) Carshell Design features

(i) Equipment arranged for ease of service.

(ii) Roof fairings that provide aesthetically pleasing body lines.

(iii) Roof drainage through interior drain tubes terminating under the car.

A. The Design shall include features that prevent water from draining over the sides or ends of the Vehicle.

B. The structure shall be designed to eliminate all water traps.

(iv) An exterior that is smooth and free of corrugations and that will allow effective vinyl wrapping.

A. The body sides of Vehicle shall be flat or include a designed curve. Deviations shall not exceed 2.5mm over 1m.

(v) A carshell finish that is graffiti resistant, and does not promote snow and ice adhesion.

(c) Thermal and Acoustical Insulation

(i) Thermal insulation shall be installed throughout the Vehicle, such that all exterior walls, floor and ceiling to meet energy objectives.

(ii) Sweating shall not occur on any interior or exterior surface under any temperature or humidity level.

(iii) Acoustical insulation shall be utilized as required to meet the noise requirements outlined in this article.

(d) Articulation Section

(i) All aspects of the articulation shall be service proven.

(ii) Articulation sections shall be proven per ASME RT-1, or equivalent, by static compression test. Collision requirements of ASME RT-1 shall be proven by calculation.

(iii) Articulations shall include interior and exterior flexible bellows that provide a water-tight seal and prevent Passenger exposure to pinch points. Bellows shall be compliant to the smoke, flammability and toxicity limits of this article. Exterior bellows shall be flush with the exterior surface of the side walls.

(iv) Articulation sections shall be designed to allow a free flow of Passengers between body sections. Minimum aisle width through the articulation shall be 1.2m. Hand holds shall be provided throughout the articulation section.

(v) The floor panels shall be arranged to allow relative motion between body sections and allow easy access to the articulation joint. The Design shall not present a trip hazard under any conditions of movement, including rotation about the longitudinal axis (body roll).

(e) Carshell structural features shall include:

(i) A full width anticlimber on each end of the Vehicle;

(ii) A coupling speed up to 8km/hr with no resulting damage to coupler or anchorage. Replaceable energy absorption components of the coupler are excluded from this requirement;

(iii) Provisions for Vehicle towing;

(iv) The structural integrity shall be to ASME RT-1 or equivalent and protect the driver and passengers;

(v) Sufficient jacking pads to allow Vehicle jacking during maintenance and in the case of derailment. Jacking pad locations shall be coordinated with the

requirements of Part 6 – MSF and rerailing equipment. The position of the jacking pads shall be identified on the carshell;

(vi) Pilot beams, skirting and an energy absorbing front bumpers to prevent structural damage or entrapment of struck objects;

(f) Carshell Strength Requirements

(i) Strength requirements shall be in accordance with ASME RT-1 or equivalent.

(ii) If EN 12663 is proposed as an alternate specification for carshell strength, the Vehicle shall meet the requirements of category P-III.

(g) Carshell Collision Resistance Requirements

(i) Collision resistance requirements shall be in accordance with the requirements of ASME RT-1 or equivalent.

(ii) If EN 15227 is proposed as an alternate specification for collision resistance, crushable elements shall be tested in accordance with the requirements contained therein. The Vehicle shall meet the requirements of category C-III.

(h) Carshell Qualification Testing

(i) The first carshell shall be evaluated and certified to comply with the strength requirements and collision crashworthiness of ASME RT-1 or equivalent.

3.18 Coupler and Draft Gear

(a) General

(i) The couplers shall be fully optimized for the Vehicle Design, for both initial and future operation. Full Train consists shall be fully functional, including capability to pull or push another full Train consist.

(ii) The coupler shall be equipped with an energy absorption device and a shear off device that contains the coupler while allowing front end deformation under crash conditions.

(b) The coupler shall:

(i) Be foldable or retractable to allow concealment by front bumper/coupler cover;

(ii) The coupler cover shall be easily removable for cars that are configured to operate as a pair. The cover may be omitted from the design and a standard non-foldable coupler may be utilized for Vehicles that be permanently coupled (a married pair) during Revenue Service, as long as exposed ends of the consist are fitted with a folded coupler and coupler cover;

(iii) Lock in the folded and unfolded position. Easily accessible handles shall lock/unlock the coupler;

(iv) Be a service proven Design;

(v) Use an automatic centering device that is negatable for coupling on curve;

(vi) Contain (10%) spare pins on electrical heads;

(vii) Be able to transmit VMS data signals and communications network signals across the coupled interface;

(viii) Be equipped with a weather protective device to protect couplers from rain, ice and snow;

(ix) Include manual coupling/uncoupling lever(s);

(x) Be equipped with heaters for coupler faces. Additional heaters shall be provided if they are required to ensure reliable operation in Ottawa climatic conditions; and

(xi) The Vehicle shall be provided with redundant LVPS units or coupler pins for B+ and B- suitable for providing low voltage power to all low voltage loads of the adjacent Vehicle (not including battery charging).

(c) Safety

(i) Coupler control shall be interlocked with the no motion relay.

(ii) Couplers shall be provided with shear bolts or equivalent to allow anti-climbers to engage in the event of an accident.

(iii) Couplers shall be capable of retreating rearward in a crash to allow complete collapse of all 3 crash energy management zones, as required in ASME RT-1-2009 or equivalent.

(d) Coupler Type Tests

(i) The first coupler shall be evaluated or certified to meet the requirements of operation within the OLRT System. Manual force requirements shall not exceed the limits for 5th percentile females as detailed in MIL-STD-1472, latest edition:

A. Static design load test (a maximum length consist pushing or towing an equal length consist);

B. Shear pin/crushable Element test (shall not deform under test A or during compression tests);

C. Gathering range test (shall be sufficient to couple under all possible scenarios foreseeable in revenue or non revenue service on the mainline or in the MSF);

D. Lateral force test;

E. Manual lever force test;

F. Maximum coupler Swing (shall be sufficient to negotiate all mainline and yard track);

G. Centering device test;

H. Electric coupler Water test (car wash); and

I. Electric coupler ice and snow test (exposed in snow or ice storm).

(e) Coupler Routine Tests

(i) Each unit shall pass a routine test before shipment from the supplier factory.

3.19 Cab Equipment and Controls

(a) The cab shall be a spacious, ergonomic, Driver friendly environment. It shall be full width, separated from the Passenger area by a full partition and a lockable cab door. The cab shall provide the Vehicle with an aesthetically pleasing, modern look. Large windows on all four sides of the cab shall not only add to the style but shall also provide excellent visibility to the Driver, which shall contribute to the Safety of the System.

(b) All controls necessary to operate the Vehicle, including circuit breakers, cut-out and bypass switches, shall be located in the cab. The arrangement and location of the controls and seat, visibility and overall comfort provided to the Driver shall be reviewed and approved during the mock up review.

(c) Cab shall be as follows:

(i) A full width contoured front windshield;

A. Designed to minimize glare and interior reflection.

B. Laminated Safety glass, FRA Type 1, clear.

C. Electrically heated.

(ii) Cab side windows;

A. Horizontal sliding panel on both sides of cab.

B. Latch easily operated by Driver.

C. Glazing to be laminated Safety glass.

(iii) Side windows; and

A. Fixed horizontal panels on both sides.

B. Maximized in size to contribute to the modern feel of the vehicle.

C. Glazing to be laminated Safety glass.

(iv) Partition Wall Windows.

A. Large windows on door and both sides of partition, if practical.

B. Glazing to be laminated Safety glass.

(d) Driver's Console

(i) A full width, modern, wrap-around style console shall be located at the center line of the Vehicle. The console shall be sealed to IP55 or NEMA equivalent. The console shall include the following:

A. All device controls, switches and pushbuttons;

i. Controls shall be labelled with recessed, durable, contrasting coloured pictograms to avoid cluttering the appearance of the console.

B. Warning and status indicators (LED);

C. All speakers, buzzers or other audible warning devices;

D. Coupler controls;

E. Sanding pushbutton;

F. Silent alarm pushbutton;

G. A Master Controller, including:

i. A transfer switch which uses a dedicated cab control key;

ii. A spring loaded handle to activate the dead man circuit or alternative alertness system that reduces ergonomic impact on the driver; and

iii. A direction switch;

H. Alternative approaches to the Master Controller arrangement may be considered during the cab mock-up presentation.

I. A VMU and a VMU display screen;

J. A CBTC panel;

K. Central dimming control knob for all displays and LED indicators;

L. A Communication Control Panel which shall include interfaces to:

i. PEI;

ii. Crew Intercom (cab to cab);

iii. PA (separate interior/exterior);

iv. Train voice radio (Public Safety Service Radio) as provided by others; and

v. PIDS;

M. A center forward facing camera with a clear view of the Tracks;

N. Passenger door controls, which shall:

i. Be a momentary recessed push buttons that preclude accidental activation. (collar type pushbutton); and

ii. Illuminated when activated (Color coded as follows: open = green, close = red, enable = yellow);

O. Irretrievable Emergency brake switch;

P. A low voltage voltmeter with a range as applicable for battery voltage; and

Q. An odometer.

(e) Other Cab Controls

(i) Separate circuit breaker panels for each voltage.

(ii) A bypass / cutout switch panel.

(iii) A PTU interface panel for access to the Communications System and its attached systems.

(iv) Ventilation, cooling, and heating controls.

(v) Platform camera monitor display screen(s).

(f) Cab Interior Appointments

(i) Hinged cab door, arranged to allow quick emergency egress into the passenger compartment (panic bar).

(ii) Cab flooring, wall lining and ceiling consistent with passenger area.

(iii) A lockable storage cab cabinet or box to store personal items. Volume shall be no less than 7,000cc.

(iv) A fully adjustable, heated cab seat.

(v) Independent cab heater with manual controls.

(vi) Side window defrost (may be combined with cab heater).

(vii) An adjustable footrest.

(viii) Armrest(s).

(ix) A fully adjustable visor for side and forward usage.

(x) A recessed folding coat hook.

(xi) A lockable convenience outlet.

(xii) Two Fire extinguishers (10lb and 20lb, ABC).

(xiii) Flashlight.

(xiv) Flip down cab seat or alternative arrangement for training purposes.

(xv) Lighting fixtures including:

A. Directionally adjustable and dimmable overhead lights on both sides of cab which shall be tied to the emergency lighting circuit; and

B. Auxiliary lights for breaker and cutout switch panels.

(g) Cab Exterior Appointments

(i) Windshield wipers:

A. Electrically operated (operable in the Lead cab only);

B. Speed control which includes Off, Low, High and adjustable Intermittent; and

C. Blade shall park out of view and not be fouled by ice build-up.

(ii) Windshield washers with no less than 15 litres of washer fluid capacity.

(iii) 100dBA Horn with deflecting cone.

(iv) 85dBA Bell.

(v) Three headlights, marker lights, turn signals.

(h) Cab Mock up

(i) Project Co shall build a mock-up of the cab, including cab console, Driver ergonomics, seating, window locations, cab wall and all cab amenities shall be reviewed with the City. Project Co shall implement any agreed ergonomic or functionality changes into the vehicle cab design.

(i) Hostler Panel

(i) A hostler panel, if applicable, shall be provided to allow the Vehicle to be operated from the non-cab end of the LRV. The size and location of the hostler panel shall ensure that safe operation of the Vehicle can be performed while, at the same time, providing passenger seating/standee space to maximize Vehicle capacity.

3.20 Passenger Doors and Controls

(a) The passenger side door system shall be designed to afford minimum dwell time and shall be suitable for operations in the City of Ottawa environment in peak or non-peak times.

(b) The door system shall be the bi-parting sliding plug type using high reliability overhead electric operators. Doors shall be arranged to ensure that the Platform may not be fouled under any circumstances.

(c) Door Operator Design Features

(i) A single door operator shall control each pair of doors and ensure that the panels open and close simultaneously. The operator shall be a service proven Design with a history of reliability without the need for maintenance and adjustment. The door mechanism shall be suitable for operation in cold temperatures and snow and ice storms.

(ii) The door operator shall be a simple, safe Design employing interlocking relay logic to prevent unintended operation. The door operator shall be interlocked with the no-motion relay.

(iii) Door panels shall be closed and locked out of service with a mechanical lock which is independent from the motor and mechanically prevents panel movement. The lock shall cut out door motion, provide a close and locked indication to the door summary loop and energize a door out of service sign. Door operators shall operate from the low voltage battery power circuit.

(iv) Door control operation, should provide the ability to adjust open and close time intervals using the maintenance PTU.

(v) The door closing force shall not exceed the limits specified in APTA SS-M-18-10 or equivalent specification. Pressure sensitive obstruction detection or motor current monitoring shall automatically open the doors when an obstruction is encountered. The obstruction detection system shall stop the affected panel from closing when an obstruction is detected, fully reopen and recycle.

(d) Door Panel Design Features

(i) The door panels shall be designed to blend seamlessly with the Vehicle exterior. Panel Design shall meet the following requirements:

A. Be fitted with laminated Safety glass windows. Window to be aligned with passenger side windows and tinted to match; and

B. Be provided with interior and exterior passenger pushbuttons in compliance with AODA and ADA to allow individual door control when enabled.

(e) Door Controls

(i) Doors shall be operable via pushbuttons in the cab, trainline signals or local door open pushbuttons, depending on the mode set up within the consist.

(ii) A Door Enable feature shall release door control and illuminate a “Door Open” LED pushbutton at each active door, in the interior and exterior of the Vehicle allowing passengers to open individual doors by pressing the “Door Open” button. A pictogram shall indicate the function of the pushbutton switch. Pushbuttons out of service will not display energized LEDs.

(iii) Door open indicators shall audibly and visually indicate door open status.

(iv) Crew switches shall have the capability to cycle the doors. Interior and exterior crew switches shall be installed on each side of the car adjacent to the doors nearest each end of the car.

(v) The door shall have a control system that permits fault monitoring and recording and shall be networked with the VMU over the Train Control System (see Section 3.31 of this Article for VMU details).

(vi) The door control system shall comply with the fault plan requirements of Section 3.31 of this Article.

(f) Safety

(i) Door control on each car shall be interlocked with the no motion detection system on that car.

(ii) Door operator Design shall include a Safety device to ensure doors recycle after contact with a 19mm round object or 9.5mm thick by 75mm wide object.

(iii) Doors closed and locked status shall be interlocked with propulsion.

(iv) All doors shall have a mechanical emergency release mechanism inside and outside the Vehicle.

(v) Door operators shall have a cut-out that locks the door and completes the door closed summary loop.

(vi) Door system shall have an audio and visual warning while open and during closing. Provision for the ability to flash marker lights and brake lights shall flash whenever doors are open.

(vii) Vehicle evacuation through a vehicle on its side shall be conceptually demonstrated.

(g) Side Door System Type Testing

(i) Door Operator Type Test

A. The door system shall be proven to be reliable in service.

(ii) Door Panel Strength Tests

A. One of the first door panels shall be tested to ensure its strength is sufficient to withstand a load of 90kg applied over a $20cm^2$ area. The maximum deflection of the panel shall be no more than 10mm, without permanent deflection.

(iii) Side Door System Routine Testing

A. Each door operator shall pass a routine test before shipment from the supplier factory. All functions shall be verified to operate correctly, including passenger request pushbuttons.

3.21 Heating, Ventilation and Air Conditioning

(a) The HVAC Equipment shall provide safe, reliable climate control in accordance with the climatic and environmental conditions outlined in this Article. The system shall utilize microprocessor controls to automatically control interior temperatures (both in the cab and passenger area) and prevent snow or ice or water from accumulating on the Vehicle floor or at thresholds. The system shall incorporate a layover mode to maintain moderate interior temperatures when Vehicles are not in revenue service.

(b) System Description

(i) The system shall be roof-mounted, fully unitized packages (no less than 2) with a height that meets the roof Equipment height limits detailed in this Article.

(ii) Watertight and leak-proof seals shall be provided between carbody and HVAC unit return and supply air interfaces.

(iii) The refrigerant circuit shall be hermetically sealed system charged with non-ozone depleting refrigerant. Refrigerant shall comply with all applicable Canadian standards and laws.

(iv) Eight (8) m3/hr fresh air per passenger shall be provided (all seats occupied and 4 standees/square meter) to ensure compartment air quality. Fresh air dampers, or equivalent, shall allow a quicker warm-up or cool down during initial start-up by limiting fresh air.

(v) The HVAC heating system shall be arranged to operate in stages. The system shall use duct sensors to keep supply air within 8°C of return air temperature.

(vi) Over-temperature Safety protection shall be:

A. Self re-settable thermostats that disable control voltage to the heater contactors; and

B. Fusible link(s), or equivalent, to protect the system in the event of a failure of the over-temperature thermostat.

(c) System Capacity

(i) The system shall be designed to maintain interior conditions between 19°C and 22°C with 1% Design conditions for cooling and 99% Design conditions for heating as defined in ASHRAE fundamentals handbook. Load calculations shall be submitted as part of the Works Submittals according to Schedule 10 – Review Procedure.

A. Setpoints shall be easily adjustable. Project Co shall adjust the setpoint as directed by the City.

(ii) The relative humidity in the interior of the car shall be maintained between 30-60% during all operating conditions requiring cooling.

(iii) A positive interior pressure shall be maintained at all times and at all Vehicle speeds.

(iv) Vehicle interior temperature shall be within 1.5°C of setpoint, 2 minutes after a 30 second door opening cycle in worst case Design conditions.

(v) Temperature stratification shall be limited to 2°C within any vertical or horizontal plane.

(d) HVAC Controls

(i) The HVAC controller shall allow software adjustments and modification to settings, including a ±2°C setpoint adjustment for all switching points. Setpoint accuracy shall be ±0.2°C.

(ii) The HVAC controllers shall have fault monitoring and recording and shall be networked with the VMU over the Train Control System described in Section 3.31 of this Article. The HVAC system shall comply with the fault plan requirements of Section 3.31 of this Article.

(e) Additional HVAC Features

(i) Emergency shutdown switch for HVAC system (per car and consist control) shall be located in the cab.

(ii) Emergency fresh air damper close switch (per car and consist control) shall be located in the cab.

(iii) Smoke detectors shall be located in all fresh air intake ducts. Upon activation, the detector shall energize a signal that shall indicate a smoke alarm, including Vehicle number and location of alarm within the consist. Activation of either the damper closed or HVAC shutdown will silence the smoke alarm signal.

(iv) A layover thermostat to maintain interior temperatures between 4°C and 8°C. (Dampers shall be closed and windshield heaters de-energized during layover).

(f) Floor Heat

(i) The grilles/heater guards shall be designed to prevent passenger exposure to unsafe surface temperatures and electrical connections.

(ii) Threshold heaters shall also be provided as part of the floor heat system. These heaters shall be sized to keep snow or ice from accumulating at the doorway or affecting the operation of the door system. Thresholds shall be arranged to allow drainage of melted snow and ice.

(g) Cab

(i) The HVAC Equipment within the Driver's cab shall consist of:

A. An electrically heated windshield;

B. Overhead air diffusers with volume and directional adjustability; and

C. Thermostatically controlled cab heater(s) with the following features:

i. Infinitely adjustable temperature control;

ii. OFF-LOW-HIGH rotary switch for air speed/volume control of both cab heaters;

iii. Heater noise level in HIGH speed not to exceed 72dBA;

iv. Heater coil and blower powered by AC circuits;

v. Manual adjustment to direct airflow to floor, cab side windows, or both;

vi. Cab heater surface temperatures shall not exceed 52°C; and

vii. Over-temperature protection shall include:

1 An over-temperature thermostat which shall automatically cycle the heater contactors upon excessive temperatures; and

2 Failure of the over-temp thermostat shall cause a manually resettable shunt trip breaker to open power to the heaters. Manual reset switch shall be easily accessible to the Driver.

(h) HVAC Type Tests

(i) The first HVAC unit shall be evaluated or certified to comply with these test requirements outlined below before production Equipment manufacturing is commenced. Testing shall at a minimum include the following:

A. Cooling and heating capacity tests;

B. Condensate carry-over test;

C. Heater safety tests; and

D. Smoke detector test.

(i) Cab Heater Type Tests

(i) Cab heater safety tests

(ii) Windshield defrosting tests

(j) HVAC Routine Tests

(i) Each unit shall pass a routine test.

(k) HVAC Climate Room Test

(i) Unless already certified in environmental conditions similar to Ottawa, a vehicle shall be completely instrumented and fully tested in a climate chamber to ensure the requirements of the RFP are met or exceeded.

3.22 Lighting

(a) The lighting system consists of all interior lighting, exterior lighting, and indicators. The Design shall provide lighting with a minimal degradation of color or luminosity over time. Safe levels of lighting shall be provided in the event of emergency conditions.

(b) The Lighting system shall:

(i) Be primarily LED based, operating entirely from the Vehicle low voltage system;

(ii) Have two luminosity levels for the main interior lighting: normal and emergency;

(iii) Be configured so that lighting in a multicar Train can be controlled from the lead car;

(iv) Provide lighting levels in passenger compartments and at doors compatible with AODA/ADA requirements;

(v) Have headlights, tail lights, marker lights, and stoplights consistent with the requirements of Canadian laws and regulations;

(vi) Provide indications to passengers and crews of failed doors and doors out of service.

(c) Interior Lighting

(i) The main lighting fixtures shall use LED cluster modules operating from the low voltage distribution network.

(ii) The interior emergency lighting shall use LED modules operating from the Vehicle battery.

(iii) LLEPM shall be provided along the aisle and vestibules leading to the doorways, utilizing a HPPL material strip embedded into the floor.

(iv) An interior LED indicator light shall be provided over each door to indicate that the door is not closed and locked.

(v) A small LED backlit sign shall be provided over each side door to indicate when the door is locked out of service.

(d) Cab area:

(i) LED indicator and instrument lighting shall be provided.

(ii) Overhead lighting shall be provided using two dimmable and directionally adjustable lights.

(iii) LED cab Equipment compartment lighting shall be provided.

(iv) Overhead and Equipment compartment lighting shall be included in the emergency lighting system.

(e) Exterior Lighting

(i) The following exterior lighting shall be LED type, visible in all natural and artificial lighting conditions:

A. Dual color marker lights;

B. Provision for turn signals (for mixed traffic operation), tail lights;

C. Brake lights;

D. Propulsion fault light;

E. Door open LED indicator light at each door;

F. LED backlit sign over each door to indicate when the door is locked out of service;

G. ATP bypass light; and

H. Vehicle door summary status light, viewable from transverse and longitudinal directions.

(ii) Headlights shall be provided on each cab end.

(iii) A third, forward facing headlight shall be provided at the center line of the Vehicle, above the cab to distinguish the LRV from other types of vehicles

(iv) Headlights shall have high and low beam functionality.

(f) Lighting Controls

(i) All lighting controls switches and circuit breakers shall be located in the cab area.

(ii) Passenger compartment lighting control shall be a trainline control function from the control panel on the lead car.

(iii) Cab lighting shall be controlled through a switch with dimmer control.

(iv) Equipment locker lighting shall be controlled by a switch on the control panel and a limit switch actuated by the locker door.

(v) A dimmer switch shall be provided to control the intensity of indicator panel back lighting.

(vi) Control of headlights, tail lights, stop lights, and marker lights shall be interlocked with the direction Train lines and coupler loop switches so that head lights, tail lights, stop lights and marker lights shall only be active at ends of the Train in accordance with Train direction.

(g) Performance

(i) The cab and passenger area lighting intensity shall meet as a minimum, the requirements of EN 13272 or equivalent.

(ii) Emergency lighting shall be available for 90 minutes after loss of the low voltage power supply and shall meet or exceed the minimum illumination requirements of APTA SS-E-013-99, Rev. 1.

(iii) LLEPM shall meet APTA standard SS-PS-004-99 Rev. 2.

(iv) Headlights shall meet all requirements of Canadian Motor Vehicle Safety Regulations, Technical Standard 108.

(v) Amber marker lights shall be activated on the front of the lead car when the master controller is in the forward position.

(vi) Marker Lights, tail lights and brake lights shall operate as follows:

A. Red marker lights and tail lights shall be activated on the last car at all times;

B. Brake lights shall be active on the last car when the Train brakes are applied;

C. Red marker lights and red tail lights shall be active on the front of the Train when no direction is selected;

D. Tail light and stop light intensity shall meet the requirements all requirements of Canadian Motor Vehicle Safety Requirements, Technical Standard 108;

E. Marker lights and brake lights shall flash when the Train is stopped and the doors are open. Marker and brake lights shall also flash when the Master Controller is in the reverse position; and

F. Turn signals operated from the console shall be provided and shall operate in accordance with Canadian highway regulations.

(vii) Interior passenger and cab lighting shall time out in 20 minutes after the Vehicle is turned off.

(viii) Exterior Vehicle door summary status lights shall be visible from both the longitudinal and transverse directions.

(h) Type Testing

(i) Verification of Design luminosity.

3.23 High Voltage Distribution and Auxiliary Electrical Equipment

(a) High voltage power shall be collected from the pantograph, which shall:

(i) Be capable of operation in both directions;

(ii) Have tension characteristics compatible with overhead contact system Design;

(iii) Be provided with a lightning arrestor rated for outdoor operation;

(iv) Be equipped with an electrically controlled system for raising and lowering; and

(v) Be equipped with a means of raising and lowering manually from inside the vehicle.

(b) The high voltage power distribution network shall be protected by a HSCB.

(c) The HSCB shall:

(i) Be rated in excess of the worst case interrupt current and line voltage;

(ii) Have trip settings coordinated with the Traction Power system Design to prevent nuisance tripping of Traction Power breakers; and

(iii) Provide a remote trip and reset function to be controlled by the propulsion system and auxiliary power.

(d) Output from the HSCB shall be split into three separately protected main circuits: Traction Power A, Traction Power B and Auxiliary Power.

(i) Fuses for Auxiliary Power systems shall be roof mounted in a protective enclosure.

(ii) Circuitry shall allow the Auxiliary Power system, and only the Auxiliary Power system, to connect to a Shop Power Feed. When the shop power feed is connected, the pantograph feed shall be disconnected through an electrical and mechanical interlocking system.

(e) Return Currents and Safety Grounding

(i) The high voltage return circuit Design shall return power safely to the rails in a manner that protects bearings, prevents return currents from interfering with trainline circuits and minimizes harmonic interference with the wayside systems.

(ii) The grounding of the car body sections, trucks and Equipment shall be designed in a manner that provides maximally redundant paths to the return rail and that complies with the EMC management plan described in Part 4 Article 9 – EMI/EMC.

(iii) The voltage rise between rail and car body shall not exceed 50mv with the loss of a single ground brush.

(iv) Resilient wheels shall be provided with 2 or more shunt straps between the wheel hub and rim.

(f) Auxiliary Power

(i) Auxiliary power converters shall include:

A. 3 phase 60Hz AC power inverters to supply power for HVAC, blower motors, compressors, fans, etc.; and

B. LVPS to provide low voltage DC power for control systems, and battery charging, lighting, etc.

(ii) Redundant inverters and LVPS shall be provided with independent controls and control power supplies to provide maximum availability.

A. In the case of failure of one inverter all essential Vehicle loads and 50% of HVAC loads shall be maintained by the remaining unit.

B. In the case of failure of one LVPS all loads and limited battery charging shall be maintained.

i. If vehicles are provided as married pairs, LVPS redundancy may be achieved with a single LVPS on each car if all low voltage loads and limited battery charging can be provided from the single LVPS.

(iii) Line filters shall be provided to protect the LVPS and auxiliary inverters and to minimize conducted emissions back into the OCS.

A. Line filters shall protect against all positive and negative OCS transients in accordance with IEC 60850.

B. If inverters and LVPS on each end of the Vehicle are located in a common enclosure with a common line filter, circuit breakers or contactors shall be provided to isolate shorted or failed units from the line filter.

C. LVPS and auxiliary power inverters shall comply and the line filters shall comply with the EMC management plan described in Part 4 Article 9 – EMI/EMC.

(iv) Power IGBTs used for inverters and LVPS shall not be exposed to any circulating air, filtered or not. Cooling of IGBTs shall be through external heat sinks or sealed heat transfer tubes only.

(v) Auxiliary Inverter output waveform and the Design of the attached motors shall be coordinated to prevent motor insulation and motor bearing damage.

(vi) The LVPS output shall meet the power quality requirements of EN 50155 and the ripple requirements of IEC 60077-1.

(vii) The LVPS shall have an automatic dead battery start feature.

(viii) Monitoring and Diagnostics

A. The LVPS units and the auxiliary power inverters shall be provided with diagnostic and fault recording capability and shall report all faults to a VMU.

(g) Battery

(i) A battery charged by the LVPS units shall be provided on each Vehicle.

(ii) The battery shall be protected by a fuse and a positive and negative side disconnect switch and over voltage protection.

(iii) The battery compartment shall be ventilated sufficiently to prevent build-up of explosive levels of hydrogen gas.

(iv) The battery shall not be lead acid.

(v) The battery shall be sized to meet the following loads:

A. In case of LVPS failure, 50% of lighting and all loads necessary for operation of the Train,; and

B. In case of loss of primary power, emergency lighting and communications functions and door operators (a minimum of 12 door opening cycles) shall be maintained for 90 minutes while other functions shall be progressively shed.

(h) AC and Low Voltage Distribution

(i) All AC and low voltage DC circuits shall be circuit breaker protected.

(ii) Low Voltage DC and AC Circuit breakers shall be located in locked enclosures in the cab.

(iii) All AC and DC circuit breakers shall meet the requirements of IEEE Std C37-13 and IEEE Std C37-14 respectively.

(iv) The low voltage DC system shall be grounded in a manner which prevents differences in potential between cars caused by traction return currents from interfering with trainline signals.

(v) Galvanically isolated, ground fault protected single phase 120VAC 60Hz power shall be provided to cab and passenger compartment outlets as needed for cleaning and for Vehicle maintenance.

(i) Qualification Testing

(i) Auxiliary Inverter and LVPS components shall be type tested in accordance with the standards outlined.

(ii) Auxiliary Inverter and LVPS shall be tested in accordance with IEC 61287.

(iii) The converters shall be noise tested in accordance with IEC 61133.

(iv) The battery shall be capacity tested at the point of manufacture in accordance with APTA RP-E-007-98-1999 and to demonstrate that it meets the capacity and emergency lighting requirements of this Article. The Battery cells shall be tested in accordance with IEC 60623.

(v) The HSCB shall be tested to prove compliance with the requirements of this section and IEC 60077-3:2001.

3.24 Propulsion and Dynamic Braking

(a) General

(i) Propulsion shall be microprocessor controlled IGBT inverter drives with two AC motors for each motored truck.

(ii) The propulsion system and its components shall meet the performance and duty cycle requirements of this Article.

(iii) At least one inverter shall be provided for each power truck.

(b) Propulsion Control shall:

(i) Be based upon networked and trainlined tractive effort and braking effort commands with load weigh compensation to provide consistent acceleration and braking rates regardless of passenger loading;

(ii) Detect and correct spins and slides in coordination with the friction brake and traction control system;

(iii) Request sanding control to apply sand in front of both wheels of the leading axle when wheel spin or slide exceeds a preset level;

(iv) Monitor direction, propulsion and braking control and friction brake status trainlines and inhibit or shutdown propulsion in case of conflicts;

(v) Protect the inverter semiconductors by tripping the HSCB and or dropping the line contactor in event of a critical fault or out of tolerance voltage surge;

(vi) Provide fault protection from events that may result in motor, wiring, or inverter or line filter damage or cause violations of electromagnetic emissions limits;

(vii) Coordinate with the friction brake system to prevent roll back during start-up on the maximum grade;

(viii) Coordinate with the friction brake the blending of brakes to ensure smooth transitions from dynamic to friction braking;

(ix) Provide fault recording and diagnostics for system troubleshooting and report faults to the Vehicle monitoring unit described in of this Article;

(x) Report all faults to the VMU described in this Article; and

(xi) Meet all requirements for monitoring and diagnostic systems outlined in that section.

(c) Line Filter

(i) Each traction inverter shall be protected by a line filter which shall protect it against any surges or spikes that may occur on the Traction Power system. Line filter shall comply with IEC 60850.

(ii) The line filter and the inverter control Design shall meet the requirements of the EMC management plan of Part 4 Article 9 – EMI/EMC.

(iii) Line filter and inverter isolation shall be provided in case of an out of tolerance line voltage, an emergency brake request or a critical inverter, line filter or motor fault.

(iv) Protection against energizing a dead section of the OCS with the line filter or regenerative braking energy shall be provided.

(v) Filter capacitors shall be rated for 15 year life in the Design operating environment and selected in accordance with IEC 61071.

(d) Traction Inverters

(i) Traction inverter units shall be microprocessor controlled with modular keyed IGBT semiconductor switches rated for the application voltage and all transients.

(ii) Unless 4 quadrant Traction Power Supplies or a Traction Power energy storage system is provided, a brake chopper and resistors shall be provided to control DC link voltage and dissipate braking energy.

(iii) The inverter container IGBTs, capacitors and control electronics shall be sealed from outside air. Cooling shall be through external heat sinks or sealed gas filled heat tubes only. The convection or forced cooling of the external heat sinks or heat tubes and the line inductor shall be provided.

A. If forced cooling is utilized, diversification of blower motors shall be provided and the Design of intake screens shall permit easy removal and cleaning.

(e) Traction Motors and Gear Units

(i) Traction motors shall be of a self-ventilated or totally enclosed Design. If motors are self-ventilated, air intakes shall be designed to preclude the ingestion of airborne material.

(ii) Traction motor insulation shall be rated class H or better and be designed for the inverter output voltage and waveforms.

(iii) Motor bearings shall be protected from high frequency IGBT switching harmonics capacitively coupled to the rotor.

(iv) Traction motors shall tolerate a minimum of 6mm difference in wheel diameters for the axles on a truck without overheating or causing a reduction in system performance or life.

(v) Gears shall be rated for bi-directional service in accordance with the duty cycle requirements.

(vi) Motor and gear unit bearings shall have an ANSI/AFBMA L10 rating or approved equivalent standard.

(f) Efficiency

(i) The propulsion system shall provide an energy system of greater than or equal to 80% efficiency from the OCS to the wheel.

(ii) Regenerative braking into a receptive line shall return 80% of the mechanical energy to the OCS when braking from 70km/hr to 8km/hr.

(g) Propulsion and Dynamic Braking system Qualification Tests

(i) Project Co shall perform qualification tests of the first two traction motors in accordance with IEC Std 60349-2 and IEEE Std 11.

(ii) Brake resistors shall be qualification tested in accordance with IEC 60077, 60322 and IEEE Std 16-2004

(iii) Inverter and line filter components shall be type tested in accordance with the tests listed IEC 61287-1 Section 4.5.2.1 Test of converter components and subassemblies.

(iv) A combined systems laboratory test shall be conducted on one complete set of propulsion Equipment, including the motors, brake resistor(s), power conditioning Equipment, inverters, protection devices, logic and controls, etc. A dynamometer shall be used for this test which simulates Vehicle inertia by various methods. The dynamometer test shall simulate the OLRT route profile to prove compliance with the normal, degraded mode, and towing mode requirements. Motor and inverter and IGBT temperatures shall be recorded to prove compliance with the thermal performance requirements. Worst case environmental conditions and wheel diameter variation shall be simulated.

3.25 Trucks

(a) Each LRV shall be supported by 4 wheeled trucks.

(b) The leading and trailing trucks shall have freedom of rotation about a center pin.

(c) All axles shall be fitted with hydraulic brake systems. Track brakes shall be fitted on all trucks.

(d) Truck Components

(i) Shall be either cast steel or fabricated/welded steel construction.

(ii) The secondary suspension shall be controlled by a levelling valve to fulfill AODA/ADA level boarding requirements.

(iii) Secondary lateral and vertical dampers shall be used.

(iv) Wheels shall be of resilient type and the wheel profile shall be selected by the car builder in concert with the Track Designer to ensure that a compatible wheel/rail interface is selected. The wheel/rail interface and truck Design shall be subject to a dynamic analysis, including wheel unloading, Vehicle overturning and truck hunting as described in APTA RP-M-009-98.

(v) Axles shall be solid and designed in accordance with AAR M-101 and APTA RP-M-001-98, or equivalent.

(vi) Journal bearings shall be tapered roller or spherical, designed with an L-10 life rating of 1,600,000km.

(vii) Heated sand tubes and scatter units shall be provided to prevent clogging by snow, ice or wet sand.

(viii) Stone guards and splash guards shall be provided.

(ix) Hinged or easily removable skirts that blend with the exterior visual aesthetics of the Vehicle shall be provided.

(x) Shock and vibration environment criteria for axle mounted components shall be:

A. 10g vibration levels up to 100 Hz;

B. 80g shock loads laterally and vertically; and

C. 50g longitudinal shock loads.

(xi) Shock and vibration environment criteria for truck mounted components shall be:

A. 6g vibration levels up to 100Hz; and

B. 20g shock loads – all directions.

(e) Truck Motion Control

(i) The trucks shall control Vehicle motions such that the dynamic envelope defined in Section 3.36 of this Article is not violated.

(ii) Primary suspension strokes shall never be exhausted under any condition of dynamic operation, Vehicle weight, weight variation and suspension creep.

(iii) Primary and secondary vertical and lateral stops shall not be contacted under normal operating conditions. Stops shall be fabricated from replaceable elastomeric bumpers.

(iv) A means for Vehicle height adjustment shall be provided to account for wheel wear and/or rail wear.

(v) Equalization shall be such that with the car on level Track under an AW0 load, lifting or dropping any wheel up to 38mm shall not change the load on any other wheel of the car by more than 60%.

(vi) Raising or lowering any wheel up to 50mm shall not result in loss of contact between any of the other wheels on the car and the rail.

(f) Vehicle Modeling

(i) Vehicle modeling, including collision analysis, shall include the requirements of ASME RT-1 or equivalent.

(ii) The analysis shall consider the limits of environmental conditions, Track deterioration, suspension wear, Vehicle weight and speed variations.

(iii) Modeling of Vehicle performance shall be by NUCARS, Vampire or equivalent.

(g) Stress Analysis

(i) For a service proven Vehicle, stress analysis and FEA results from a previous contract shall be submitted as part of the Works Submittals according to Schedule 10 – Review Procedure.

(ii) For a new or modified Vehicle a complete stress analysis shall be submitted as part of the Works Submittals according to Schedule 10 – Review Procedure.

(h) Design Ride Quality

(i) The methodology used to evaluate ride quality shall be ISO 2631 (latest edition), in the frequency range of 0.5 to 80Hz. Limits are valid for 3 axes.

A. Passenger RMS acceleration values shall not exceed $0.32 m/s^2$.

B. The vibration total value (root sum of squares summation) for each measurement point shall not exceed $0.50 m/s^2$.

(i) Resonant Frequency

(i) To ensure Bridge/truck/Vehicle resonant frequency compatibility, Project Co shall determine truck primary suspension frequency that ensures dynamic stability under all conditions, with appropriate safety margins.

(j) Truck Qualification Testing

(i) The first truck unit shall be type tested before production Equipment is commenced. Testing shall include the following, at a minimum:

A. Project Co shall perform a fatigue and static load test to verify that the maximum allowable stresses are not exceeded when the truck is subjected to the static loads;

B. After completion of the static tests outlined in A above, all critical welds of the tested truck frame shall be radiographically inspected; and

C. Project Co shall perform a wheel load equalization test to verify that the maximum allowable unloading is not exceeded.

(k) Routine Testing

(i) QC inspection of all components shall be performed and included with the shipping documentation.

(ii) 100 % of the truck frames shall be tested via MPI.

3.26 Friction Brakes, Track Brakes

(a) General

(i) A disc brake friction brake system shall be provided for all trucks.

(ii) Friction brakes shall be of an electro-hydraulic, microprocessor controlled Design with a spring applied/hydraulic release parking brake and shall coordinate with propulsion control to provide blended braking, slide control and roll back prevention.

(iii) A Track brake system shall be supplied to provide the required emergency brake rate. A sanding system shall be provided to apply sand to the rails in front of the lead axles.

(iv) The friction disk brake and the Track brake system shall meet all requirements of this Article.

(b) Disc Brakes and Calipers

(i) Hydraulic actuated disc brakes shall be provided on all axles of all trucks.

(ii) The friction surfaces of the disc rotors shall be replaceable without removing wheels or any truck parts other than brake calipers.

(iii) Disc rotors shall have a wear limit indicator.

(iv) Disc brake calipers shall:

A. Have a spring apply/hydraulic release parking brake;

B. Be provided with a pump release from inside the car for towing purposes;

C. Have a manual release for the calipers in case of hydraulic failure. The release shall be either mechanical or from a hydraulic circuit separate from the service hydraulic line. Access to the release shall be available either from the side of the Vehicle or inside the car;

D. Reset manually released calipers to normal operation after a maximum of three service brake applications, once the brakes are cut back in;

E. Brake calipers shall include an automatic slack adjusting feature that functions during both service and parking brake operation; and

F. The slack adjuster shall compensate for brake pad wear and shall ensure drag free operation.

(c) Hydraulic Fluid

(i) The hydraulic fluid shall be fire-resistant and meet all requirements of the latest revision of MIL-H-83282.

(d) Electro Hydraulic Unit

(i) The friction brake actuators on each truck shall be powered by the electro hydraulic unit for that truck.

(ii) EHU shall be resiliently mounted above the secondary suspension and be capable of meeting the shock and vibration loads specified in this Article.

(iii) The EHU shall contain a hydraulic fluid reservoir, motor driven pump and all necessary control valves, pressure switches and pressure transducers.

(iv) External connections shall be made directly to the manifold plate using self-sealing, quick-connect couplers.

(v) The reservoir shall be provided with a drain plug, fluid level sight glass and a quick-connect coupler for filling.

(vi) The motor driven pump shall operate from the Vehicle low voltage power supply and shall function within specification over the range specified.

(vii) Designs in which the pump motor operates continuously (100% duty cycle) shall not be permitted.

(viii) The EHU shall report low fluid fault conditions through the Vehicle monitoring system.

(ix) Pressures in the brake cylinders shall be limited to 60% of the maximum system pressure.

(x) The EHU shall have sufficient hydraulic capacity to provide continuous normal service operation with friction brakes only.

(e) Accumulators

(i) Nitrogen charged accumulators shall be provided to store the hydraulic energy.

(ii) The pressure level shall be sufficient to meet the required response times for all operating conditions including emergency and system cut-out.

(iii) A manual cut-out valve shall be provided to hydraulically depressurize the accumulator for maintenance.

(iv) The accumulator shall be protected from corrosion.

(v) The accumulators shall be properly sized such that from EHU cut-in pressure, the accumulator has sufficient pressure to supply two AW3 full service and one AW3 emergency brake applications with 30 second applications and 2 minutes between applications.

(f) Friction Brake Control Unit

(i) The hydraulic disc brakes of each truck shall be controlled by a FBCU for that truck.

(ii) The FBCU shall be physically independent or integrated with propulsion logic provided that the level of Safety, reliability and availability is the same as with an independent unit.

(iii) The FBCU shall:

A. Read and interpret trainline requests and load weigh transducers;

B. Communicate over a direct link with the propulsion system for that truck;

C. Read the dynamic braking effort signal from the propulsion system and command the friction brakes to provide the difference between braking request and the braking effort supplied by propulsion;

D. Take over if the TCU cannot control a vehicle slide within a preset time;

E. Request the sanding system to apply sand during low adhesion;

F. Perform Safety self-checks of the brake system and default to a restrictive state in case of failure;

G. In coordination with the propulsion system, provide roll back protection when the Vehicle is starting from a dead stop;

i. The roll back prevention function of the FBCU shall be coordinated with propulsion to prevent any rollback greater than 10cm during start-up on the absolute maximum grade for the OLRT System (6%).

H. Provide fault recording and diagnostics for system troubleshooting;

I. Meet all the requirements for fault reporting, system integration and local access;

J. Provide a brake application and inhibit Train propulsion when any accumulator pressure falls below a level required to provide a friction only AW3 emergency brake stop;

K. Control braking to provide the total trainline braking request in case of failure of the propulsion system to provide electric braking or in case of communications failure with the propulsion system; and

L. Default to safe operating mode if a failure of the load weigh sensor occurs on the truck.

M. Distinguish between speed sensor failures and vehicle slides.

(g) Track Brakes

(i) Track brakes shall be provided on each truck.

(ii) Track brakes shall be powered from low voltage DC system and the car battery.

(iii) Track brakes shall be adjustable with hand tools to compensate for wheel and Track brake wear.

(iv) Brake shoe material shall be removable without removing the whole Track brake assembly.

(v) All Track brake magnetic coils shall be hermetically sealed and all electrical connections shall be waterproof to IP67 per IEC 60529 or NEMA equivalent.

(vi) Track brake electrical connections shall be of a waterproof quick disconnect type.

(h) Sanding System

(i) A sanding system shall be provided that shall deposit sand at the wheel rail interface of the lead axle of each Vehicle in the Train.

(ii) The air system powering the sander shall store sufficient compressed air that it is capable of 20 seconds of sand application without running the air compressor.

(iii) Sand boxes and nozzles shall be heated.

(iv) Sanders shall be activated during spinning or sliding events and continuously down to zero speed during any emergency brake application.

(v) A momentary switch shall be provided on the console to manually activate sanding.

(i) Qualification Testing

(i) The following minimum tests shall be performed:

A. Golden shoe force test of service brake and emergency brake application;

B. Golden shoe force test of parking brake application;

C. Emergency brake build up time;

D. Dynamometer test of brake pad wear rates;

E. Efficiency of the slide control system proven to be equal to or greater than 85% in braking over the entire speed range;

F. Dynamometer test for compliance with friction brake only operation performance requirements; and

G. Brake shoe and wheel noise test.

3.27 Communications and Passenger Information System

(a) Communications System Functional Requirements

(i) Provide synchronized audio and visual passenger information announcements and shall include, at a minimum destination, Station stops, time, emergency announcements.

(ii) Coordinate emergency announcements on the Vehicle with station announcements so that station and Vehicle announcements do not compete.

(iii) Provide a passenger emergency intercom system.

(iv) Provide reliable voice communications with the TSCC.

(v) Provide networked data communication with the wayside network in line with safety and security requirements and for downloading maintenance, data passenger count information and for updating passenger announcements.

(vi) Provide a CCTV video monitoring and recording system.

(vii) Provide a display that shall provide a view of all Train doors and any passenger compartments in which there is an Emergency.

(viii) Provide fault recording and diagnostics for system troubleshooting.

(ix) Include a silent alarm reporting function.

(b) Power Distribution and Supplies

(i) Each subsystem listed in this section shall be powered from the low voltage DC power system and shall have its own isolated power supply.

(ii) Communications and passenger information systems shall operate reliably from the low voltage DC power system within the ranges and power quality allowed by EN 50155.

(iii) Each communications subsystem shall be protected by a separate circuit breaker.

(c) System Requirements

(i) Train Voice Radio

A. The vehicle PA system shall provide, as required, power, analog and digital interfaces and connections to the radio system supplied by others. Project Co shall work with the Radio System Supplier to determine the type and functionality required.

B. Project Co shall work in partnership with the Radio System Supplier to ensure that the antenna and transceiver do not cause intermodulation or interference with the other OLRT radio systems and equipment. Operational compatibility testing shall be coordinated with the City and the Radio System Supplier and operation shall be demonstrated to the satisfaction of Industry Canada.

(ii) Hi-Speed Train-to-Wayside Data Radio

A. Project Co shall ensure that the high speed Train-to-Wayside data radio system is resilient and does not present a security risk to the OLRT Systems and Vehicles.

B. The high speed Train-to-Wayside data radio shall reliably support all required train wayside networked data communications loads required by Articles 3 and 6 of this Schedule 15-2 Part 4.

(iii) Public Address System

A. The PA system shall accept input from the Driver's cab microphone, patched through TSCC announcements, and the automatic announcement system.

i. TSCC and cab input shall take priority over automatic announcements.

B. Voice shall be transmitted digitally over the CTS.

C. The PA and speaker system shall meet the performance requirements of IEEE Std 1477-1998, for frequency response, ambient noise level adjustment range, speaker distribution and intelligibility.

D. The PA system shall automatically compensate for ambient noise up to a 95dBA without exceeding Station platform noise level limits.

E. The PA control shall emit an activation chime different from the door chime before any announcement.

F. The PA system shall have both internal and external speakers. External speakers will not be active unless selected.

G. Turning off or reducing external speaker volume at night at At Grade Stations shall be provided.

H. Automatic selection of the correct side for external speaker activation based on location of the Station Platform shall be provided.

I. The PA broadcasts shall be transmitted over the Train and Vehicle Communications Network as VoIP.

(iv) Cab to Cab and Passenger Emergency Intercoms

A. Voice shall be transmitted digitally over the Train communications network for all intercom systems.

B. PEI and cab-to-cab intercom systems shall have a session hold function with ability to transfer between PEI and cab-to-cab sessions.

C. Once activated, the PEI stations shall require no further intervention by the passenger to communicate with the Train. PEI stations shall meet ADA and AODA requirements.

D. Queuing of multiple PEI or cab-to-cab intercom calls shall be possible.

E. The PEI system shall permit a passenger speaking at a distance of 50cm from the PEI unit in a normal tone of voice with ambient noise levels up to 85dBA to be heard. Total harmonic distortion through the system from microphone to cab handset shall be less than 2%.

F. If passenger announcement displays in the vehicle are not visible from a seated wheelchair position during peak hour ridership, the PEI in the accessible areas shall include a localized message display panel that also provides PA and announcement information.

G. Activation of a PEI station shall be reported and identified on the Video display along with a video feeds from the car in which the PEI was activated. Video frame rate shall be increased to 30fps until cleared by security personnel.

H. The passenger emergency video feed shall only appear when the Train has stopped. The Driver shall not be able to select video feeds.

(v) Radio and Intercom Control Panel

A. The Communications System control panel radio handset shall by default connect to the Train voice radio.

B. LED pushbuttons shall be provided to connect the handset to the cab-to-cab intercom and PEI systems. An LED pushbutton shall also be provided to activate the session hold functions described in the intercom section

C. Controls shall be provided to adjust the volume of the radio, and intercom speakers and handset volume above a preset minimum level.

(vi) Automatic Announcement System

A. The automatic announcements shall provide pre-recorded simultaneous voice and visual announcements over the Train PA system and the transverse announcement signs located in each body section of each Vehicle.

B. Station and connection announcements shall be provided as the Train enters each Station.

C. Pre-recorded special announcements may be selected from the Communications Systems control panel at any time and override any other messages.

D. The cab system may make direct announcements at any time over the PA system using the gooseneck microphone and a control switch.

E. Special announcements, voice and visual may be relayed from the TSCC over the high speed Train-to-Wayside data radio. The list of pre-recorded messages may also be updated over the high speed Train-to-Wayside data radio along with message priorities, announcement frequency, and expiration dates.

F. Station announcements shall be triggered based on Vehicle location provided by the CBTC system or alternative arrangement.

G. All automatic announcements shall be made in English and French using the existing standards established by the City.

H. Project Co shall provide all necessary management software and hardware for the City to generate and or modify announcements and upload the announcements to the Vehicles over the high speed Train-to-Wayside data radio system provided.

I. Project Co shall provide training to City personnel in the use of the automatic announcement management systems.

(vii) Passenger Information Control panel

A. A driver's passenger information Control Panel shall be provided to allow the driver to select pre-recorded announcements over the PA and to select destinations in case of the automatic system's failure.

B. The Driver's Passenger Information Control Panel shall also display failure of PA sign or PEI equipment in any vehicle in a Train.

C. The Passenger Information Control Panel shall be either an independent unit or a sub-screen of the train Display Screen of the Vehicle monitoring system described in this Article.

(viii) Announcement Signs

A. Electronic passenger announcement signs shall be located throughout the passenger compartment so that passengers may read a sign from any location in that compartment.

B. The announcement signs shall be controlled by the automatic announcement system from the lead Vehicle in the Train over the Train communications network.

C. Signs shall display characters at least 5cm in height and shall be large enough to display up to 30 characters.

D. Signs shall display longer messages by sequencing rather than scrolling.

E. Signs shall display time of day (military time) when not displaying a message.

(ix) Destination Signs

A. One external electronic destination sign shall be provided and installed at the cab end of each Vehicle (only one end if a single cab is provided) and two electronic destination signs shall be provided and installed on each side of the Vehicle.

B. The destination signs for the whole Train shall be controlled over the Train Communications Network.

C. The destination sign control shall automatically display the correct destination of the Train based on Train travel direction and location.

D. When a Train enters a terminal location the destination signs shall reverse direction as soon as the Train comes to a stop unless this action is overridden. The "Out of Service" message shall also be able to be selected.

(x) Security Alarm System

A. A pushbutton switch shall be provided in the cab compartment to activate the silent alarm.

B. Pushbutton location shall be determined during review of the cab mock-up.

C. Activation of the silent alarm shall:

i. Cause an alarm message to be sent over the Train radio system to the TSCC and BCC. This alarm message shall include the Vehicle number where the alarm was activated; and

ii. Cause a tag message to be sent to the NVR of the Vehicle where the alarm was initiated to prevent overwriting of the video data.

(xi) CCTV and Non-Volatile Recorder System

A. Network video cameras shall record in color to a NVR.

B. The network cameras shall be directly networked to the NVR.

C. Cameras shall record an image that is admissible in a court of law.

D. Cameras views shall cover the entire passenger area such that there are no blind spots.

E. Additional cameras shall be mounted to record the view out the cab front window and rear window.

F. Cameras shall have an auto iris lens to compensate for variations in ambient light.

G. Cameras shall compensate for ambient light changes within 1 second when entering or leaving a Tunnel.

H. Cameras shall stream video adjustable up to 30 frames per second. Triggering the silent alarm shall set recording to 30 frames per second until reset by security personnel.

I. Cameras and NVR shall be powered from the low voltage DC power with necessary DC to DC isolation converters.

J. Data shall be transmitted from the cameras over shielded cabling with rugged transportation duty connectors.

(xii) NVR

A. The NVR shall be networked into the communications network to provide video feeds to the Driver.

B. Each NVR shall have storage capacity sufficient to store 30 days of video data from the attached cameras without overwriting. The storage device shall be shock and vibration hardened for rail transit duty.

C. The NVR shall have an industrially rated RJ45 Ethernet or USB Port with a secure cover for local downloading of video data.

D. The NVR system shall safeguard and maintain authenticity of the video images using security techniques such as digital image watermarking or encryption and shall be able to demonstrate a chain of custody for data that will be used as evidence in a court of law. When a tag is activated, the NVR shall prevent the video data from being overwritten for 60 days.

E. Activation of the silent alarm shall insert a tag in the files of all recording units in the Train.

F. Any activation of the PEI, or silent alarm, shall insert a tag on the data files of the recording unit for the corresponding Vehicle.

G. A means shall be provided to determine if the camera has been tampered with or vandalized, or if the camera has failed.

(xiii) Cab Video Display

A. The cab video display shall be energized only in the active cab.

B. The cab video display shall be blanked when the Train is moving.

C. The cab video display shall display views of Train doors while the Train is stopped in a Station. A method shall be provided to ensure that the view provided is from the correct platform.

D. During a PEI call camera views from the car in which the PEI is activated shall be transmitted to the cab display when the Train comes to a stop. No camera views of the passenger areas shall otherwise be provided to the cab.

E. Camera views from the Vehicle where a PEI request has been made shall take precedence over all other video feeds until cancelled by the cab.

(xiv) APC System

A. The APC system shall use an infrared or other non-mechanical system to detect passenger boarding or exiting.

B. The APC passenger detection system shall distinguish between passengers boarding and exiting and shall not count passengers standing in the doorway.

C. The APC system shall count passengers with 95% accuracy and provide data on ridership that can be compared on a trip, daily, monthly, or yearly basis at each Station.

D. Once installed the APC system shall not require calibration or adjustment for the life of the unit.

E. The APC system shall have non-volatile memory capacity to store passenger data for all doors for 8 days assuming 20 round trips per day.

F. The APC system shall have a diagnostic and fault recording system and shall report failures to the VMS.

G. Diagnostics shall be remotely available over the communications network.

H. The data collected by the APC shall be provided to the Performance Monitoring System at TSCC in real time.

I. Project Co shall supply all relevant passenger counting data to the City. Data shall be downloaded every 24 hours.

(xv) Monitoring and Diagnostics

A. Each networked communications, passenger information or security subsystem shall have its own diagnostics and fault recording system.

B. Each subsystem shall report its health to the VMS described in this Article.

C. Diagnostics of all networked communications and passenger information and security systems shall be accessible over the communications network using a laptop PC and a web browser.

(xvi) Qualification Testing

A. All communications Equipment and power supplies shall be tested for successful operation within the LVPS voltage supply ranges and power quality as described in this Article.

(xvii) Routine Testing

A. Each system shall be tested to prove the performance of all specified functions and to prove proper operation under network loading.

3.28 Interior and Exterior Appointments

(a) General Interior Design

(i) The Vehicle shall provide level boarding at Stations. The entire low floor section shall be ADA/AODA accessible and include longitudinal fixed seats as well as the appropriate number of flip up style seats, to provide accessibility for wheelchairs at all door vestibules.

A. In addtion to the above, the Vehicle shall be designed and constructed to satisfy Transport Canada rules and regulations including but not limited to the CTA Code of Practice, Passenger Rail Car Accessibility and Terms and Conditions of Carriage by Rail of Persons with Disabilities.

(ii) Project Co shall provide a method to convey the interior design to the riding public and associated stakeholders to elicit feedback and market the new vehicle and assist in finalizing the aesthetics and branding.

(iii) Project Co shall provide a full size mock-up of the cab with proposed material finishes, to facilitate operating staff review of the ergonomics and aesthetics of the design. The cab mock-up shall be of suitable quality and construction to allow an efficient mechanism of showing equipment positioning and driver field of view to support the ergonomic study. The Driver's seat shall be the prototype proposed for production with complete adjustment and functionality. Where required, the mock-up shall be designed to be recyclable and maximise the ability to re-use components and equipment or place these back into maintenance spares. The cab mock-up shall be non-portable and be located at the MSF. Project Co shall

dispose of the cab mock-up once all ergonomic and safety assessments have been completed.

(iv) Project Co shall provide a mock-up of half of the vehicle only to facilitate staff and public review of the functionality and aesthetics of the design (including 70% and 100% low floor sections). The passenger mock-up shall be of suitable quality and construction to allow an efficient mechanism of demonstrating passenger movements for boarding, alighting and passenger movement within the vehicle. The passenger mock-up shall be non-portable and be located at a location to be determined. Project Co may dispose of the mock-up once all staff and public assessments have been completed.

(v) The partition and door between the cab and the passenger area shall include large laminated Safety glass windows to allow visibility through the front of the LRV.

(vi) Seats

A. The passenger seating shall be:

i. Stainless steel or aluminum shell construction;

ii. Contoured seats with rail transit grade cushion and a vandal resistant material; and

iii. A minimum width of 457mm.

(vii) Stanchions, Handrails and Grab Bars

A. Stanchions shall be placed to not interfere with passenger flow during boarding / alighting, but one or more stanchion, handrail or grab bar shall be within reach from any standee areas, including the articulation section.

(viii) Flooring

A. The floor panel material shall be composite construction. Wood based, or wood containing products shall not be accepted.

B. The floor covering shall include the following:

i. High friction material in both wet and dry conditions; and

ii. Smooth surface (non-ribbed or dotted).

(ix) General Interior Design

A. FRP, gel coated sidewall lining panel/window masks.

(x) Interior Safety Equipment shall include:

A. PEI units located near every accessible area at a height in accordance with AODA requirements.

B. One (1) PEI unit located on each passenger compartment end wall.

C. Manual door release at each side door; and

D. First aid kits in the cab.

(xi) Miscellaneous interior appointments shall include:

A. Advertising card frames for ceiling corners, side walls, and end walls;

B. Locked convenience outlets for car maintenance (110 VAC);

C. Signage placed adjacent to the accessible space and denote priority seating for persons with disabilities;

D. Additional interior graphics/signs/instructions in Canadian English and French in consultation with the City; and

E. Emergency and car number information in Braille. General interior signage shall be submitted in accordance with Schedule 10 – Review Procedure.

(b) General Exterior Design

(i) The exterior Design of the Vehicle shall be sleek, modern and attractive. All electrical and mechanical Equipment shall be concealed behind easily replaceable roof shrouds, truck skirts, cab side skirts and the coupler cover. The pantograph and the ice scraper (when in use) shall be the only visible mechanical device on the Vehicle.

(ii) Articulation sections shall be covered with internal and external bellows. Intercar dampers and linkage shall be located undercar or on the roof.

(iii) All electrical connections, where feasible, shall be fitted with connectors between Vehicle wiring and components.

(iv) Exterior Equipment shall include:

A. Roof Equipment shall include no less than:

i. Two (2) unitized HVAC units;

ii. Two (2) propulsion inverters;

iii. Two (2) auxiliary inverters, or a single inverter with backup protection to allow unassisted return to maintenance shop after a failure;

iv. One (1) of each knife switch, HSCB, line filter, etc.;

v. Two (2) LVPS/battery chargers, or a single LVPS if married pairs are provided and all loads of the pair can be powered from the single LVPS;

vi. 1 battery box;

vii. Braking resistors;

viii. One (1) pantograph, equipped with protection (shear pin, or equivalent) that drives the arm to its lowest position in the event of excessive force applied to the head. Pantograph shall be heated, if required, to prevent build-up of snow on the head;

ix. One (1) ice scraper (electrically isolated pantograph without carbon strip or cabling) or alternate means of removing ice from the catenary shall be provided; and

x. All roof mounted equipment shall allow the use of cleaning agents that are reclaimed and controlled.

B. Undercar Equipment shall include no less than:

i. Two (2) automatic couplers;

ii. Three (3) hydraulic power units;

iii. Three (3) complete truck assemblies, that comply with the following:

1 All powered trucks shall be interchangeable; and

2 All non-powered trucks shall be interchangeable;

iv. One (1) Horn/Bell unit per vehicle end;

v. Vehicle Location System transponder reader antenna; and

vi. Sandboxes (if not underseat).

(v) Exterior Appointments shall include:

A. Passenger side windows;

i. Laminated Safety glass with a tint layer.

B. Exterior speakers next to each passenger side door;

C. Sand filling provisions;

D. Destination signs as follows:

i. LED type matrix displays shall be provided;

ii. One located at the front of each cab car;

iii. No less than two (2) located on each side of the car; and

iv. LED Exterior indicator lights;

E. At each passenger side doorway, the following crew access items shall be provided:

i. Exterior manual door release;

ii. Door indicator lights;

iii. Door audible chime;

iv. Door Open passenger pushbuttons; and

v. Door open/close crew switches at opposite corner doors of the LRV.

F. Exterior antennas for radio and high density wireless data communication to the station;

G. A method of viewing the entire consist length on both sides of the vehicle while the driver is seated;

H. Options for exterior painting, vinyl wrapping, decals and color scheme shall be submitted by Project Co for consideration by the City;

I. General exterior signage shall be submitted in accordance with Schedule 10 – Review Procedures;

J. Car number shall be prominently displayed on both ends of the LRV, both sides of the center section and on the roof;

K. Exterior RFID tags, or equivalent, shall be provided to allow car number communication; and

L. CBTC antennas.

(c) Qualification Testing

(i) Seats shall exhibit no permanent deflection when subjected to the following:

A. 1100N shall be evenly distributed across the front edge of the seat. Load shall be applied in a vertical downward configuration;

B. 1100N shall be evenly distributed across the top of the seat back. Load shall be applied in a horizontal direction, from front of seat to back; and

C. Fatigue loading of 15kg dropped from 300mm above the seat a total of 20,000 times.

(ii) Low Floor Panels (supported at maximum beam spacing per Vehicle Design) shall exhibit no delamination, deflect no more than 3.18mm or permanently deform no more than 0.25mm under the following tests:

A. A 1300N load uniformly distributed over a 15mm x 15mm surface area;

B. 2700N over a 150mm x 150mm surface area; and

C. An impact load resulting from a 3kg steel ball dropped from a height of 1.5m.

(iii) Heater guard tests to ensure surface temperatures do not exceed 52°C.

(iv) Stanchion mounting tests with 1.5kN applied to the midpoint of the span to ensure sturdy mounting. Cantilever mounted grab bars and hand-holds shall be tested with the load applied at the unsupported end.

3.29 Communication Based Train Control

(a) The onboard and wayside portions of the CBTC system are specified in Part 4 Article 5 – Train Control.

3.30 Event Recorder

(a) General Objectives

(i) Independent of the VMS, a separate event recorder shall be provided on each Vehicle.

(ii) The Event recorder shall be crashworthy, meeting the Construction requirements of IEEE 1482-1999.

(iii) The Event Recorder shall record all Safety critical data and allow retrieval after accidents or unsafe events.

(b) Data Recorded

(i) As a minimum, the following data and signals shall be recorded:

A. Mandatory channels from IEEE Std 1482.1-1999;

B. Car number;

C. Brake cylinder pressure from each truck;

D. Deadman control;

E. Dynamic brake application;

F. Propulsion effort request of the Master Controller and the CBTC systems ATO function;

G. Time and date;

H. Irretrievable Emergency Brake Switch activation;

I. Distance (shall be defined, preset wheel diameter);

J. Emergency brake application;

K. Catenary voltage;

L. Horn activation;

M. All Bypass or cutout switches;

N. Tractive effort level;

O. CBTC mode of operation;

P. All communications to and from the Zone Controller;

Q. All commands of the CBTC system to the trainlines and to the Emergency brake system;

R. CBTC cut in/cut out status;

S. Speed;

T. Current authorized speed; and

U. All cab initiated PA announcements.

(c) Diagnostics and Self-Test

(i) Event recorder shall have fault indication.

(ii) Event recorder shall perform automatic self-tests.

(iii) The Event recorder shall report its health to the VMS via a discrete output.

(d) Data Storage and Retrieval

(i) Data storage shall be FIFO, such that the latest information is retained.

(ii) The event recorder shall have sufficient storage to store 48 hours of continuous operation data before overwriting.

(iii) Data retrieval shall be retrievable by a laptop computer or similar portable device.

(iv) Downloaded raw data shall be converted into an easily readable format and visual display.

(v) Retrieval of data shall not delete data from the internal hardened memory module.

(vi) Event recorder Design shall prevent unauthorized access.

(e) The event recorder shall be powered from the battery backed up low voltage bus through a dedicated magnetic push to reset circuit breaker which cannot be turned off.

(f) Event Recorder Qualification Testing

(i) On the first car the Event Recorder shall be tested to ensure that all required data is accurately recorded.

3.31 Monitoring & Diagnostics System

(a) General

(i) The VMS shall be the central collection point for fault data on each Vehicle and shall provide access to diagnostic features of various subsystems. The VMS shall consist of:

A. A VMU in each Vehicle which shall collect fault and event data from all Vehicle subsystems in that car and transfer that data to all other VMUs.

B. TDS in each cab.

C. A connection to the high speed data radio for uploading fault data to the wayside maintenance database.

(b) System Description

(i) At a minimum, the VMU shall interface with the following subsystems:

A. LVPS;

B. Door control system;

C. HVAC system;

D. CBTC system;

E. Brake system;

F. Communications and Passenger information sub systems;

G. Propulsion system;

H. Auxiliary Inverters; and

I. Event Recorder system.

(ii) The VMU and the TDS shall operate from the Vehicle low voltage system and operate as a critical load from the Vehicle battery supply. The VMU shall use non-volatile solid state or battery backed memory to store recorded faults and events.

(iii) The real time clocks of all VMUs and subsystems shall be synchronized to the CBTC system time.

(c) Local Access for Subsystems

(i) Each subsystem reporting to the VMS over the network shall also have a local access port for access by a portable laptop computer.

A. The access port shall be of a type supported by the most current laptop computers and most likely to have continued support, for example USB 2.0 or higher or Ethernet, but not RS232.

B. The access port shall be industrial grade with a dust cover.

(d) Train Display Screen

(i) The TDS in the operating cab shall display a default screen showing a graphic of all cars in the Train.

(ii) The graphic shall highlight any doors open or brakes applied and indicate the malfunction.

(iii) Vehicles with any faults affecting Train operation shall be highlighted.

(iv) Clicking on the highlighted Vehicle shall list the current fault and recommended action.

(v) More detailed fault and diagnostic information shall be available to maintenance personnel in a key or password protected mode.

(vi) Fault logs of every subsystem on every car shall be selectable and viewable from the TDS without moving from car to car.

(e) Performance

(i) The VMU shall record and store not less than a rolling 60 days of faults in non-volatile solid state or battery backed memory in a circular first in first out file.

(ii) The VMU shall upload fault data and odometer reading to the MSF maintenance database upon request providing all new faults and flagged events since the last upload.

(iii) Transferring fault data to a PTU or to the wayside maintenance database shall not erase that data from VMU or subsystem memory.

(f) Project Co shall be responsible for systems integration of the monitoring and diagnostic system, including:

(i) Integration of the subsystems with the VMU; and

(ii) Train network integration of the VMUs with the TDS.

(g) Reliability

(i) Failure of the TDS or a VMU shall not disable the Train.

(ii) There shall be no loss of data due to memory degradation or failure.

(iii) If battery backed memory is used then batteries shall not require replacement more often than every 5 years.

(h) VMS Qualification Testing

(i) All subsystems reporting to the VMU shall be tested for ability to send and record data and faults in accordance with the Design fault plan.

3.32 Trainlines and Networks

(a) General

(i) The provided LRVs shall operate as a trainset through:

A. Discrete trainlines for critical functions;

B. An IEEE 1473 type T, or similar standard WTB/MVB Train Control System for Vehicle monitoring and Train Control functions;

C. An IEEE 1473 draft type E network or similar standard for communications and passenger information;

(b) Discrete Trainlines

(i) Safety critical functions such as door control, the all doors closed and locked interlock, emergency brake control, shall be transmitted either as double break trainlines or as two independent trainlines. Propulsion and braking control shall be implemented over the Train Control System with a discrete Train line check.

(ii) Power for trainline signals shall be provided from circuits off the LVPS/battery network of the lead car. Return power shall be through the battery negative trainline.

(iii) Cab control make up, and certain trainlines necessary for Train operation (but not necessarily Safety critical) and trainlines which may be cross checked may be implemented as single break trainlines.

(iv) Lighting control shall be provided by discrete trainlines.

(c) Train Control Network

(i) Vehicle monitoring communications within and between Vehicles shall take place over the Train Control network.

(ii) WTB Train sequencing data shall be available for other systems.

(iii) Train propulsion and brake control and other critical Train-wide functions as specified shall be implemented over the Train Control network or discrete trainlines.

(d) On Board Communications Network

(i) All Train-wide voice communications, control of destination signs and passenger information signs and transmission of video within the Train shall take place over the OBCN.

(ii) The VMU which is connected to the Train Control System shall also connect to the OBCN to:

A. Report Vehicle status to the wayside Maintenance database;

B. Provide Train sequencing information to the communications systems which need it; and

C. Receive health status from communications systems.

(e) CBTC System Network

(i) The CBTC system shall use the Train Control System or its own dedicated network for communications between its subsystems or between Vehicles. The OBCN shall not be used for this purpose.

(f) Performance

(i) Trainlines and networks shall be designed to allow operation of the Train, and control of doors from any active cab.

(ii) The networks shall have capability of increasing data loads by 50% without missing deadlines or losing data.

(iii) The OBCN transmission through the electrical coupler shall have the capability to simultaneously support four video streams plus a PEI session and PA and sign announcements with no visible or audible delays.

(g) Reliability and Availability

(i) Trainlines and networks shall be redundant across all coupler connections.

(ii) If any node fails, network communications shall be maintained between all unaffected nodes.

(iii) All networks shall be redundant through the Train.

(iv) All network Equipment and relays shall be located in the interior of the Vehicle.

(v) All network Equipment shall be compliant with EN 50155.

(h) Network Security

(i) Project Co shall provide an assessment of all network security threats in particular to the Communications System and the Train Control Systems and their potential impact as well as an analysis of the efficacy of all countermeasures designed to mitigate each threat.

(ii) The analysis provided shall be in accordance with the guidelines of the IEC/ISO 27000 series standards.

3.33 Materials and Workmanship

(a) Standards

(i) All materials shall conform to APTA, AISI, ANSI ASTM, ASME, IEEE, CEC, CAN/CSA and other specifications as stated herein or as otherwise applicable.

(b) Prohibited Materials

(i) The Vehicle shall comply with the Toxic Reductions Act of 2009, Ontario Regulation 455/09.

(ii) In addition, the following materials shall be prohibited from use on the Vehicles:

A. PVC;

B. Asbestos;

C. Cadmium (except for battery);

D. Lead (except in solder used for electrical purposes);

E. PCBs;

F. Carcinogenic materials as listed by current Publication of TLV and BEIs guidelines published by the ACGIH;

G. Materials that, in their normal installed state, emit products that are known to be toxic or irritants as per materials listed in 29 CFR 1910.19;

H. All CFC and HCFC compounds classified as ozone depleting substances per 40 CFR 82; and

I. Urethane Foam.

(c) Fasteners

(i) Fasteners – General

A. No protruding screws, rivets, mounting bolts, or similar items shall be permitted on the exterior of the Vehicle. Interior fasteners shall not protrude enough to become a tripping or snagging hazard.

B. Fasteners exposed to passengers shall be tamperproof.

C. All carbon steel fasteners shall be zinc plated.

(ii) Fasteners – Locking Requirements

A. All threaded fasteners shall be self-locking or provided with locking devices.

(d) Elastomers

(i) Elastomers – General

A. Elastomeric parts used for interior decorative trim shall be coloured to harmonize with adjacent surfaces. All colors shall be as approved by the City.

B. Elastomers shall meet the combustibility requirements of this Article.

(ii) Elastomers – Floor Covering

A. Project Co shall submit color and material samples and material friction tests in wet and dry conditions to demonstrate safety of Passengers as Part of the Works Submittals according to Schedule 10 – Review Procedure.

(e) Laminated Safety Glass

(i) Laminated Safety glass shall be used exclusively and shall conform to the following general, manufacturing, and finish requirements:

A. Float glass quality shall conform to ASTM C1036, Type 1, Class 1, quality Q3.

B. Tinted assemblies shall use a tinted PVB layer with clear glass laminate. Tinting shall be applied to the perimeter of the glass to mitigate UV damage of the elastomer surround or bonding agent.

C. Manufacturers stamp shall be positioned in lower right hand corner as viewed from inside the Vehicle.

(ii) Group I glass shall:

A. Be clear laminated Safety glass used for forward facing glazing;

B. Meet the requirements of 49 CFR 223, FRA Type I rating, having a minimum thickness of 14 mm; and

C. Be certified to comply with the requirements of ANSI Z26.1.

(f) Tempered Safety Glass

(i) Tempered Safety glass that may be used for internal glazing and partitions, shall be manufactured to ASTM C1048, Kind FT, Condition A, Type 1 clear, Class 1 clear, quality Q3 (or Class 3, tinted, light reducing).

(g) Piping and Fittings

(i) Piping and Fittings – General

A. Project Co shall perform a leak test on the final air and/or hydraulic piping system, with all components installed, on each Vehicle in accordance with IEC 61133. A copy of the test report for each Vehicle, including retest reports if appropriate, shall be included with each vehicle history book.

(ii) Piping and Tubing

A. Piping and tubing shall be fastened with insulated clamps.

B. After full installation on the Vehicle, and before connection or installation of system components, the piping system shall be completely flushed to remove and/or dissolve all contaminants from manufacture and installation. The piping systems shall be purged, following completion of component installation.

(h) Wire and Cable

(i) Wire and Cable – General

A. All wire and cable shall be in accordance with AAR RP-585 and the recommendations of APTA RP-E-009-98 section 6.0 (or latest version).

B. New wire and cable shall be soft annealed copper, tinned, stranded, and jacketed with radiation cross linked polyolefin (Exane), or City accepted equal, in accordance with ASTM B33 and AAR Standard S 501.

C. The use of aluminum wire and/or cable is prohibited.

D. The insulation system for all internal wires and cables shall be flame retardant and be specifically formulated to minimize smoke, noxious emissions or corrosive fumes in the event of severe overheating or fire. Materials used for the insulation shall be free of halogens.

E. All wires and cables shall be protected against movement, chafing and contact with other components that might cause damage to the insulation.

F. All wiring shall be printed with manufacturer's identification, conductor size, voltage rating and temperature rating.

(ii) Wire and Cable – High Temperature

A. High temperature wire and cable shall be used in locations where the operating temperatures shall exceed the limits of the other indicated insulations.

B. High temperature insulated wire shall not be used in conduit or raceways. This type of wire and cable shall not be bundled together or run with any other type of cable.

(i) Wiring

(i) Wiring – General

A. Wiring which operates at 120Vac and 208Vac shall not be placed in the same conduits or ducts with wires operating at battery voltage.

B. Wiring shall be in conduit, raceways or ducts.

C. Safety grounds shall utilize dedicated grounding bosses or grounding pads.

D. Power Train line cables shall be supported by insulated cable cleats with sufficient spacing between individual conductors to permit adequate ventilation.

E. For proper identification of phases, color coded shrink type markers shall be used on 208 volt cable ends.

F. Low and high voltage cables shall have separate individual raceways.

G. Splicing of conductors is prohibited.

(ii) Wiring – Terminals

A. All wiring shall be fitted with pre-insulated diamond grip terminals.

(iii) Wiring – Grounding

A. Battery (low voltage DC) circuits shall not be individually grounded.

B. All Equipment enclosures and frames of all resiliently mounted electrical apparatus, with the exception of the battery box, shall be suitably grounded to the car body.

C. The Vehicle grounding system shall meet all technical requirements of IEEE Std 16-2004 and APTA SS-E-005-98 (or latest version).

(iv) Wiring – Conduits and Fittings

A. Wires shall not occupy more than 50% of the free cross-sectional area of any conduit.

B. Where necessary to facilitate component removal and replacement, minimum lengths of flexible liquid tight conduit may be used.

C. Insulated bushings shall be used in all conduit and conduit fittings.

(j) Welding

(i) Welding – General

A. All welding practice shall be in accordance with the applicable requirements and recommendations of the AWS.

(k) General Corrosion Control

(i) All materials used shall be corrosion resistant. Equipment located in areas highly susceptible to corrosion shall be made from inherently corrosion resistant materials.

A. Areas exposed to corrosive fluids or cleaning solutions shall be protected with coatings resistant to those fluids.

(l) Dissimilar Metal Treatment

(i) Direct contact between electrically dissimilar metals is prohibited except for electrical connections between copper and aluminum where appropriate joint compounds are used. Isolating and moisture-proofing materials, appropriate to the materials being joined, shall be used at all times.

(ii) All metals used in the fabrication process shall be surface treated with corrosion-resistant materials prior to assembly.

(iii) All ferrous metal surfaces, other than stainless steel, shall be protected by painting or zinc plating.

(m) Flammability, Toxicity and Smoke Emission

(i) Materials shall comply with the flammability, smoke emission, toxic gas and fire retardation requirements specified herein.

(ii) Materials shall be low halogen in addition to meeting the low-smoke requirements specified herein.

(iii) As a minimum, all materials used in the Construction of the Vehicle shall meet the requirements of the 49 CFR 238.103, and Appendix B to Part 238 – Test Methods and Performance Criteria for the Flammability and Smoke Emission

Characteristics of Materials Used in Passenger Cars and Locomotive Cabs. Unless otherwise specified, all materials and Construction shall meet the requirements of NFPA 130-2010.

(iv) Should a conflict exist between the NFPA requirements, federal requirements and requirements listed elsewhere in these provisions, the more restrictive requirement shall govern.

(v) Project Co shall retain a list of materials (flammability matrix) used in the Vehicles showing location of material, weight (density and total weight), heat value per pound and per Vehicle, flame spread, flashpoint, smoke generation and toxicity.

(vi) Project Co shall retain laboratory test results for each test, including a technical data sheet.

(vii) Test report documentation shall specifically identify the tested material by the same description that appears on the technical data sheet and other related references. This documentation shall be directly traceable to the applicable carbuilder drawings.

(viii) Flammability and Smoke Generation Criteria, Flammability and Smoke Generation Criteria requirements are outlined in Table 4-3.8.

Table 4-3.8

Function of Material	Test Procedure	Performance Criteria
All Vehicle materials and components except as otherwise noted.	ASTM E162 ASTM E662	$I_s \leq 35$ D_s (1.5) ≤ 100, Ds (4.0) ≤ 165
HVAC Ducting	ASTM E162 ASTM E662	$I_s \leq 35$ D_s (4.0) ≤ 100
Lighting Diffusers / Plastic Glazing	ASTM E162 ASTM E662	$I_s \leq 100$ D_s (1.5) ≤ 100, D_s (4.0) ≤ 200
Thermal and Acoustical Insulation	ASTM E162 ASTM E662	Is ≤ 25 D_s (4.0) ≤ 100
Flexible Cellular Foams	ASTM D3675 ASTM E662	Is ≤ 25 D_s (1.5) ≤ 100, Ds (4.0) ≤ 175
Elastomers – Lock strip gaskets	ASTM C542 ASTM E662	D_s (1.5) ≤ 100, D_s (4.0) ≤ 200
Elastomers – Other gaskets or seals	ASTM C1166 ASTM E662	100mm (4.0in), maximum flame propagation (15) D_s (1.5) ≤ 100, D_s (4.0) ≤ 200

Function of Material	Test Procedure	Performance Criteria
Structural – Floor, Roof	ASTM E119	Pass (30 minutes minimum endurance at AW3 loading)
Floor Covering	ASTM E648 ASTM E662	CRF ≥ 0.5W/cm^2 D_s (1.5) ≤100, D_s (4.0) ≤ 200
Seat Cushion, Mattresses	ASTM D3675 ASTM E662	I_s ≤ 25 D_s (1.5) ≤ 100, D_s (4.0) ≤ 175
Seat Frame, Seat Shroud	ASTM E162 ASTM E662	I_s ≤ 35 D_s (1.5) ≤ 100, D_s (4.0) ≤ 200
Upholstery	14 CFR (FAR) 25.853 (Appendix F, vertical, textiles) ASTM E662	Flame Time ≤ 10s Burn Length ≤ 150mm (6in) D_s (4.0) ≤ 200
Wire Insulation	IEEE Std 383 – Flammability ASTM E662	Pass D_s (4.0) ≤ 50

(ix) Toxic Content Limits In Combustion Products

A. The maximum toxic gas concentration in the combustion products of any materials used in the Construction of the Vehicle shall not exceed the values outlined in Table 4-3.9:

Table 4-3.9

Toxic Gas – BSS-7239	Maximum Concentration
CO	3500ppm
Hydrogen Fluoride (HF)	200ppm
Nitrogen dioxide (NO2)	100ppm
Hydrogen Chloride (HCL)	500ppm
Hydrogen cyanide (HCN)	150ppm
Sulphur dioxide (SO2)	100ppm

(n) Panel Flatness

(i) The maximum allowable deviation of any point on the panel measured from a reference plane taken from any three corners shall be 3mm. The overall deviation of the panel thickness shall not exceed 1mm.

(o) Acoustic Insulation

(i) Sound damping material used in the fabrication of the Vehicle shall be resistant to diluted acids, greases, gasoline, fuel oils, aliphatic oils, and vermin. Material shall be resistant to fungus and shall not support combustion. The material shall not be affected by sunlight or ozone, and shall not become brittle with age.

(p) Thermal Insulation

(i) Thermal insulation materials shall be transportation grade of the rigid, non-rigid, or spray-on type. Insulation shall be installed with a vapour barrier as required to preclude moisture accumulation.

(ii) The type of thermal insulation to be used shall not be susceptible to mould or rot and shall not absorb water. Metals, which are attached to the insulation shall be corrosion resistant and not settle under Vehicle vibration.

(iii) Urethane foam insulation is prohibited.

(q) FRP

(i) FRP shall be polymeric-reinforced laminated material, composed of a gel-coated surface, fibreglass reinforcement, and polyester, acrylic, phenolic, or approved equal resin.

(r) Films and Graphics

(i) Films and Graphics – General

A. All graphic materials shall be transportation grade materials. Signage graphics shall have an opaque background with clear, vandal resistant overlayment. Printed signage graphics shall be either reverse printed on the back of the clear overlayment, or printed on opaque background and covered by the clear overlayment.

B. Films and graphics shall withstand effects of detergents and brushes used in washing procedures for removal of multiple applications of graffiti.

C. Films shall use a removable grade adhesive that upon removal does not require use of solvents, or secondary operations to remove adhesive or graphic residue.

(ii) Films and Graphics – Emergency Exit Signage

A. Emergency exit signage shall comply with APTA SS-PS-004-99, Standard for Low-Location Exit Path Marking and 49 CFR, Part 238.

B. LLEPM material shall be provided to illuminate the path to each emergency exit.

C. The LLEPM and emergency exit signage shall be passive and independent of the car's normal and emergency lighting systems.

i. HPPL material shall be used in the fabrication of the exit signage and the LLEPM.

(iii) Films and Graphics – Emergency Access Signage

A. Each door intended for use by Emergency responders for rescue access shall be identified with emergency access signs and instructions consisting of retro-reflective materials.

(s) Electrical Devices and Hardware

(i) Electrical Devices and Hardware – Contactors, Relays and Switches

A. All devices shall be readily identifiable by means of a permanent, durable marking strip giving the device circuit Designation.

B. Switches shall be provided with a "keying" feature that prevents the body of the switch from rotating.

(ii) Electrical Devices and Hardware – Circuit Breakers

A. The "on", "off" and "tripped" positions of all circuit breakers shall be permanently marked.

B. All circuit breakers shall be sized by current rating and tripping time to protect both the associated Equipment and the minimum size wire.

C. All circuit breakers shall be of a high shock-resistant Design.

(iii) Electrical Devices and Hardware – Fuses

A. Fuses shall be used only where the use of a circuit breaker is not technically feasible.

B. Each fuse shall be permanently identified and readily accessible.

i. The rating of each fuse shall be clearly and permanently marked on the fuse and holder.

C. The fuse holder shall have fuse retention devices at both ends.

D. Blown fuse indication shall be provided.

(iv) Electrical Devices and Hardware – Bus Bars

A. Bus bars shall conform to the requirements of IEEE Std 16-2004.

(v) Electrical Devices and Hardware – Switch, Circuit Breaker, and Fuse Panels

A. All live portions of the protected circuitry shall be completely concealed so that no danger of electrocution or shock exists from the touching of the panel or any appurtenances or devices mounted thereto.

B. All switches, circuit breakers, fuses, and indicating lights shall be provided with a nameplate clearly identifying the circuit which each controls and its circuit Designation.

(vi) Electrical Devices and Hardware – Illuminated Status Indicators and Annunciators

A. All illuminated status indicators, annunciators or similar devices shall be long-life LED type lamps.

(vii) Electrical Devices and Hardware – Rotating Equipment

A. Rotating machinery shall be suitable for continuous duty, and the continuous duty shall be confirmed in accordance with IEEE Std 11-2000.

3.34 Vehicle Testing

(a) General

(i) Qualification tests may be waived, at the sole discretion of the City.

(ii) Project Co shall notify the City of the planned test date no less than 30 calendar days prior to the planned start of the test.

(iii) Additional tests shall be performed by Project Co as required to ensure complete compliance to the specification, as well as all Applicable Laws, regulations and standards.

(iv) Production tests shall take place on all Vehicles.

(b) Test Documentation

(i) Test Plan

A. Project Co shall prepare a Master Test Plan. The Test Plan shall include all tests required to prove complete compliance to the Vehicle Article/specification.

B. The Master Test Plan shall be submitted as Part of the Works Submittals according to Schedule 10 – Review Procedure.

C. Test order shall be arranged, to the maximum extent possible, such that failures resulting in re-Design do not nullify the results of successfully completed tests.

D. Subsystem performance requirements may be addressed in one or more comprehensive tests, as elected by Project Co.

(c) Test Procedures

(i) All test procedures authored by Project Co or sub-supplier shall be submitted as Part of the Works Submittals according to Schedule 10 – Review Procedure.

(d) Test Reports

(i) Test reports shall be produced by Project Co and be available for review by the City, at the City's request.

(e) Test Protocol

(i) Labs shall be certified to perform tests, if required by applicable agency or administration.

(ii) All Equipment used in the performance of tests shall be calibrated by an independent test laboratory on an annual basis, or more often, if required by the specific test.

(f) Test Notification

(i) The City reserves the right to witness any test or portion of a test required on any Vehicle delivered under this contract. Project Co shall notify the City of any planned tests a minimum of 30 calendar days prior to the test taking place.

(g) Types of tests

(i) Component Qualification Tests

A. Components shall be Qualification tested before they are presented for review and approval at the FAI. FAI approval is required prior to sub-system installation on the first production car.

B. Component qualification testing is documented in the previous sections of this Article.

(ii) Component Production Tests

A. Components shall be production tested at the sub-suppliers factory before shipment to Project Co.

B. Test reports shall be shipped with each component. Copies of the test reports shall be included in each car history book.

(iii) Vehicle Production Tests

A. Vehicle Production Tests shall be completed before Project Co requests permission to ship each car.

B. Test reports shall be shipped with each Vehicle. Copies of the test report shall be included in the Car history Book.

C. Production Tests shall include:

i. All of the tests necessary to prove proper functionality of the Vehicle;

ii. Verification that water shall not enter the Vehicle during revenue service operation; and

iii. Vehicle weighing.

(iv) On-Site Commissioning Tests

A. Vehicles arriving on City property shall be commissioned to ensure they are ready to run in revenue service.

B. Testing shall include all tests required to ensure the Vehicle is safe to operate.

C. Testing shall also include all production tests required to verify complete functionality of all Equipment.

(v) Vehicle Qualification Testing

A. Qualification tests are one-time tests on the first production Vehicles produced by Project Co. The tests are required to prove that the Vehicle performs as required by the specification.

B. Vehicles other than the first production car may be used to complete tests, such as carbody compression and HVAC climate room, as deemed appropriate by the City.

C. Testing shall be performed on the completed Vehicles with production components.

3.35 Dynamic Envelope

(a) The dynamic envelope shown below represents the clearance envelope that has been utilized in the preparation of the Reference Documents. Project Co is responsible for definition of the dynamic envelope resulting from their design and the implications of the dynamic envelope on all aspects of the design, recognizing the constraints of this Schedule 15-2.

(b) Proponents shall size the structures based on the dynamic envelope of their selected Vehicle. If the envelope allows a reduction of the dimensions listed in Schedule 15-2 Part 2, Article 2.5 or in Schedule 15-2 Part 4 Article 8, the proponent may propose modified dimensions with appropriate supporting drawings detailing the resulting clearances and demonstrate that system safety is not compromised.

6700
4200
3985 (panto lockdown)
1560
1527
1360
1584
1690
1290
1353
120
257
500
1150
2250
2683
3225
3761
3985
max catenary height
platform edge
1365 at standstill
1405
min catenary height
top of rail
Draft OLRT Vehicle Dynamic
Envelope Dec 13, 2010

ARTICLE 4 NON-REVENUE VEHICLES

4.1 General

(a) Project Co's maintenance responsibilities related to the Non-Revenue Vehicles and the right of way are detailed in Schedule 15-3 – Maintenance and Rehabilitation Requirements. Project Co shall provide a sufficient number of Non-Revenue Vehicles to comply with these requirements, with consideration to availability, Mean Time to Repair, Response Time, etc.

(b) At the end of the Maintenance Term, all Non-Revenue Vehicles shall be provided to the City in a new or overhauled condition as per the Requirements of Schedule 15-3 – Maintenance and Rehabilitation Requirements. Non-Revenue Vehicles that are outsourced and not purchased or leased are not required to be provided to the City at the completion of the contract.

(c) Non-Revenue Vehicles shall be stored in a protective, sheltered environment when not in use.

(d) All non- revenue vehicles shall be detectable and protected by the Train Control System in the CBTC territory or on signalled MSF Track. When near the Alignment, protection shall be governed through mitigations developed from the safety and hazards analysis.

(e) Non-Revenue Vehicles shall be compatible to the physical and electrical Infrastructure of the LRV Train Control System.

(f) To promote service consistency and safety, Project Co shall work with the City to identify and select the non-revenue vehicles that shall be branded in accordance with Schedule 15-2 Part 1 Clause 2.9.

(g) Project Co shall ensure that civil Infrastructure, both new and existing, shall accommodate the worst case loading scenario for all Non-Revenue Vehicles.

4.2 Non-Revenue Vehicle Types and Maintenance Tasks

(a) Project Co shall submit a list of non-revenue vehicles required for OLRT and their respective task descriptions to support revenue operations and maintenance of LRT infrastructure.

ARTICLE 5 TRAIN CONTROL

5.1 Introduction

(a) Project Co shall provide for a CBTC system integrated with the wayside portion of the system.

(b) The CBTC system shall provide vital ATP with a moving or virtual block Design. The CBTC system's ATP function shall vitally enforce Train separation, switch and interlocking protection and direction of traffic interlocking. The ATP system shall vitally enforce all temporary and permanent speed restrictions as long as any portion of the Train is within the restriction zone.

(c) The CBTC system shall also provide a non-vital ATO overlay function operating within the limits established by the vital ATP system. The ATO function shall provide automatic speed regulation to keep the Train under the speed profile enforced by the vital ATP system. The ATO function shall also provide automatic station stopping and implement supervisory commands to adjust Headways and schedules.

(d) Trains shall normally operate in an ATO mode from Tunney's Pasture to Blair.

(e) Future extension of the System beyond these Stations into partially segregated rights-of-way with at grade crossings shall require Trains to operate with ATP only in those areas.

(f) The CBTC system shall also have a non-vital ATS function to non-vitally adjust the Train speed limits within the ATP speed profile and adjust Station dwell times to optimize Headway and Train spacing and to reduce energy usage. The ATS system shall also provide non-vital interlocking command and control and automated operation of the line.

(g) The Design of the wayside and onboard systems of the CBTC system shall provide minimum 80-90 second Headways.

(h) If the CBTC system cannot provide inherent redundancy of operation to locate the vehicle in the event of communications failures, Project Co shall provide a redundant or alternative method of train location independent of the CBTC system. The fall back signals at the interlocking shall provide additional safety against head on and conflicting route collisions and switch derailments. A means shall also be provided to detect broken rail and update the CBTC system of the areas of broken rail and necessary speed restrictions.

(i) Redundancy shall be built into all Train Control Systems to provide maximum availability.

5.2 Codes, Standards and Manuals

(a) The Design and Construction of the Works shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or

practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) AREMA Communications and Signal Manual – 2011.

(ii) EN 50126:1999, Railway Applications – The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS)

(iii) EN 50128:2001, Railway Applications – Communication, Signalling, and Processing systems – Software for Railway Control and Protection Systems

(iv) EN 50121: 2000, Railway Applications – Electromagnetic Compatibility

(v) EN 50129:2003, Railway Applications – Communication, Signalling and Processing systems – Safety Related Electronics for Signalling

(vi) EN 50155:2001, Railway Applications – Electronic Equipment Used on Rolling Stock

(vii) EN 50159-2:2010 Railway applications – Communication, Signalling and Processing Systems -- Part 2: Safety Related Communication in Open Transmission Systems

(viii) IEC 61508, Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems

(ix) IEEE Std. 1474.1 – 2004, IEEE Standard for Communications-Based Train Control (CBTC) Performance and Functional Requirements

(x) IEEE Std. 1474.2 – 2003, IEEE Standard for Functioning of and Interfaces Among Propulsion, Friction Brake and Train-borne Master Control on Rail Rapid Transit Vehicles

(xi) IEEE Std. 1474.3 – 2008, IEEE Recommended Practice for Communications-Based Train Control (CBTC) System Design and Functional Allocations

(xii) IEEE Std. 1483 – 2000, IEEE Standard for Verification of Vital Functions in Processor-Based Systems Used in Rail Transit Control

5.3 System Description

(a) General

(i) The CBTC system shall consist of Equipment located on the wayside, at the TSCC, at the MSF and onboard each LRV Train. The wayside, TSCC, and MSF Equipment shall be connected to each other by redundant fibre optic networks.

The onboard Equipment shall communicate to the wayside and TSCC and MSF Equipment through wireless APs connected into the CBTC Network. Systems providing the same functionality, Safety and level of redundancy as that described below are acceptable regardless of the assignment of functions among hardware or the terminology used.

(b) TSCC and MSF Equipment

(i) The TSCC shall serve as the command and control center for the OLRT. Work stations located in the TSCC shall communicate with redundant ATS and ATC servers located in the MSF. The TSCC workstations and the ATS servers located in the MSF shall allow the TSCC personnel to setup routes through interlockings using entrance/exit selection or direct switch control, and to clear, cancel or fleet signals. Using this system, TSCC personnel shall also be able to stop and release any Train or group of Trains. The TSCC personnel shall be able to put the ATS servers in an automatic mode to automatically set up routes through interlockings, send ATS commands to Trains to control dwell times, speeds, and acceleration or braking rates to manage Headways, and schedules and/or optimize energy usage. In the automatic mode, the ATS system shall also route Trains out of and into the MSF to build up and reduce service around the rush hours.

(ii) The ATC servers shall maintain the most up to date Track Database. The ATC servers shall push the latest version of the Track Database including Track profile, Station locations and civil speed out to the ATC Zone Controllers and to all Trains. Handshaking shall be provided to ensure that all ATC servers, ATC Zone Controllers and Vehicles maintain the same up to date version of the Track Database. The ATC Zone Controllers shall maintain a registry of all equipped Vehicles in CBTC territory. Authorised TSCC personnel shall be able to use workstations to update, add or remove speed restriction zones and work zones.

(iii) The ATS workstations at the TSCC shall have display screens that allow TSCC personnel to view the entire line and all the Trains (identified by lead car number), interlockings and switch positions as well as Equipment warnings, alarms, temporary speed restriction zones and work zones. GUI controls shall be provided to allow the TSCC personnel to control interlockings and switches, to clear, cancel and fleet signals, to turn switch point heaters on and off, to stop and release Trains and to transfer interlockings and the entire line between automatic and manual operation.

(iv) CBTC maintenance database servers shall be provided at the MSF to record all faults from wayside, TSCC, MSF and on board CBTC and network Equipment

A. Fault alerts and easy database access shall be provided for maintenance personnel.

(v) TSCC workstations and MSF servers shall be set up in a redundant configuration with redundant network interfaces.

(c) ATC Zone Controllers

(i) ATC Zone Controllers shall be distributed throughout the line to control the Train movements in the various zones. Redundant ATC Zone Controllers shall be provided in each zone. The number of zones shall be determined by the latency requirements of providing the required Headways, the requirements of maximum availability, as well as the requirements of the vital interface with the interlocking controllers provided.

(ii) Each ATC Zone Controller shall:

A. Receive Train location, length, speed and identification messages from each Train;

B. Synchronize Track Database versions with the MSF ATC server;

C. Receive signal status, switch position, and block occupancy status of the fixed block system either directly or from a VMIS;

D. Read input from the intrusion detection system installed at the OLRT Tunnel portals;

E. Read inputs from the smoke detector system;

F. Request and receive the Track Database version from each Train in its zone;

G. Deny Movement Authority to Trains without a valid Track Database version until the database is made current;

H. Send Movement Authorities to all Trains within its zone including overlap into adjacent zones;

I. Send a vital confirmation to Trains when they are fully berthed in a Station if required by system Design;

J. Provide Train location to the ATS system;

K. Inform adjacent ATC Zone Controllers of all switch, signal positions and Train location information within it zone; and

L. Receive the same information from adjacent controllers.

(iii) Redundant ATC Zone Controllers shall be provided for each zone.

(iv) Future expansion of OLRT may involve operation in partially separated rights-of-way with at-grade crossings. The ATC Zone Controllers shall have capability of interfacing with City traffic signals and with crossing barriers.

(d) Local ATS Processor

(i) Redundant local ATS processors shall provide a non-vital interface between the ATS servers and the VMIS to allow ATS control of interlockings. The local ATS processors shall also connect to the Local Control Panel to allow local control of the interlocking.

(ii) The local ATS processor shall direct ATS commands to Trains to adjust Train speeds and dwell times and shall obtain Train location information for the central ATS system. The processor shall also receive the Train locations from the ATC Zone Controller and report them to the MSF ATS servers.

(iii) The local ATS function may be combined in various hardware configurations and location provided:

A. Processor redundancy is provided.

B. Local control of the turn backs at terminal locations and of the interlocking controlling entrance to and exit from the MSF is not dependent on the health of the line CBTC Network.

(e) Interlocking Control

(i) Interlockings shall be controlled by redundant VMIS units using standard interlocking Safety logic including route locking, approach locking, detector locking, etc. A fixed block Train detection system shall be used in all interlockings to supplement CBTC location detection. Vital interlocking logic shall include control of traffic direction between interlockings. Traffic direction status shall be vitally maintained through power failures. Vital interlocking control may be integrated into the Zone Controller package provided that:

A. Local control of the turn backs at terminal locations is not dependent on the health of the line CBTC Network; and

B. Failure of the CBTC portion of the Zone Controller shall not disable local control of terminal location turn backs or the interlocking controlling entrance to and exit from the Maintenance and Storage Facility.

(ii) The VMIS units shall vitally read the states of all fixed blocks including those outside the interlocking.

(iii) The VMIS units shall provide the ATC Zone Controllers the status of all signals, switches, and fixed blocks within the zone as well as the allowed direction of traffic on each Track.

(iv) The local non-vital ATS processor shall allow the VMIS to process central ATS requests from the MSF ATS servers and provide indications to the ATS system.

A. The non-vital interface shall support a local control panel for testing and Emergency operation of the interlocking.

B. The non-vital local ATS processor shall support local automatic operation of the interlocking based on approach triggering.

C. In local automatic operation, Trains shall be routed to the inbound Platform Track first and only if that Track is occupied to the other Platform Track. Provisions shall be made for taking a Platform Track out of service.

(v) In normal operation, approach locking shall utilize the ATC Zone Controller knowledge of Train speed and position and Movement Authority to minimize approach locking time.

(vi) Wayside signals with stop, diverging and normal aspects controlled by the VMIS shall be provided at the interlockings. In case of CBTC system failure, visual signal protection of interlockings shall supplement line of sight operation between interlockings.

(f) Central Instrument Houses

(i) All interlockings shall be controlled from a CIH.

(ii) Project Co shall locate the CIH within any building in close proximity to the interlocking as dictated by performance requirements of the signalling system. CIH's may be prefabricated units or part of the adjacent OLRT Infrastructure.

(iii) The CIH shall be secured in accordance with safety and security requirements.

(iv) The CIH shall be provided with doors with locks at each end. The doors shall also have an emergency bar on the inner side of the door which shall bypass the lock and open the door.

(v) The CIH shall house all microprocessor systems, relays, electronic switch controllers, etc necessary to control the interlocking from the central ATS servers or from the local control panel.

(vi) The CIH shall house, as necessary, CBTC Equipment such as ATC Zone Controllers, local ATS processors, CBTC networking Equipment, etc.

(vii) A Local Control Panel with switch controls, signal controls and Track and switch indications and switch heater status shall be provided. Controls to select local or ATS control, and local automatic or local manual control shall be provided.

(viii) The CIH shall be constructed with a white outer and be resistant to corrosion and weather damage. The Design shall minimize electromagnetic interference from the Traction Power fields.

(ix) The CIH shall be insulated to a level that minimizes heating and cooling loads for the HVAC and heating systems.

(x) A 600 VAC single phase feed shall be provided with appropriate step down transformer(s) and distribution panels for signal power and for bungalow power outlets, lighting, HVAC etc.

(xi) A transfer switch and an outside connection for a portable emergency generator and pad for placement of that generator shall be provided.

(xii) Power for vital signal systems shall not be grounded.

(xiii) Four (4) hour battery backup shall be provided to power all signal and CBTC systems including fixed block detection and switch operation.

A. Batteries chargers shall be redundant.

B. Battery charger filtering shall be sufficient that the ripple requirements of attached processor systems can be met even when batteries are not attached.

C. Batteries provided shall be selected for the required capacity and minimal degradation of capacity with age and suitable for the environmental conditions outlined in the Output Specifications.

D. Batteries shall not be lead acid.

(xiv) HVAC and heating systems shall be provided with sufficient capacity to maintain room temperatures between 15ºC and 22ºC.

(xv) A fire detection and suppression system shall be provided which shall be integrated into the central SCADA system.

(xvi) A control head, transceiver and antenna shall be provided for the radio.

(xvii) The CIHs shall be grounded. All racks in the CIH shall be connected to the earth ground bus.

(xviii) Where high density termination blocks are used in signalling equipment located within the CIH, the types used shall:

A. Allow for circuit isolation without disconnecting wires from the terminal blocks;

B. Provide crimped terminations on wires to provide strain relief at the wire insulation;

C. Provide cable identification; and

D. Provide evidence of environmental testing to EN50125-3 Environmental conditions for equipment, *Equipment for Signalling and Telecommunications*. Special attention shall be paid to the clearance and creepage requirements and lightning suppression for entrance rack terminations.

(g) Switch Machines

(i) Power switch machines provided shall:

A. Have heaters to prevent internal condensation;

B. Have a lockable hand throw lever and mode of operation; and

C. Have a record of reliable operation in heavy traffic transit operation.

(ii) Switch heaters shall be provided to prevent ice and snow from building up and immobilizing the switch points and switch rods. Switch heaters shall:

A. Be controlled by the TSCC/BCC or YCC with local manual control available for maintenance and troubleshooting; and

B. Have sufficient thermal rating and appropriate controls to operate successfully in the Ottawa climate.

C. The status of the switch heater (ON/OFF) for each switch shall be reported to the local control panel and to the TSCC, BCC or YCC.

D. Failure of switch heaters status to correspond to command status shall cause an alarm indication.

(iii) Switch heaters shall be powered from the OCS or from the same utility breaker that supplies power to move the switches.

(iv) If electric switch heaters are used:

A. A switch heater case shall be provided at each interlocking or group of interlockings to distribute power to each switch heater;

B. A main circuit breaker and disconnect shall be provided at each switch heater case; and

C. The power for the switch heater for each switch shall be separately current protected.

(v) If gas heaters are used:

A. Flameout and ignition failure shall be provided; and

B. A safety analysis of gas heaters as well as the gas delivery or storage systems shall be provided.

(vi) Switch machine controls shall provide overload protection and automatic recycling in case of obstructions.

(h) Wayside Signals

(i) Wayside signals shall be provided only at MSF and mainline interlockings.

A. When the System is expanded into partially segregated territory, wayside signals shall be provided at interconnected highway traffic signals.

(ii) Wayside signals shall be mounted such that the vertical center of the signal head is approximately 2.6 meters above top of rail. Lower signals may be provided in the MSF yard but the bottom of the signal head shall be at least 1 meter above top of rail.

A. Built in ladders shall be provided on high signal masts to permit the changing of aspect lamps.

(iii) Signal heads shall be located outside the dynamic envelope of the LRV.

(i) Location Norming Transponders

(i) Passive transponders with location and Track information shall be installed along each Track in CBTC territory. The transponders shall be located at intervals as required to provide the specified Train location error limits, to provide verification of Track at interlockings and to provide the specified Station stopping precision.

(ii) The LRV's Onboard Computer shall detect missing of malfunctioning norming transponders and shall report this failure to the CBTC maintenance server.

(j) Fixed Block Train Detection System

(i) Subject to the results of the safety, risk and hazard analysis, in order to minimize disruption caused by communications failures, a fixed block Train detection system shall be provided. If a fixed block Train detection system is provided, the fixed block status shall be provided to the ATC Zone Controller through the VMIS.

A. In case of failure of CBTC with an individual Train for more than a pre-determined time, the ATC Zone Controller shall determine the location of that Train from fixed block occupancy;

B. In the case of a general communications crash and re-boot, the ATC Zone Controller shall utilize fixed block occupancy and vacancy to assist in verifying that all Trains are accounted for during recovery;

C. The length of fixed blocks shall be consistent with facilitating a quick recovery from a system crash; and

D. Fixed block Train detection electronics and power Equipment shall be consolidated in the CIHs located at interlockings.

E. Where track circuits are used, track circuit voltage selection shall take into account the track bed, stability, leaf contamination, wheel and rail profile and the potential for rail oxidization due to climatic conditions.

(k) Broken Rail Protection

(i) A broken rail detection system shall be provided.

A. The broken rail protection system shall provide direct input to the ATC Zone Controllers or use data collated by alternative rail condition monitoring methods to update the speed restriction table used by the Zone Controller and enforce speed restrictions.

B. If Track circuits are used for this purpose, the use of insulated joints shall be kept to a minimum.

C. If an alternative broken rail detection system is proposed it shall be subject to the following constraints:

i. Project Co shall monitor the environmental temperature of the track and associated track system and increase the frequency of rail monitoring /testing after experiencing >= 20 degree Celsius thermal swings in 12 hours or less;

ii. The frequency and type of monitoring shall be commensurate with the type of track used, its construction methods and the track bed;

iii. Project Co shall provide a method of interpreting track data such that the speed restriction tables in the Zone Controllers can impose the necessary speed restrictions;

iv. Project Co shall monitor Ottawa's seismic activity and increase the frequency of rail monitoring /testing after experiencing seismic activity that would exceed the design of the track and track bed or compromise structural integrity of the rail or stability of the track bed;

v. Project Co shall develop KPI's that will report the track condition to the City at a minimum of every month. This report shall detail temperature change and any seismic activity during that time period; and

vi. Project Co shall demonstrate that the alternative broken rail detection system has been assessed through the Safety and FMEA Analyses and any required mitigations or design changes shall have been implemented before trial running.

(l) The broken rail detection requirement applies to all mainline Tracks. It shall also apply to MSF Tracks if warranted by the Safety and FMEA analyses.

(m) CBTC Network

(i) The TSCC workstations, the MSF servers and all wayside CBTC controllers and interfaces, shall be connected to each other and to wayside APs over independent redundant fibre optic networks.

(ii) Networks Design and Equipment shall be based upon an open standard such that replacement Equipment may be procured from multiple sources.

A. Copper cat 6e or higher cables may be used within control rooms.

B. The fibre optic backbone networks shall designed such that for each node there are 2 paths to any other node.

C. Network switches shall be located in CIHs and in station communications rooms as needed.

i. All network switches regardless of location shall have at least 4 hours of battery backed up power.

(iii) The Network shall be designed to reliably meet the latency requirements determined by the Headway requirements outlined in Part 1 Article 2 – Operational Performance Requirements.

(iv) The integrity of vital messages shall not depend on network protocols but upon error checking and time stamp checking methods used by the attached vital systems.

(v) The CBTC system fibres shall be run in separate cables from all other communications systems. Each of the two CBTC fibre optic networks shall be run in a separate cable and a separate conduit or trough. The routing of fibre cables shall minimize the possibility disabling both networks with a single digging accident or lightning strike.

(n) CBTC Wireless Communication

(i) APs shall be provided along the right of way.

(ii) Communications between APs and Trains shall be based upon an open or proprietary standard such that replacement APs may be procured from multiple sources.

(iii) Leaky coaxial cable or waveguides may be used instead of antennas to guarantee reliable communication in Tunnels.

(iv) Advanced encryption and error checking, time stamping, etc. in accordance with EN 50159-2 or equivalent standard shall be used to prevent deliberate and random message falsification and to guarantee message integrity. Additional measures shall be taken to mitigate the possibility of and damage from non-safety critical interference such as denial of service and man in the middle attacks and to reduce potential interference from external wireless networks.

(v) The CBTC wireless communication system shall not carry data for any other Vehicle or wayside system.

(vi) Nodes on both backbone networks shall be able to talk to all APs.

(vii) APs shall be spaced along the Alignment as needed to provide redundant radio coverage for each Train antenna at all times. Not only shall coverage be redundant but APs shall be redundant.

(viii) AP electronics shall be protected in sealed enclosures watertight to IP67 or NEMA equivalent. Alternatively, they shall be IP65, and be mounted high enough to prevent them being under water due to any environmental condition.

(ix) Project Co shall perform propagation studies and intermodulation studies to determine placement of APs and antennas on the wayside and the proper location of antennas on the Trains.

(x) Frequency selection and antenna placement for LRV voice and non CBTC data radios shall be coordinated to minimize interference with CBTC wireless communication.

(xi) Power for all APs shall be provided from a source with a minimum of a 4 hour battery backup. Power distribution to the APs shall be redundant. A short in a single AP shall not affect the operation of any others.

(o) Event Recording

(i) A TSCC and CIH event recording systems shall be provided to record changes in switch positions, and signal aspects, fixed block occupancy, Train location, and ATS commands to the interlockings and Trains.

(ii) All events shall be time stamped.

(iii) Sufficient storage shall be provided to record all events for a minimum of 60 days.

(iv) Onboard CBTC systems shall report all changes in Movement Authority, all Onboard Computer Train Control commands, all changes in speed limits, etc. to the Vehicle Event Recorder.

(p) Onboard CBTC Systems

(i) The onboard components of the CBTC system shall include redundant Onboard Computers, redundant VLS, a CBTC Panel in each cab, and redundant CBTC data radios and antennas. The onboard systems shall be powered any time battery power is available on the Vehicle.

(ii) The Onboard Computer shall:

A. Manage and verify communications with wayside CBTC systems;

B. Obtain Movement Authority from the ATC Zone Controller;

C. Vitally check the integrity and version of its Track Database;

D. Obtain an up to date Track Database as necessary;

E. Vitally determine the length of the Train and Train integrity;

F. Determine location of the Train and the maximum accumulated position error based upon data provided by the VLS;

G. Communicate Train location, length, speed and maximum position error to the ATC Zone Controller;

H. Calculate and enforce a penalty brake speed profile based upon Train location, Track grades, Movement Authority, civil and temporary speed restrictions and work zones;

I. Initiate an emergency brake application for any violation of the penalty brake speed profile or if a Train moves beyond the end of its Movement Authority;

J. Obtain a vital determination that the Train is within the Station and stopped before doors may be opened;

K. Vitally permit door opening on the Platform side of the Train only;

L. Provide zero velocity status to any Vehicle systems that need it;

M. Provide a vital roll back protection function; and

N. Have a non-vital processor to implement automatic speed regulation, automatic station stopping and other ATO functions and to implement ATS commands received from the wayside.

(iii) Vehicle Location System

A. The VLS shall determine Vehicle location based upon vital tachometer pulse counting with error correction based on vital interrogation of wayside norming transponders.

B. Vital checks shall be provided for speed sensor and pulse counter integrity.

C. The VLS shall also independently detect the direction of Train motion.

D. An algorithm shall be provided to account for distance travelled during spins and slides.

(iv) Vehicle CBTC Data Radios and Onboard CBTC Networks

A. Redundant data radios and antennas shall be provided to communicate with the wayside CBTC controllers through wayside APs.

B. Redundant communication paths and Equipment shall be provided both for Train to wayside and for all networked CBTC subsystems within the Vehicle and Train.

C. Any Train network used by the CBTC system to communicate between CBTC Onboard Computers on different Vehicles in a Train shall be redundant and have a proven record of reliable communication over electrical coupler heads that are frequently coupled and uncoupled. Reliance on Ethernet through standard electrical coupler heads for the operation of the CBTC system is not permitted.

(v) CBTC Panel

A. A CBTC Panel shall be mounted in each cab. The CBTC Panel shall be separate from the Train Display Screen.

B. The CBTC Panel shall be designed to minimize distraction from the task of operating the Train.

C. The displays on the CBTC Panel shall be designed for at least 100,000 hours MTBF.

i. Inputs shall be by pushbuttons rather than touch screen.

D. The CBTC Panel shall at minimum display:

i. Train CBTC operating mode;

ii. CBTC operational status as result of checks when entering CBTC territory, self-checks, etc.;

iii. Current CBTC determined Train speed;

iv. Currently authorized maximum CBTC Train speed;

v. Train speed alarm active;

vi. Side on which doors are enabled to open;

vii. ATS Station hold active indication;

viii. Bypass stop at next Station indication;

ix. Dwell over warning; and

x. Short messages indicating the reason for a temporary speed restriction or the approach to a work zone, faults, etc.

E. The CBTC Panel shall support at minimum the following system inputs:

i. Mode Selection – ATO, ATP Only, Coupling, or Non CBTC Territory.

(vi) CBTC Bypass

A. In order to allow movement of the Train under CBTC failure conditions, a CBTC bypass switch shall be provided in a locked cabinet to allow the Train Driver to bypass all CBTC control of the Train and its propulsion, braking and emergency brake systems.

B. When the CBTC bypass switch is activated:

i. An indicator that CBTC is bypassed shall flash on the CBTC Panel;

ii. Master Controller commands shall be passed directly to the propulsion and braking system;

iii. The propulsion system shall non-vitally limit Train speed to a reasonably safe speed; and

iv. Operation with CBTC bypassed shall be line of sight under TSCC supervision with observance of interlocking signals.

(q) Train Initiation

(i) Before any equipped Train may enter CBTC mainline territory and receive Movement Authority it shall register with the wayside CBTC system.

(ii) When the Onboard Computer determines it has entered CBTC territory it shall disable the Non-CBTC Territory mode of operation, come to a stop and attempt to initialize the Train with the wayside CBTC system.

(iii) During Train initiation the Onboard Computer shall:

A. Provide all data required by the wayside CBTC system to track the Train and the moving or virtual block it is occupying;

B. Update and verify the Track Database; and

C. Provide any other information required for ATS scheduling and routing.

(iv) If initialization requires RFID tags on the Vehicle and wayside tag readers, tags shall be provided on all Vehicles and readers shall be provided at all entrances to CBTC Territory and as required to handle contingencies.

(r) Non-Revenue Vehicles

(i) Non-Revenue high rail Vehicles shall be detected and protected by the CBTC system.

5.4 Modes of Operation

(a) Modes of line operation and interlocking operation shall be selectable from the TSCC ATS workstation.

(b) Modes of CBTC Vehicle operation shall be selectable from the Control Panel. The mode of operation of each Vehicle shall be reported to the ATS system and displayed on the TSCC dispatcher's workstation display and recorded in the TSCC event recorder.

(c) ATP Only (Vehicle)

(i) ATP Only mode of operation may be used in any CBTC area.

(ii) In ATP Only mode all vital communications between the wayside and the Vehicle shall be processed.

(iii) In ATP Only operation, the Train speed shall be controlled within the limits of the penalty brake speed profile.

(iv) Door opening and closing shall be enabled.

A. The ATP system shall allow door opening only within the limits of the Station and only on the Platform side.

(v) When a Train exceeds a service brake speed profile 2 to 3km/hr below the penalty brake speed profile, the ATP system shall request a service brake application until the Train is below the service brake speed profile. An alarm shall sound until the Train is underspeed.

(vi) When the Train is 2 to 3 seconds from an automatic service brake application, an alarm shall sound.

A. Timing of the alarm and the service brake speed profile shall be designed so that a Driver will not exceed the penalty brake speed.

(vii) If the Train speed crosses the penalty brake speed profile, an emergency brake application and removal of all propulsion power shall be initiated.

(viii) ATS speed modification commands and station hold commands will not be enforced by the Onboard Computer ATO function. However, "station hold" and "next station bypass" indications shall be provided on the CBTC control panel.

(d) ATO Mode (Vehicle)

(i) ATO is a non-vital function overlaid on the vital ATP function and operating within the limits imposed by the ATP function. ATO mode shall be initiated from the CBTC Panel. In ATO mode, the Onboard Computer ATO function controls the propulsion and braking trainlines to:

A. Limit acceleration and braking rates in order to ensure a level of passenger comfort consistent with the required Headway and run times;

B. Allow the Train to operate as close as possible to the ATP penalty brake speed profile without exceeding it;

C. Accurately stop Trains in Stations;

D. Hold Trains at Stations based on ATS commands;

E. Skip Station stops based upon ATS commands;

F. Adjust allowed acceleration and braking rates and non-vital speed limits based on ATS commands received; and

G. Adjust maximum speeds within the ATP penalty brake profile to comply with ATS energy saving or schedule enforcement commands.

(ii) Automatic door opening and closing with override shall be a configurable feature of the ATO mode of operation.

(iii) A Driver may be required to take control of Train operation even during ATO operation. The interface with the Train Control system shall be such that a Driver

may assert control of the Train with the same Master Controller handle movement as would be used if the CBTC system were in ATP Only Mode. For example, it may be necessary for the ATO function to monitor the Master Controller output as well as its own propulsion and braking requests and output to the trainlines the more restrictive of the two.

(iv) The deadman function of the Master Controller handle shall be active during ATO.

(v) Automatic correction of station overruns shall not be provided.

(vi) With future expansion into partially segregated rights-of-way with at-grade crossings, the ATO mode shall be automatically cancelled when the Train enters the partially segregated territory. The Train shall drop back to ATP Only Mode.

(e) Coupling (Vehicle)

(i) A Train Control function shall be provided to allow a Train to close in on another Train at reduced speed for coupling purposes. This function shall not permit movement into an interlocking with a signal at stop.

(ii) When two Trains or Vehicles couple, the new Train that is formed shall register with the CBTC system before Movement Authority can be granted.

(iii) When a Train decouples into two Trains or Vehicles each section shall register with the CBTC system before Movement Authority can be granted.

(f) Non-CBTC Territory Mode (Vehicle)

(i) The Non-CBTC Territory Mode is provided for operation in areas where CBTC enforcement is not applied.

A. Movement Authority shall end at the beginning of Non-CBTC Territory. In order to move the Train into Non-CBTC Territory, a Driver shall select Non-CBTC Territory Mode.

B. In Non–CBTC Territory Mode, the Onboard Computer enforces a 20km/h speed limit.

C. Upon leaving Non-CBTC Territory, Non-CBTC Territory Mode is disabled and the Train will brake to a stop until it receives Movement Authority to proceed from with the wayside CBTC system.

(g) Manual Release Mode (Vehicle)

(i) A Manual Release mode shall be provided for each Vehicle to allow a latched manual operation at a restricted speed through areas where communications has failed. The restricted speed shall be enforced by the ATP function. When

communications is restored, the Onboard Computer shall automatically disable this mode and return to ATP Only mode.

(ii) Manual Release mode shall be initiated by activating a switch which is not accessible from the cab seat. This mode is a line of sight operating mode which requires TSCC permission.

(iii) During reverse movement in Manual Release, speed shall be limited to 5km/h.

(h) ATS Automatic Mode (Line Operation)

(i) The automatic mode of the ATS system shall control interlockings and switches, as well Train dwell times, Train speeds and acceleration rates within the parameters allowed by the ATP and vital interlocking systems.

(ii) In Automatic mode, the ATS system shall enforce schedules. When delays occur the ATS system shall automatically adjust Headways, departure times and speeds to optimize recovery and return to schedule. The ATS system shall also automatically control the interlocking interfacing with the yard to build up and reduce service around rush hours with minimal disruption of mainline traffic

(iii) Automatic mode shall also automatically set up routes and clear signals to bring Trains out of the MSF to the Mainline to build up service for rush hours and take Trains off the line to reduce service after rush hours.

(iv) Two optimization options for automatic operation shall be provided:

A. Headway and schedule optimization; and

B. Energy saving.

(i) ATS Manual Operation Mode (Interlockings)

(i) In the Manual Operation mode of the ATS system, the TSCC personnel shall control interlocking signals and switches through the TSCC workstation.

A. The TSCC personnel shall be able to set up routes by selecting entrances and exits or by selecting switch position for each switch.

B. The TSCC personnel shall be able to request switch positions and block and block and unblock switches

C. The TSCC personnel shall be able to call, cancel and fleet signals.

D. The TSCC personnel shall be able to set interlockings to an automatic turn back mode with approach triggering, scheduled departure ring offs and inbound Track preference. Automatic departure schedule adjustment to recover from delays shall not be available in this mode.

5.5 Interface with Passenger Information and City of Ottawa Systems

(a) The ATS servers or similar shall provide Train location information to the Train arrival announcement system.

(b) The ATS servers shall provide data to City of Ottawa applications.

(c) Data requests and transfers to outside systems shall take place over a network other than the CBTC network. The ATS interface to outside systems shall be provided with hardware and software security measures to block outside access to the CBTC network.

(d) The OBC shall provide a location and direction trigger to the Vehicle Automatic Announcement to trigger Station announcements.

5.6 Maintenance and Storage Facility Operation

(a) The MSF shall be either CBTC or non-CBTC territory.

(b) Project Co shall Design and implement a solution for Train Control in the MSF that provides:

(i) Control of power switches and interlockings from the YCC control panel.

(ii) A display on the YCC panel of all Trains on all Tracks and the order of the Vehicles in them.

A. The level of detail shall be selectable.

(iii) Standard signal system interlocking protection such as route locking, approach locking, detector locking, etc.

(iv) Signals at all interlockings to allow safe movement of Trains without functioning onboard CBTC systems.

(v) Yard speed limit enforcement for CBTC equipped Trains.

(vi) The Design of the yard Train Control System shall allow for coupling and uncoupling of Trains on any Tracks between interlockings.

(vii) The YCC shall not control the signals and switches in the interlockings entering or leaving the yard. These shall be controlled by the TSCC and the CBTC system.

A. CBTC transponders and wireless APs shall be installed on MSF yard lead Tracks approaching the interlockings interfacing with the mainline.

B. Trains which are not registered and initialized with the CBTC system shall not be permitted to leave the MSF yard without a manual override

5.7 Monitoring and Diagnostics

(a) The Vehicle borne CBTC systems shall be provided with fault monitoring and diagnostic capabilities in accordance with Part 4 Article 3 – Revenue Vehicles.

(b) All Vehicle borne CBTC systems shall report faults to the Vehicle monitoring system.

(c) The OBC shall provide time of day correction to the VMS.

(d) All microprocessor based Vehicle and wayside Train Control Systems shall monitor and report faults to a CBTC maintenance server.

5.8 Signal Cable, Signal Case and Junction Box Requirements

(a) Signal Cable

(i) The Design and manufacture of all signal cables shall meet the requirements of AREMA 10.3.17 for armoured cable.

(ii) Signal Cable used in Tunnels shall be provided with a low smoke zero halogen jacket.

(iii) If audio frequency Track circuits are provided, the twisted pair or pairs for each impedance bond shall be run in a separate cable from the cable for any other impedance bond. The use of multi twisted pair cables feeding multiple impedance bonds is strictly prohibited.

(iv) Signal wires from cables shall be terminated with compression lugs.

(b) Signal Cases and Junction boxes

(i) Signal cases, junction boxes, and switch heater cases shall be constructed of stainless steel, aluminum or fibreglass with locking doors and neoprene door seals.

(ii) All cable wires shall be terminated on AAR terminal boards with links and double nut locking. Gold nut links shall not be used in unheated cases and junction boxes.

(iii) Signal cases and junction boxes shall be earth grounded.

5.9 Performance Requirements

(a) Latency and Response Times

(i) Communications latency and CBTC Equipment response times shall be optimized to facilitate the Operational Performance Requirements outlined in Part 1, Article 2.

(b) Maximum Position and Speed Errors

(i) Base ATP location error shall not exceed 5 meters for each Vehicle with all wayside transponders working and without any slides or spins or significant creepage due to prolonged acceleration or deceleration..

(ii) The Train shall stop reliably such that all doors are located on the Platform, with the required door setbacks from the Platform ends. The Train Control System shall be designed to allow precision stopping to support the future addition of Platform screen doors.

A. The braking profile shall be adjustable to prevent Station over runs during low adhesion conditions.

(iii) The ATP speed measurement error shall not exceed 1% at constant speed on level tangent track with scheduled wheel diameter checking.

5.10 System Safety

(a) Safe Braking

(i) The OBC shall generate penalty brake speed profiles within the limits of the safe braking model described in IEEE STD 1474.1

(ii) The penalty brake for CBTC shall be an emergency friction brake without any Track brake application. Propulsion shall be disabled in a fail safe manner. Sanding shall be provided but shall be assumed not to work for purpose of safe braking computation.

(iii) The Guaranteed Emergency Brake Rate used by the safe braking model shall be based upon an analysis of plausible combinations of brake failure modes and on brake testing under the full range of adhesion conditions..

(b) Train Operation During Train/Wayside Communication Failure

(i) If the OBC fails to receive a Movement Authority update from the ATC Zone Controller it shall continue to enforce the speed profiles from the previous Movement Authority as well as speed restrictions. If the communications failure continues for longer than 5 seconds the Onboard Computer shall command and enforce a full service brake to stop.

(ii) If the ATC Zone Controller fails to receive a location update from a Train it shall maintain the previous location for Train separation purposes. If the communications failure continues for an approved length of time, the zone controller shall use fixed block occupancy for Train location. During communications failures fixed block occupancy shall also be used for approach locking and for route and detector locking release.

(c) Response to Intrusion

(i) The CBTC System shall respond to intrusion detection by alarming Drivers and enforcing stop and proceed orders, speed restrictions or stop and hold orders as warranted by the Safety Analysis.

(d) Fire and Smoke

(i) The ATC Zone Controllers shall stop any Trains from entering the Tunnel or approaching an area where smoke is detected. In the Tunnel, but beyond the fire zone, trains shall not be prohibited from moving.

(e) Broken Rail Protection

(i) The ATC Zone Controller shall enforce a restricted speed or stop through any area indicating broken rail. A warning shall be presented on the CBTC Panel when the Onboard Computer is enforcing that restriction. If investigation proves that there is no broken rail, the restriction may be lifted from a TSCC workstation.

(f) Speed Restrictions and Work Zones

(i) The speed limit of any temporary or civil speed restriction zone shall be enforced while any part of the Train is within the boundaries.

(ii) When a Train approaches a work zone, ATO operation shall be suspended. The Train shall operate in ATP Only Mode, and the assigned speed limit or stop shall be enforced.

A. Some work zones may require operation at limited speed while others may require a stop before proceeding on permission of the work crew. Both rules shall be enforced by the CBTC system.

(g) Degraded Modes of Operation

(i) The CBTC system Design shall account for degraded modes of operation and shall develop a Safety analysis of fall back operation in accordance with the standards outlined in this article.

(ii) Project Co shall also work with the City to develop and implement solutions and operational policies for degraded modes of operation such as manual operation through interlockings with switch point detection problems, failed fixed block detection units, etc.

(h) Safety Design Standards Reference Documents

(i) The CBTC system shall meet the Safety requirements of IEEE STD 1474.1 and IEEE 1483-2000 and the formal verification methods referenced in IEEE 1483, Annex A, or IEC 61508, EN 50126, EN50128 and EN 50129. All required Safety

documentation of the generic products and the specific application and the operation the OLRT CBTC/signal system shall be provided.

5.11 Reliability and Availability

(a) Overall reliability of the CBTC Train Control System shall be such that with the provided redundancy, availability is 99.99% or greater. Availability calculations shall be based on the formula:

$$\text{Availability} = \frac{\text{Mean_Time_Between_CBTC_System_Functional_Failures}}{\text{Mean_Time_Between_CBTC_System_Functional_Failures} + \text{Mean_Time_To_Restore_CBTC_System}}$$

(i) Mean_Time_To_Restore_CBTC_System includes repair crew travel time and time to replace failed Trains on the line as well as mean time to repair the failure.

(b) CBTC availability does not include failures of fixed block or broken rail detection systems or switch machines. etc.

(c) The CBTC system shall be designed for a 30 year life.

(d) Onboard Equipment

(i) The CBTC Onboard Equipment shall meet an overall requirement of 480,000 km mean distance between chargeable failures

(e) Wayside Equipment

(i) Project Co shall provide calculations for the Mean Time Between Failures and Mean Time Between Functional Failures for all provided wayside networking Equipment, ATC Zone Controllers, VMIS, ATC and ATS Servers, local ATS processors, fixed block Train detection Equipment. Actual reliability data of similar installed systems may be provided as a substitute.

(ii) Particular attention shall be paid to the reliability of the wireless communication system.

5.12 Environmental Requirements

(a) Environmental requirements measures shall be included as part of the overall System Design considerations from the start of the Design to the final in-service testing. The wayside and onboard systems supplied shall meet the temperature and humidity conditions found in Ottawa.

(b) At a minimum, all wayside Equipment shall meet all of the environmental requirements as delineated in the AREMA Environmental Requirements. Project Co shall test Equipment and submit certified test results showing the dates, locations and testing agency that performed the verification, at the City's request, unless the Equipment has

been proven in service in an equivalent environment and test results are available which can support this.

(c) The onboard Equipment shall meet the requirements of EN 50155 and the environmental conditions outlined in Part 4 Article 3 – Revenue Vehicles.

5.13 Testing

(a) Onboard Equipment

(i) All onboard CBTC Equipment provided shall be type tested for compliance with the environmental and EMC requirements of this specification. Previous successful tests of identical Equipment may be substituted.

(ii) The onboard CBTC system shall undergo system integration tests to verify compliance with the VMS Fault Plan described in Monitoring and Diagnostics section of Part 4 Article 3 – Revenue Vehicles

(iii) The onboard CBTC system shall undergo integration testing before installation on the pilot car to verify compliance with the Network Interface Control Document described in Trainlines and Networks section of Part 4 Article 3 – Revenue Vehicles.

(b) Interlocking Testing

(i) Interlocking tests shall include point to point and vital break down tests of control wiring, insulation resistance testing of cables, and full functional testing of switch locking and signal and switch control.

(ii) All non-vital route setup, switch blocking, switch control, signal clearing and cancellation functions shall also be tested from the local control panel and from the ATS work station.

(c) CBTC System Tests

(i) Vital communications between VMIS and ATC Zone Controllers shall be fully tested for each bit or variable transferred.

(ii) CBTC software shall be subjected to the test cycles required during development by the Safety verification standards cited in Section 5.9 of this Article.

(iii) Before any wayside or Vehicle CBTC Equipment is installed, servers, workstations, ATC Zone Controllers, local ATS processors, VMIS, APs and simulated Vehicle Equipment shall be networked together to verify interface control documents and to perform functional simulations and load testing. During load testing, network errors and delays shall be simulated to verify the robustness of communications networks and that cycle times can be met under heavy traffic and less than optimal transmission and reception conditions.

(iv) CBTC equipped pilot cars shall be used to test communications quality along the entire right of way.

(v) Safe braking and Station stopping tests shall be performed under all weather and grade conditions to verify the validity of the speed profile algorithms.

(vi) All CBTC Safety and supervisory functions shall be tested including: Train separation, coupling, work zones, automatic and manual interlocking control, Headway adjustment, adding and removing Trains from the line, ATS workstation displays, local control panels, etc.

(vii) All degraded modes of operation shall be tested.

(viii) The proper functioning of system redundancy including power redundancy shall be tested at all levels.

(ix) The CBTC fault reporting system shall be tested.

ARTICLE 6 COMMUNICATIONS

6.1 General Requirements

(a) The communications systems for the OLRT will provide vital and non-vital support to daily operations and emergency services. The communications systems are designed to be integrated throughout the entire OLRT System, including Station, Tunnels, the MSF, the TSCC, the YCC, the BCC, ventilation systems, TPSS's, and CIHs. The communications system for the OLRT shall include the following:

(i) TSCC;

(ii) CTS;

(iii) PA;

(iv) PIDS;

(v) CCTV;

(vi) IAC;

(vii) Telephone and intercom system;

(viii) SCADA;

A. Traction Power SCADA

B. Train Control SCADA

C. Building Management System (BMS)

D. Building Automation System (BAS)

E. MSF BMS

(ix) Radio Communications as provided by others; and

(x) Train-to-Wayside Wireless system.

6.2 Operational Description

(a) TSCC – The TSCC for the OLRT shall be established by Project Co at the existing Bus City control center at, Ottawa, Ontario (referred to as herein). The TSCC shall include all of the systems and subsystems necessary to provide the command, control and monitoring necessary for the delivery of the OLRT services in a safe and efficient manner. The communications elements managing these functions shall be located either in the MSF communications room or in. TSCC.

(i) The TSCC, , shall consist of three new consoles constructed in a similar manner to the existing operations consoles. These consoles shall consist of workstation GUI, desktop telephones, and headsets required to access the Train Control, radio, PA/PIDS, SCADA, and security systems. The three new consoles shall be assigned as an OLRT console, superintendent console and Maintenance console. The location of the new consoles shall be coordinated with the City.

(ii) An overview display shall be installed in the TSCC which shall provide a graphical view of the OLRT Alignment as well as CCTV camera views to assist in operational monitoring of the Platform density. The location of the overview display shall be coordinated with the City. In addition, an ergonomic study shall be performed to determine the optimum location of the overview display and overall new console layouts. The overview shall display at a minimum the following pertinent information:

A. Real time location of every train,

B. Occupancy of signal blocks,

C. Position of interlocking switches,

D. Feeder breaker status for the OCS sections,

E. Vent plant status indicators, and

F. Station escalator/elevator status indicators

(iii) The workstation GUI required for operation of the OLRT PA and PIDS systems shall be integrated with the existing PA/PIDS console within the operating theatre to establish a seamless operation of the existing and new systems. TSCC personnel shall access the PA system through a desktop microphone.

(iv) The equipment room, , shall house all fibre optic and copper cabling, associated equipment, racks, video display servers, data servers, and all other equipment necessary to establish communication over the CTS with the MSF. Project Co shall assess space at to determine equipment arrangement for communication with MSF servers. Project Co shall use the existing raised floor to run cabling between the equipment room and the operating theatre. Project Co shall coordinate, assess and provide any HVAC upgrades necessary to establish sufficient operating temperatures for the new Equipment installed in the equipment room. Project Co shall coordinate and assess any electrical expansion for the equipment room.

(v) The BCC is an emergency control center facility providing a remote location complete with the basic functioning systems to dispatch, monitor, and control operations of the OLRT in case the TSCC at is unavailable.

(b) The CTS shall provide hi-speed fibre optic communications transmission for the various communications subsystems, including, CCTV, PA, PIDS, telephone, IAC system, fare

collection, train to wayside communications, fire life safety and SCADA systems, Train Control data communication shall be on a separate wireless network, see Article 5 – Train Control for details. The CTS shall be comprised of both fibre optic cabling and copper cabling with dual redundant hi-speed network nodes located at each Station, the main communications room at the MSF, and the TSCC data room.

(i) The CTS network shall include a WAN component and LAN component. The LAN shall provide local network traffic switching and aggregation of the network traffic at each OLRT Station, MSF, and TSCC for transport over the CTS WAN. The WAN shall be the core/backbone that connects all the local area networks and shall be able to interface with the Stations, MSF, TPSS, CIH and TSCC LANs.

(ii) The CTS shall include a NMS, which shall manage the network Equipment/device for fault, administration, configuration, performance, and security. The NMS shall be located in the main communications room located in the MSF. The NMS shall be accessed from an administration workstation located in the main communications room.

(iii) The CTS shall include a firewalled server which is configured to provide security for and access to non-vital components of the OLRT CTS system. The server shall allow external approved parties to retrieve operational performance and travel data (Open Data) for third party applications. This server shall produce Open Data in an XML format and will be designed to be interoperable with SIRI or other applicable standards.

(iv) In addition to the CTS, Project Co shall provide the ductwork for the City Highway Operations IT infrastructure optical fibre upgrade. Coordination of the ducts shall be undertaken with the City Highway Operations Department to ensure sufficient spare capacity, physical space and access are available for the installation of an additional 24 way optical fibre to the CTS requirement. The 24 way optical fibre shall be accessible at locations determined by the City Highway Operations Department through strategic breakout points located adjacent to the duct banks as detailed in Table 6.2.1 Each breakout point shall provide for a cabinet or housing and shall be supported on a concrete pad with duct or conduit. Any supporting trench work to link to the adjacent highways manholes to the breakout point on or near the Alignment will be accommodated by a separate contract undertaken by the City Highway Operations Department. The installation of cables will be undertaken by others.

(v) Project Co shall ensure that the ductwork alongside the Alignment (including the connection to the MSF) have the spare capacity for the insertion of this additional 24 way optical fibre cable by the City Highway Operations Department. The planning and installation of the ductbanks shall also be coordinated with the OTrain Expansion project and the ductwork terminated at the Bayview access point within the Lands to allow a separate contract to terminate or connect to the ductwork in the directions of Tunney's Pasture and Blair Stations.

(i) Table 6.2.1

(c) PA – Each OLRT Station shall be equipped with a PA system to broadcast audio announcements of arrivals, departures, general and Emergency/security information from a microphone or headset connected to the PA/PIDS console located in the TSCC. The PA system shall provide uniformly distributed audio throughout public areas of the Stations and shall be synchronized with the LRV announcements, see Part 4 Article 3 – Revenue Vehicles for details.

(d) PIDS – Each OLRT Station shall be equipped with PIDS signs to provide up-to-date, specific, location-based, visual operational and Safety-related messages for patron awareness. The PIDS shall be individually addressable and shall be accessed from the PA/PIDS console located in the TSCC. Under normal operating conditions, information presented on the PIDS shall include, but not be limited to: date, time, arrival time and destination of next Train, Safety messages, Train delays, holiday schedules, and other ad-hoc messaging. In an Emergency condition, the PIDS shall display both pre-programmed emergency announcements and simultaneous visual display of the PA system emergency announcements.

(e) CCTV System – The CCTV system shall serve both operational and security needs of the OLRT system. The CCTV system shall allow operations, security, and emergency personnel the ability to monitor elements of the system remotely from the TSCC. Operational views of the Platforms shall also be made accessible to LRV Drivers through a data connection over the Train to wayside wireless network to allow the operator the ability to safely operate and monitor the Vehicle doors. Vehicle side mounted cameras shall only be permissible when used solely for the purpose of secondary or supplementary video images to those images generated from the Platform camera views. Security related views, outside of the MSF, shall only be accessible by authorized

personnel within the TSCC. Project Co shall undertake a risk and safety assessment of the OLRT system and shall install CCTV's and / or any other security devices as an outcome of the assessment.

(i) CCTV Cameras shall meet the following requirements:

A. Provide CCTV in keeping with CPTED principles, including but not limited to CCTV coverage of entrances to washrooms, bicycles parking areas, platforms, train doors, corridors, and stairways;

B. CCTV cameras shall cover every door of the Train servicing the Station;

C. CCTV cameras shall cover all DWA. PTZ cameras shall not be used for the DWA; and

D. CCTV cameras shall monitor all Tunnel access and egress points.

(ii) The CCTV system shall be proactive in determining intrusion into the Alignment and private areas through the use of sensors and/or video analytics. The CCTV system shall be interfaced to the emergency intercoms and access control readers so that any events are automatically recorded at higher frame rates and resolution.

(iii) Where any justification is found in the safety and risk assessment, CCTV images shall be transmitted from the station area to the vehicle. Recorded video shall be downloaded from the on-board vehicle CCTV system at the MSF for long term storage of the video.

(iv) The CCTV system shall have video storage servers to store video for 31 days with sufficient resolution and frame rates required for evidence in a court of Law. Long term storage servers and system management servers shall be installed in the Data Room at. Backup system servers shall be installed in a Data Center and utilize the existing data connection between the Data Center and.

(f) IAC – This system shall control access and provide for detection of intrusion into non-public or otherwise restricted areas in Stations and along the OLRT Alignment. Project Co shall work closely with the City to ensure future compatibility with the City IAC system. Intrusion sensors shall sound an audible alarm locally and trigger an automatic alarm notification to the workstation GUI in TSCC for unauthorized entry or tampering to IAC Equipment.

(g) Access Cards – Access cards will provided as follows:

(i) Access cards shall be provided by Project Co to approved staff for entry into the MSF, CIHs, TPSS, and vent plants. This system shall be compatible with the existing IAC system.

(ii) Access cards shall be provided to Project Co staff for entry into private station areas and the TSCC.

(h) Telephone and Intercom System – The telephone and Intercom system shall provide emergency and non-emergency voice grade communications. All telephones shall use VoIP and route through the existing PBX. The emergency intercom systems (e phones and elevator help) shall provide a direct connection to the TSCC. Staff telephones shall be deployed in specific locations in the Stations and the TSCC to support OLRT operations. Emergency intercoms and staff telephones shall be VoIP and shall be routed through the City's existing PBX. Maintenance telephones shall be deployed in the MSF, TPSSs, CIHs, and vent plants and shall route through Project Co's own PBX installed in the MSF.

(i) SCADA – The SCADA system shall provide supervisory control of the OLRT and support systems. The SCADA system(s) provided shall be of the same manufacturer. The systems servers shall be located at the MSF and shall manage all system controls and indications for the OLRT. The SCADA system shall provide a GUI for operations in the TSCC, BCC, and YCC with the ability to filter out unnecessary indications and alarms according to user preference. There are a total of five (5) SCADA system functions required including:

(i) Traction Power – The Traction Power TPSS SCADA shall be an on-line, real-time, interactive system operated by TSCC personnel at the maintenance console to monitor and control power distribution and Equipment;

(ii) Train Control – The Train Control system shall have a separate Train Control SCADA monitoring system operating over the CBTC wireless network. Refer to Part 4 Article 5 – Train Control for details;

(iii) Building Management System – The BMS system shall monitor Station mechanical and electrical Equipment. Refer to Part 5 Article 4 – Mechanical Design Criteria for details;

(iv) Building Automation System – The BAS system shall monitor and control Tunnel ventilation systems and FLS systems. This system shall be compatible with the existing City systems and be interlocked with the fire management panel. Refer to Part 5 Article 5 – Electrical Design Criteria for details; and

(v) MSF BMS – The MSF BMS shall monitor and control MSF mechanical and electrical Equipment, pumps, levels, Shop TPSS, and maintenance equipment. This shall be a Project Co controlled system that is a separate system from the City BMS system and shall report to the YCC. See Part 6 Article 7 – Communications and PA System for details.

(j) Radio Communications – The OLRT shall utilize radio channels made available by the City of Ottawa Public Safety Service Radio System. The current Ottawa PSR is a trunked system with fourteen (14) voice and one (1) control channel in the UHF band (800 MHz). This system is presently used by the City of Ottawa Police Services, OC Transpo operations, Ottawa Fire Services, and the Ottawa Paramedic Service and will be upgraded as a separate contract by 2015. Project Co shall work in partnership with the

City and the Radio System Supplier to determine costs, maintenance and licensing fees for radio equipment necessary to meet the OLRT Project requirements. A radio dispatching workstation currently exists in the TSCC and will be upgraded as part of a separate contract with OC Transpo. Project Co shall install a dispatch workstation for installation in the YCC and BCC at the MSF or alternative position. Project Co shall be responsible for the procurement of the Radio Systems and shall work in partnership with the City and the Radio System Supplier to determine the radio requirements, mechanical and electrical interfaces, installation requirements, component type, quantity, costs, maintenance, testing arrangements and licencing fees for Radio equipment necessary to meet the OLRT Project requirements.

(i) Project Co shall allow the Radio System Supplier site access to manage the supply, installation and testing of the radio system within the OLRT alignment, and shall enter into a formal agreement to facilitate such access.

(k) Train-to-Wayside Wireless System – There are two separate wireless data systems required for supporting the transfer of data between the Trains and the Wayside.

(i) Project Co shall provide a wireless data system for the support of the OLRT CBTC system. This system shall have a separate fibre optic network that provides connectivity to APs along the Alignment. This system is only for CBTC, no other data systems shall be permitted on this network. See Part 4 Article 5 – Train Control for further description of this system.

(ii) Wireless APs shall be provided at each Station and within the MSF. These APs shall support the transfer of Revenue Vehicle diagnostics and, where justified by the safety and risk analyses, the transfer of live video between the Revenue Vehicles and the data servers located within the nearest communications room. Where also justified by the safety and risk analyses, the system shall also support the delivery of live video from the platform area to the vehicle.

6.3 Performance Requirements

(a) TSCC

(i) The TSCC shall contain three (3) new PC-based consoles/workstations whose functions will vary based upon the responsibility and access rights of the person who is logged on at that workstation at any given time. These consoles/workstations shall be provided for the LRT superintendent/supervisor, the LRT dispatcher, and maintenance console. Each console shall be capable of supporting any function within the OLRT systems. The system shall allow dispatchers to swap display views between the workstation GUIs and Overview displays.

(ii) A GUI on the console workstations shall provide a view of the LRT System in its entirety along with additional graphic details available by section or discipline within the transit line.

(iii) A graphical overview of the OLRT System as well as CCTV camera views to assist in operations monitoring of the Platform density, shall be provided on new video wall displays. The display shall exhibit the same level of detail as available on the dispatcher and supervisor/superintendent consoles and shall be easily visible throughout the operating theatre.

(iv) The TSCC shall provide a comfortable and ergonomic environment for operations and maintenance personnel. The consoles provided shall match the style and color and conform to the existing consoles to appear as one integrated control room.

(b) CTS

(i) The CTS shall include fibre optic and copper cable plant, network transmission Equipment, NMS, and other Equipment necessary for a complete communications network. Project Co shall provide a minimum of 50% spare fibre and network capacity for future expansion of the CTS.

(ii) The CTS shall be a high bandwidth and fault tolerant system. The CTS system shall be of a compatible design with that of the existing City system and shall have no single point of failure. Project Co shall be responsible for maintaining the existing OC Transpo optical fibre feeds to the BRT stations at all times and shall refer to the Utility article for the scope of the duct allocations. The CTS WAN shall be configured in a path-diverse topography in order to minimize disruption to the network in the event of a failure. WAN network Equipment shall support fast (sub-50 milliseconds) automatic network convergence (self-healing) in the event of a network link failure.

(iii) CTS Equipment shall include redundant power supplies. In the event of a power outage, CTS Equipment shall remain operational for a minimum of 24 hours through the use of uninterruptible power supplies, generators, and/or other backup power Equipment.

(iv) The NMS shall automatically discover network devices and network connections. In the event of a network failure, the NMS shall perform root cause analysis to pin-point location of failure. The NMS shall provide graphical reports and support export of reports.

(v) The CTS system shall be designed such that these component failures are minimized by redundancy. The availability of the system (i.e. availability of all system hardware, cabling) shall be greater than 99.9%, defined by more than 50% of circuits to any operational CTS.

(c) PA System

(i) Announcements shall be addressed to single and multiple zones within individual and/or groups of Stations. Separate zones with separate amplifying channels and

speaker systems shall be accessible individually or in combination. Stations shall have up to five (5) zones covering each Platform, mezzanine, and ancillary area.

(ii) PA system shall maintain a uniformly distributed sound level at least 10 dB above ambient Station operating noise level measured at 1.5 m above floor for indoor Stations. Outdoor Stations shall be not less than 60 dB plus or minus 30 degrees off axis, 1 meter above the floor, at Vehicle ambient noise level.

(iii) Automatic gain adjustment of the PA system shall be provided based upon ambient noise levels captured by ambient noise sensors. The system shall adjust volume and clarity in proportion to the increase in noise level from a preset quiet level.

(iv) The PA system shall be capable of playing pre-recorded messages in both English and French. All pre-programmed messages shall be provided in both languages.

(v) The PA system shall be designed such that these component failures are minimized by redundancy. The availability of the system (i.e. availability of all system hardware, cabling) shall be greater than 99.9%.

(vi) The PA system shall be fully supervised with failure annunciation at the TSCC of all major system components such as preamplifiers, power amplifiers, supervision detectors, and power supplies.

(vii) The PA announcements from TSCC shall be delivered to the station PA controllers over the CTS using TCP/IP protocol.

(viii) In the event of a power outage, PA Equipment shall remain operational for a minimum of 4 hours through the use of uninterruptible power supplies, generators, and/or other backup power Equipment.

(ix) The PA system shall be designed to accept several competing inputs with successful transmission designated according to assigned priorities. Project Co shall coordinate with OC Transpo to determine priority levels. The system shall be prioritized for TSCC communications consoles, station microphone, fire alarm panel, and pre-recorded announcement devices.

(x) The PA system shall work in conjunction with the PIDS system to provide synchronous broadcasting of audio and visual pre-recorded announcements and to provide near-synchronous transmission of live announcements.

(xi) The PA system shall be coordinated with in-Vehicle public address systems to prevent audible delays between the two systems while a Vehicle is at the Station.

(xii) The PA system announcements shall be recorded on the existing City voice recorder at.

(xiii) The local station PA systems shall accept an additional mixed input from a secondary audio channel. This secondary system shall be muted or attenuated on arrival and departure of the trains or when safety critical public announcements are made.

(d) PIDS

(i) Project Co shall design and furnish a PA/PIDS Customer Service Consoles which includes a desktop microphone, headset microphone, line audio speaker/monitor, and a PC workstation.

(ii) The Contractor shall design and furnish a GUI to serve as the means for operating the PA/PIDS System and for using the Administrative applications. No part of the PA system software shall be a command line based system.

(iii) This GUI shall have all the user selectable features and functionality of the existing PA System GUI, and shall include a provided geographical map of the entire rail system.

(iv) The PIDS shall provide a centralized message generator (that includes message creation, storage, and selection) and dispatch functions at the PA/PIDS workstation in the TSCC to address individual zones, Stations, groups of Stations, or System-wide announcements. Stations shall have zones covering each Platform, mezzanine, and ancillary area that roughly correspond with the PA system zones.

(v) At a minimum, the PIDS units shall be provided on the mezzanines of underground Stations and Platforms of all Stations as follows:

A. At mezzanine level of underground Stations, PIDS displays shall be provided near the fare collection areas. The PIDS display screen shall be in plain view of the patrons purchasing fare cards, patrons approaching the fare card machines, and for the patrons approaching the rail System's paid area; and

B. On each Platform, PIDS displays shall be provided such that at least one display is visible and legible from any location along the Platform edge. Separate displays shall be provided for each Platform edge on center Platforms. Displays shall be placed to maximize visibility throughout the Platform area.

(vi) PIDS shall have the capability of displaying messages in both English and French. All pre-programmed messages shall be provided in both languages.

(vii) The PIDS shall be designed to accept several competing inputs with successful transmission Designated according to assigned priorities. Project Co shall coordinate with OC Transpo to determine priority levels. The system shall be

prioritized for TSCC communications consoles, fire alarm panels, and pre-recorded announcement devices.

(viii) The PIDS shall work in conjunction with the PA system to provide synchronous broadcasting of audio and visual pre-recorded announcements and to enable near-synchronous transmission of live announcements. The PIDS head end may be a shared software platform as part of the PA system.

(ix) The PIDS shall be fully supervised with failure annunciation at the TSCC of all major system components such as PIDS displays, Station controllers, and power supplies.

(x) All PIDS announcements shall be recorded in database on the PIDS system servers.

(xi) All PIDS shall display station time, which will be synchronised with the central time server over the CTS.

(xii) In the event of a power outage, PIDS Equipment shall remain operational for a minimum of 4 hours through the use of uninterruptible power supplies, generators, and/or other backup power Equipment.

A. PIDS signs shall have a visual 'out of service' message when the sign is not operational.

(xiii) All PIDS signs shall be environmentally housed to prevent damage from moisture, dust, and vandalism. Outdoor signs shall be equipped to ensure readability in direct sunlight as well as protection from ultraviolet, rain, and atmospheric damage.

(e) CCTV

(i) Project Co shall provide a CCTV system based on Good Industry Practices, for example as described in the most recent edition APTA Standards Development Program Recommended Practice CCTV (APTA IT-CCTV-RP-001-11)

(ii) The CCTV system shall comply with Canada's Freedom of Information and Protection of Privacy Act.

(iii) The system shall include both fixed and PTZ cameras. Cameras shall be rated for the environment installed, including day/night capabilities, heater/blower, appropriate housing, etc.

(iv) Camera locations shall be strategically selected to ensure the views are clear, unobstructed, and not impaired by structures, signage, foliage, intense lights, or any other obstacles. Camera views of the fare collection area shall be arranged to provide images of the customer's frontal interface with the equipment.

(v) The CCTV system shall interface to the emergency telephone systems. Upon activation of passenger emergency telephones or elevator help telephones, the CCTV system at the TSCC shall automatically display the CCTV camera with the best view of the telephone area and, if necessary, automatically pan the nearest PTZ camera to monitor the area of the telephone.

(vi) The CCTV system shall interface to the IAC system. The CCTV system shall be capable of automatically displaying the best view of an access control device, either via fixed camera or PTZ preset, upon activation of an IAC system alarm or use, whether authorized or unauthorized. The City shall be capable of including or excluding automatic display of video coverage of any device, type of device, specific event, or general event type as needed.

(vii) The system shall automatically archive all alarm events automatically detected (e.g. IAC alarms, emergency telephone system activations, CCTV analytic alarms) to the TSCC head-end storage system.

(viii) The system shall have the capability to manually archive video at the TSCC for later review and retrieval. Recordings shall be digitally watermarked to prevent tampering. Access to recordings shall be restricted to Transit Law personnel only.

(ix) The system shall capture, record, store, download, view (playback), and allow monitoring of all CCTV cameras. The system shall be capable of providing simultaneous viewing, recording, and playback.

(x) The resolution and clarity of captured images shall be maintained under a range of lighting conditions from darkness through bright sunlight while ensuring optimal picture quality.

(xi) The system shall provide spare storage capacity to protect for the addition of up to 40% video inputs for future expansion.

(xii) The system shall allow an administrator to dynamically specify resolution and frame rate variation at a particular camera location for monitoring that location while not affecting the recording parameters.

(xiii) Cameras shall have de-icing and lens clearance protection. All cameras shall have a unique identity and provide a means of detecting image loss.

(xiv) The system shall store all recorded images in an accepted industry standard format.

(xv) In the event of a power outage, CCTV Equipment shall remain operational for a minimum of 4 hours through the use of uninterruptible power supplies, generators, batteries, and/or other backup power Equipment.

(f) Intrusion Access Control System (IAC)

(i) Access authorization shall be verified based on data submitted from any credential and retained in the system controller database, granting access by releasing electronic door locks once all correspondence is deemed accurate.

(ii) All access decisions/credential transactions shall be processed locally at the card reader interface board as it receives data from the system controller, minimizing network traffic while also providing real-time access determinations.

(iii) All cardholders shall have access based on facility, card reader, time, and day. The system shall allow the administrator to define access levels and apply them to any or all cardholders. Access authorization shall be denied by credential holder, time of day, group of staff, shift, and any additional characteristics that are identified by the system controller database.

(iv) The system shall provide controlled access and detect intrusion of the following:

A. Public to non-public doorways;

B. TPSS;

C. CIH;

D. Communication rooms;

E. Elevator machine rooms;

F. Escalator machine rooms;

G. Electrical equipment rooms

H. Vent Plants.

(v) The system shall also detect intrusion at Tunnel entrance/exit portals and Tunnel Station portals for any large object (i.e. human, large animal) intruding into the vicinity of the Tunnel portals. Intrusion detections shall provide an alarm at both the TSCC and the Driver panel of the approaching LRVs.

(vi) Provisions shall be made for remote signalling of the door opening to an IAC Panel.

(vii) The system shall provide a means to bypass zones for facilities/locations where certain alarm zones are not 24 hour zones and be capable of being armed and disarmed from the TSCC.

(viii) The system shall incorporate an interface to the fire alarm panel to allow override of door locks in an emergency situation.

(ix) The IAC system shall be interfaced with the CCTV system to allow the display of video of the nearest CCTV camera upon activation of an IAC alarm or use of an access control device at the TSCC.

(x) Safety and security warnings and signage shall be provided.

(xi) In the event of a power outage, IAC Equipment shall remain operational for a minimum of 4 hours through the use of uninterruptible power supplies, generators, batteries, and/or other backup power Equipment.

(g) Telephone and Intercom System

(i) The Telephone and Intercom system shall provide emergency and non-emergency voice-grade communications for the OLRT Project. The system shall include the following subsystems:

A. E phone emergency telephones;

B. Elevator help telephones;

C. Staff telephones; and

D. Maintenance telephones.

(ii) Emergency telephones shall be well marked. Emergency telephones shall be of similar construction to existing phones and shall be installed every 30m along the platform and in the DWA.

(iii) E phone emergency telephones and elevator help telephones shall interface with the CCTV system to automatically provide video of the area at the TSCC receiving a call from these phones. A minimum of two cameras shall view the areas so that cameras cannot be purposely panned away from possible incidents.

(h) SCADA System

(i) The SCADA head-end equipment consists of master terminal equipment, including servers and workstation GUIs, to control, monitor, gather data and communicate with OLRT field equipment. The SCADA system shall be a continuous, dynamic scanning type for gathering information and status indication of all points. Each point will be sequentially scanned point by point under normal conditions and the status of all points shall be continuously transmitted to the SCADA head-end.

(ii) The SCADA head-end ascribed functions shall be accomplished via the Remote Terminal Units (RTUs).

(iii) The SCADA system shall facilitate the transmission of indications and alarms from the RTUs to the TSCC and the transmission of controls from the TSCC to the RTUs via the CTS.

(iv) Signals transmitted from the RTUs to the processors at the TSCC shall be processed to provide monitoring information to all required subsystems, generate commands to be transmitted back to the RTUs, provide information for displays and alarm processing at the control consoles, and store information and historical data for future processing.

(v) For each remote location, the SCADA system shall display the following items on the SCADA monitoring workstations in the TSCC:

A. Current system and subsystem status;

B. Control panel status;

C. Remote control RTU functions;

D. Alarm handling and fault resets; and

E. Historical event logging.

(vi) RTUs shall operate in a full-duplex mode in which each continuously scans and reports the status of indicators and commands.

(vii) Each RTU shall be designed to interface to the CTS. The RTU shall have electrical isolation between the system inputs/outputs and the CTS units.

(viii) Redundant server processors shall be provided and configured in a primary/backup mode to support automatic failover to the backup processor upon failure of the primary processor.

(ix) Each remote, monitored location shall provide a local HMI for local alarm annunciation and system control.

(x) Emergency conditions shall immediately be displayed within 3 seconds on the workstation GUI operating displays to permit the monitoring of device actions by the TSCC .

(xi) SCADA servers and related processing Equipment shall be located at the main communications room in the MSF and connected to a redundant or dual LAN.

(xii) High availability application servers shall perform real-time data acquisition and processing, generation of supervisor control commands, database queries, overview display, alarm management, executing of diagnostic, administrative and maintenance programs. The computer system shall produce, at a minimum, alarm and related logs, summaries, and other user defined reports.

(xiii) Schematic, one-line, pictorial, and alphanumeric displays of the SCADA system shall have the capability to be generated, altered, or deleted online by a GUI.

(xiv) As a part of initial system sizing, the SCADA system shall be provided with the processing capability and memory required for the OLRT Project. The SCADA system shall be designed for ease of expansion and alteration in an economical and efficient manner to protect for future OLRT expansion.

(i) Radio Communications Systems

(i) The train voice radio system, provided by others, shall cover the entire length of OLRT within the right-of-way, both above and underground Stations, yard, and MSF. Project Co shall work with the Radio System Supplier to determine quantities of radio equipment required to efficiently operate and maintain the LRT System.

(ii) Project Co will be part of a larger user group for the City of Ottawa Corporate Radio System and are identified as follows:

A. For the OLRT normal day-to-day operations:

i. LRV

ii. TSCC staff

iii. Project Co staff

iv. Transit Law

v. OC Transpo bus operation staff

(iii) The train voice radio system shall support fixed, mobile, and portable radio units. Project Co shall establish a separate contract for the provision of radios and maintenance with the Radio Supplier who will provide Project Co with the necessary radios for OLRT operations and the associated installation and testing. Project Co shall provide specifications of performance and quantities of equipment required to efficiently operate and maintain the LRT System.

(iv) The radio supplier shall implement a diagnostic and monitoring system for monitoring the active components used in the radio system. Any failures shall be immediately reported to Project Co and appropriate maintenance carried out by the radio installer. Project Co shall provide operational procedures in the event of loss of radio communication.

(v) Should Project Co require the use of the existing City of Ottawa Corporate Radio System during the OLRT construction period, Project Co shall negotiate terms and conditions with the City and radio supplier. In the event that the radio

specification and performance is insufficient for Project Co's requirements, Project Co shall make alternative provisions.

(j) Train-to-Wayside Wireless System

(i) Project Co shall provide a Train-to-Wayside wireless system that shall provide all LRVs with a high speed data connection at each Station and at the MSF for the data transfer of Train diagnostics, passenger count provision and CCTV video from the VCU.

(ii) The Train-to-Wayside wireless system shall be an extension of the CTS. A LAN connection shall be provided between the wireless APs and the nearest communications room in order to connect to the CTS WAN.

(iii) The system shall provide the latest wireless technology standards with backwards compatibility of established standards as needed.

(k) Systems Infrastructure Interface

(i) Each communications system element has a requirement for both power supply and data transmission.

(ii) Project Co shall supply and connect the power systems necessary for each communications device to operate properly to each device location.

(iii) Project Co shall supply and connect the data transmission systems necessary for each communications device to operate properly to each device location.

(iv) Project Co shall provide the power provisions and data provisions necessary for each fare collection device to operate properly to all communication rooms.

ARTICLE 7 FARE COLLECTION

7.1 General Requirements

(a) Power source provisions shall be provided within the communications room electrical service for all fare collection equipment needs.

(b) Data communication channels shall be provided within the communications room via the CTS so that fare vending Equipment may communicate with fare collection head end Equipment and accounting personnel located within the TSCC.

(c) All fare collection Equipment (Ticket Vending Machines, validators and servers) to be provided by others.

(d) Refer to Part 5 Article 5 – Electrical Design Criteria for Project Co responsibilities related to conduit for fare collection Equipment.

7.2 Equipment Description and Features

(a) Ticket Vending Machine

(i) Power, data requirements and Equipment size

A. Power for the TVM shall be provided by a single circuit breaker protected line delivered by underground conduit to the base of each TVM.

B. Data lines shall be provided to the base of the TVM from underground conduit using CAT 6 cable.

(b) Validators

(i) Power, data requirements and Equipment size

A. Power for the validator shall be provided by a single circuit breaker protected line delivered by underground conduit to the base of the validator.

B. Data lines shall be provided to the base or mounting devise of the validator from underground conduit using CAT 6 cable.

ARTICLE 8 OVERHEAD CATENARY SYSTEM

8.1 General Requirements

(a) This section provides the criteria for the OCS, including technical, operational, maintenance, local climatic and economic considerations.

(b) The OCS consists of the catenary system and their physical supporting structures. The OCS distributes DC power from substation to the LRVs operating on the mainline Tracks, yards and within the MSF through the pantograph interface.

(c) On mainline, the catenary shall be designed to include a wire tensioning system to maintain constant tension throughout its tension length. Where a simple catenary system is implemented, the wire tensioning system shall consist of balance weight assemblies with pulleys mounted out of running, one span away from the overlap transition span and supported with standard anchorage assemblies. The balance weight operating range shall accommodate the designed tension length.

(d) Project Co shall blend the appearance and style of the overhead catenary system into the adjacent communities and at visually sensitive areas including, but not limited to the following elements:

(i) Pole size, shape and color;

(ii) Location of the pole; and

(iii) Special attention shall be paid to the design of the catenary system and supporting system in visually sensitive areas of the alignment corridor as follows:

A. Within all Station Platform areas extending 15m to either side of Platform end;

B. From the West Portal to west of Bayview Station where the Tracks enter the existing BRT trench;

C. From the East Portal to Tremblay Road east of the VIA "D" loop road;

i. Excluding where the elements of the catenary system are located within the existing BRT trench in the vicinity of Lees Station.

D. In visually sensitive areas of the alignment corridor, closed or tapered sections shall be used.

(e) Design shall include components that:

(i) Are standard and off-the-shelf, available from multiple suppliers;

(ii) Have a proven maintenance performance; and

(iii) Maintain functionality even during extreme weather conditions and temperature changes as defined in the Output Specifications.

(f) In addition, the Design shall take into consideration existing overhead obstructions such as Bridges, overpasses, buildings and aerial Utilities that may impact the final layout.

8.2 Operational Requirements

(a) The OCS shall be comprised of the following major items:

(i)	Catenary Wires	Messenger and Contact/Trolley;
(ii)	Feeder Cables	Feeders from Substation to Catenary;
(iii)	Supports	Cantilever or Cross-Span;
(iv)	In-Span Materials	Hangers, Jumpers, Splices, etc.;
(v)	Midpoint Anchors	Tie Wire and Downguy Assemblies;
(vi)	Poles	Poles both Center and Wayside;
(vii)	Foundations	Drilled Shaft and Ground Connections;
(viii)	Lightning Arresters	Surge Protection;
(ix)	Structure Guying	Termination, Anchors;
(x)	Tensioning Systems	Balance Weight Assembly with Weights and Pulley Systems;
(xi)	Insulated Overlaps	Sectionalization;
(xii)	Section Insulators	Isolation; and
(xiii)	Disconnect Switches	Isolation.

(b) OCS Configuration and Tension Systems

(i) The OCS system shall be designed to meet:

A. Line speed;

B. Clearance;

C. Mandatory national standards;

D. Climatic and environmental constraints;

E. Vehicle power consumption and amipacity determined by the operational performance requirements; and

F. Traction Power load flow simulation.

(ii) Where there is a requirement for the transition between the two types of catenary, it shall be accomplished by a full catenary parallel wire overlap. The fixed termination overlap catenary shall be supported by an intermediate cantilever structure on the catenary at midspan.

8.3 Design Parameters

(a) The design parameters are outlined in Table 4-8.1.

Table 4-8.1

Ambient Temperature Range	In accordance with environmental conditions referenced in Section 15-2, Part 1 and Part 4
Auto Tension Temperature Range	In accordance with environmental conditions referenced in Section 15-2, Part 1 and Part 4
Heavy Ice Loading	In accordance with environmental conditions referenced in Section 15-2, Part 1 and Part 4
Maximum Design Train Speed	100km/hr, mainline 30km/hr, yard lead Tracks 15km/hr, MSF
Elevation Above Sea Level	60m

8.4 Electrical Clearances

(a) Clearances shall be maintained between live conductors, including pantographs and any grounded structures, in accordance with Table 4-8.2.

Table 4-8.2

Clearances	Static	Passing
Normal Minimum	155mm	130mm
Absolute Minimum	130mm	80mm

Where:

(i) Static clearance is the clearance between the catenary system and any grounded structure when not subject to pantograph pressure.

(ii) Passing clearance is the clearance between the catenary system or pantograph and an overhead structure under actual operating conditions during the time it takes the Train to pass.

(b) Mechanical clearance from the pantograph to any fixed item, excluding the steady arm or registration arm of a cantilever, shall not be less than 130mm. Pantograph clearance to steady arm shall not be less than 38mm.

(c) For Vehicle related clearance, full allowances shall be included for dynamic displacement of the Vehicle under operating conditions, including tolerances for installation and maintenance of the Track.

8.5 Height, Depth and Gradient Requirements

(a) The nominal contact wire height above top of the rail at Track centerline shall be in accordance with the requirements outlined in CAN/CSA C22.3 No. 1 & No. 8 as detailed in Table 4-8.3.

Table 4-8.3

Route Description	Track Type	Type of OCS	Contact Wire Height (mm)
Tunnel	Direct Fixation	Fixed Simple Catenary	4200 minimum
Open Route Alignments	Ballast	Auto –Tension Simple Catenary	5500 normal 4880 exclusive way
Yard Tracks	Ballast	Fixed Trolley Fixed Simple Catenary	6500 maximum 5700 minimum
Road Crossing	Embedded	Auto-Tension Simple Catenary	5700 minimum
Overhead Bridges	Ballast	Auto-Tension Simple Catenary	4800 desirable 4280 absolute minimum

(i) The contact wire height at supports shall take into consideration the effect of wire sag, due either to temperature rise or to ice loading, and installation tolerance, including Track Construction and maintenance tolerances.

(b) The system depth is defined as the height or distance between the messenger and trolley wires at the point of support. The nominal system depth is outlined in Table 4-8.4.

Table 4-8.4

Locations	System Depth, Nominal

Open Route Alignments	1220mm
Tunnel or Underneath Overhead Bridges	152mm
Yard Loop Tracks	1220mm

(i) These heights may vary at specific locations for the profile through Tunnel structures or under overhead structures.

(c) The contact wire gradient is defined as the rate of change in elevation of the contact wire with respect to TOR. Where possible, the contact wire grade shall match the grade of the Track for a contact wire gradient of zero.

(i) Table 4-8.5 presents the maximum gradient as per CAN/CSA C22.3 No. 8-M91:

Table 4-8.5

Train Speed	Maximum Contact Wire Gradient
Yard (15 km/hr) Yard (30 km/hr)	2.3% (1:43), Storage and Maintenance Tracks 2.0% (1:50), Yard Lead and Loop Tracks
50 km/hr	1.3% (1:77)
75 km/hr	0.8% (1:125)
100 km/hr	0.6% (1:167)

(ii) Except for MSF conditions, the change of grade from one span to the next shall not exceed one half the values shown above.

8.6 Horizontal and Vertical Clearances

(a) Side clearance shall be measured from the centerline of tangent Track. Minimum side clearances shall be as outlined in Table 4-8.6.

Table 4-8.6

Location	Horizontal Clearances
Tangent Track	1890mm to face of pole
Outside of Curved Track	Increase 12.5mm per degree of curve to the clearance for tangent Track
Inside of Curved Track	Increase 12.5mm per degree of curve and 2 times the actual super-elevation to the clearance for tangent Track

(b) The minimum vertical clearance above top of the rail at Track centerline is governed by the overhead catenary clearance requirements as outlined in Table 4-8.7.

Table 4-8.7

Route Description	Type of OCS	Minimum Vertical Clearance
Tunnel	Fixed Simple Catenary	4700mm
Overhead Bridges	Auto-Tension Simple Catenary	4800mm (note i) 4500mm (note ii)
Station Areas	Surface Alignment Underground	5500mm 4800mm

Notes:

(i) This represents the minimum for Construction of any new overhead Bridges.

(ii) This represents the acceptable minimum for existing structures, provided that the Track is tangent and a direct fixation type and the catenary can be suspended between poles spacing 18 meters maximum or supported from the existing overhead Bridges and structures.

8.7 Loading and Overload Factors

(a) Loadings and overload factors shall be based on the most current NESC requirements.

8.8 Strength Requirements

(a) The OCS shall be designed in accordance with the strength requirements specified in NESC Section 26.

8.9 OCS Wire Tensions and Tension Lengths

(a) The following shall be the base wire tensions for the stated tensioned system with a base temperature of eight (8) degrees Celsius:

(i)	Surface Alignment (Auto-Tension):	Messenger	2700 kg
		Trolley	1350 kg
(ii)	Tunnel and MSF Lead (Fixed Termination):	Messenger	2200 kg
		Trolley	1100 kg
(iii)	MSF Tracks (Fixed Termination):	Trolley	1100 kg

8.10 Sectionalizing Requirements

(a) The overhead catenary system shall be electrically sectionalized by means of insulated overlaps near each substation. The OCS Design shall adopt a combination of both insulated wire overlaps and section insulators (sleds). The OCS shall require sectionalization at crossovers, the MSF, and other special Trackwork. Section insulators

shall be used at crossovers, pocket Tracks, turnout, and siding locations. Overlaps shall not be placed on sharp curves.

(b) Additional sectioning may be required at specific sensitive areas of the Alignment where EMI considerations are required to be mitigated.

(c) Sectionalizing at Interlocking

(i) The sectioning of the standard two Track crossover arrangement, facing or trailing, shall be the standard arrangement of three (3) switched mainline insulated overlaps, and two (2) section insulators in the crossover wires. Diamond crossovers shall have insulated, and switched overlaps on both Tracks and on both ends of the interlocking and section insulators in the crossovers. The positioning shall be capable of allowing a single Train (5 cars) to pass the Track switch and signal.

(d) Sectionalizing in the MSF

(i) The Tracks in the MSF area shall be divided into working groups of four (4) Tracks or less. Exceptions may be granted for more Tracks of shorter lengths. Each group shall have a manually operated switch and section insulators to accomplish the section isolation. The catenary for the entrance to and exit from the MSF shall not be fed from the same DC breaker.

(e) Sectioning at the Maintenance and Storage Buildings

(i) Each Track inside the MSF buildings including the paint shop shall have the capability of individual sectionalization. A door mechanism shall be installed with insulation, which allows continuous pantograph passage when the door is in the "open" position. A switch shall be installed for de-energizing the trolley wire. Insulated joints shall be installed at the apron of all MSF Tracks.

(ii) Isolation Requirements

A. The OCS shall be designed with manual disconnects for isolating sections of wire at interlockings, at the MSF for isolating the MSF from the mainline, throughout the MSF for isolating sections of Track, and in the shop for isolating each section of wire.

8.11 System Safety and System Assurance Requirements

(a) As a minimum, the following items shall be provided by Project Co in the Design, specification, Construction, and functionality of the overhead catenary system:

(i) Double insulation from any type of grounded pole, structure, building, etc. shall be provided to eliminate the possibility of bridging or spanning from neutral or grounded parts to live wires.

(ii) Warning signs shall be attached to OCS or the supporting structures to warn personnel of the proximity of high voltage wires. Signs shall be attached to the OCS to denote the end of the electrified wires over the Tracks. The signs comprise of "High Voltage", "Danger", "Danger Live Wire" and "Electric Train Stop" in red and black with white background.

8.12 Pole Deflection

(a) Pole deflection plus foundation rotation during Train operation shall not exceed 50 mm at contact wire height. Pole deflection at the top of the pole under OESC heavy loading condition shall not exceed 3% of pole length. Overload factors shall not be applied in the calculation of pole deflection.

8.13 Pole Grounding and Bonding

(a) Each pole or structure shall be grounded by a 4/0 AWG copper stranded wire by exothermic weld connections to two reinforcing bars in the foundation and to a ground rod adjacent to the foundation if necessary. All OCS support structures shall be grounded to a total ground resistance not exceeding 25 ohms.

(b) Touch potential overvoltage at each pole or structure shall be limited to 50 V under normal operation and 70 V under outage conditions.

8.14 Bridge, Overhead and Roof Structure Attachments

(a) Attachment to overhead Bridges and overhead structures shall be prohibited unless other methods are not available. In instances with clearance limitations or where Bridge spans are greater than the allowable OCS span, attachments may be required. Underneath roof structures, a soft suspension assembly shall be used to minimize pantograph bounce and loss of contact between the pantograph and contact wire.

(b) Overhead Bridge and Tunnel Portal Protection

(i) At locations where the catenary passes underneath overhead structures that are equipped with sidewalks or walkways without guard and there is less than three (3) meters of clearance to the nearest wire, appropriate fencing is to be provided.

(c) Overgrade Bridges

(i) Where the catenary and Track are supported by overgrade Bridges, all metal materials attached to the Bridge shall also be attached to the electrical grounding system. Where poles are to be mounted, the pole ground shall be attached to the electrical grounding system.

8.15 Cathodic Protection

(a) Each structure shall be designed with a passive protection system. For specific requirements, refer to Part 1 Article 14 – Corrosion Control.

8.16 Construction Tolerances

(a) The following are System-wide allowable Construction tolerances:

(i)	Contact wire height:	-13 mm to +25 mm, open route 0 mm to +13 mm, Tunnel
(ii)	Messenger and contact wire stagger: (Relative to centerline of pantograph)	+/- 25 mm
(iii)	System Depth:	+/- 50 mm, open route +/- 25 mm, Tunnel

8.17 Lightning Protection

(a) A connection from the OCS to a lightning arrestor and to ground shall be provided at each feeder point, at approximately 300 meters each side of the DC feeders and at all mid-point anchor assemblies. The lightning arrestors shall have a minimum energy discharge capability of 2.6 kJ at 1000 kV.

8.18 Performance Requirements

(a) The system minimum functional life expectancy shall be 40 years.

(b) The LRVs shall be equipped with ice removal device(s) for operations during snow and ice conditions. All OCS Equipment shall undergo all complete factory and on-site inspections and testing. On-site inspection and testing include the following:

(i) Acceptance Measurements: Stagger, Trolley Wire Heights, Pole Horizontal Offset and Wire Stringing Tensions;

(ii) Visual Inspection;

(iii) Clearance Envelope Tests: Pantograph Clearance Envelope and Vehicle Clearance Envelope; and

(iv) Electrical Tests: Megger Test, Circuit Continuity (or Loop) Test, Hi-Pot Tests and Ground Resistance Measurement at Lightning Arrestors.

ARTICLE 9 EMI / EMC

9.1 General Requirements

(a) The Equipment shall be designed to be compatible with the surrounding electromagnetic environment expected in Ottawa. The OLRT System shall be designed and constructed such that the System does not electrically or magnetically interfere with the safe and proper operation of the Vehicle or any wayside Equipment, including Equipment or systems external to the OLRT System.

(b) The whole System shall also be designed and constructed to limit electromagnetic emission levels in order to protect against adverse effects in humans from exposure to electric and magnetic fields.

(c) All wayside electronic Equipment shall meet the immunity requirements of EN 50121 -4

(d) All onboard Equipment shall meet the immunity requirements of EN 50121-3.2

(e) If Track circuits or wheel counter systems are used, they shall be selected for minimum susceptibility to the conductive and inductive emissions of AC traction LRVs.

(f) Inductive and conductive emission limits for LRVs shall be coordinated with any Track circuit and wheel counter susceptibility levels if such Equipment is used.

(g) An EMC management plan, based on EN50121-1, for the entire System shall be submitted as part of the Works Submittals according to Schedule 10 – Review Procedure.

(h) As part of the EMC management plan, Project Co shall undertake an EMC risk assessment of the Design in order to detail the potential risks for electromagnetic compatibility and determine the necessary mitigations to reduce or eliminate those risks.

9.2 Reference Documents

(a) The Design and Construction of the Works shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) EN 50121-1: Railway Applications – Electromagnetic Compatibility – Part 1: General

(ii) EN 50121-2: Railway Applications – Electromagnetic Compatibility – Part 2: Emissions Of The Whole Railway System To The Outside World

(iii) EN 50121-3-1: Railway Applications, EMC – Rolling Stock – Train and complete vehicle;

(iv) EN 50121-3-2: Railway Applications, EMC – Rolling stock – Apparatus;

(v) EN 50121-4: Railway Applications, EMC – Emission and immunity of the signalling and telecommunications apparatus and

(vi) EN 50121-5: Railway Applications, EMC – Emissions and immunity of fixed power supply installations and apparatus

(vii) IEEE C95.1-2005: IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 3 to 300 GHz

(viii) IEEE C95.6-2002: IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0 to 3 kHz

(ix) IEC 61000-2008: Electromagnetic compatibility (EMC), Testing and measurement techniques

(x) IEC 1000-5-2: EMC Cabling guidelines

(xi) EMI / RF Baseline Study and Report by ViaTech Engineering during Preliminary Engineering

9.3 Emission Limits

(a) Except as otherwise indicated, limits for emissions shall be based on those given in EN50121-2. The most restrictive limit shall apply.

(b) All Equipment used on the OLRT shall be designed to be within FCC guidelines for emitted radiation.

(c) Project Co shall determine the location and sensitivity of Equipment, located in Third Party Facilities or privately owned, in the vicinity of the OLRT Alignment that might be affected by emissions from the OLRT System. The emissions from the OLRT System shall be limited to ensure that operation of any sensitive Equipment identified shall not be interfered with by the OLRT. Where such emission limitation is not feasible Project Co shall engage with the affected third-party facilities to mutually investigate possible EMI remediation and Project Co shall supply the required mitigation.

(d) The emissions from the OLRT System shall be kept within the maximum exposure levels identified in IEEE standards C95.1 and C95.6.

9.4 Susceptibility Limits

(a) All Equipment used on the OLRT shall be designed to have immunity to the expected ambient electro-magnetic environment. The presence of any EMI shall not cause any system or subsystem, either connected or indirectly connected, to malfunction outside of the expected designed performance or enter into an operating condition that would be unsafe.

(b) Except as otherwise indicated, limits for immunity to EMI shall be based on those given in the appropriate sections of EN50121.

(c) It is the responsibility of Project Co to conduct an EMI Site Survey along the Alignment prior to the completion of the OLRT System in order to identify existing sensitive receptors and emitters and engage with them to ensure that mutual EMC concerns are appropriately addressed and mitigated.

9.5 Grandfather Rights

(a) Project Co shall use, where feasible, Equipment that can demonstrate prior EMC performance testing and in-service proven ability. Use of these components or Equipment shall be assessed on prior records; if this is demonstrable their inclusion into the Design shall be justified using an EMC risk assessment.

9.6 Sensitive Receptors and Emitters

(a) The following locations have been identified where there is a potential EMC concern. It is the responsibility of Project Co to ensure that all existing sensitive receptors and emitters are identified, and that their EMC concerns are appropriately addressed.

(i) CBC

A. The CBC – Ottawa Broadcast Centre houses both transmitters and sensitive receivers.

(ii) NRCan

A. NRCan has a Magnetic Observatory in the Ottawa area. The Magnetic Observatory houses instrumentation that is used to measure fluctuations in the ambient magnetic field. Project Co shall ensure that any distortion to the ambient magnetic field potentially caused by the OLRT System is below the level that will be detected as excessive noise at the observatory. Excessive noise is defined as a disturbance that exceeds 100 picoTeslas (0.1nT) at the NRCan observatory.

(iii) University of Ottawa

A. The OLRT passes very close to the campus of the University of Ottawa. Some buildings within the campus house research instruments that are susceptible to fluctuations in the ambient magnetic fields and to electrical interference.

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SCHEDULE 15-2
DESIGN AND CONSTRUCTION

PART 5
DESIGN AND CONSTRUCTION REQUIREMENTS – STATIONS

ARTICLE 1 INTRODUCTION

1.1 Introduction

(a) The OLRT Stations shall be efficient, universally accessible, sustainable facilities that provide Passengers with an enjoyable, comfortable and safe transit experience.

(b) Stations shall act as a catalyst for transit oriented Design and shall enhance connectivity to surrounding neighbourhoods while not precluding integration opportunities with future planned developments.

(c) Project Co shall provide LRT Stations, complete, to fully support the operational requirements of the OLRT while minimizing crowding, travel impedances and physical barriers.

(d) Stations shall be planned and designed to satisfy the requirements in Schedule 15-2, Part 1, Article 2, Operational Performance Requirements.

1.2 Overview

(a) Thirteen (13) Stations shall be constructed for the OLRT Project.

(b) Types of Stations constructed for the OLRT Project shall include the following:

(i) New Underground Stations Downtown West, Downtown East and Rideau;

(ii) At Grade Stations include all Stations constructed with the platform level at grade, above grade, within the existing BRT trench, or within an existing building as follows:

A. Terminal/Transfer Stations Tunney's Pasture, Bayview, Hurdman and Blair;

B. BRT to LRT Station conversions including Campus, Lees, St. Laurent and Cyrville; and

C. New At Grade Stations Lebreton and Train.

(c) Project Co shall Design and construct the Stations, and shall obtain necessary Permits, Licences and Approvals for the same. Station Structures and systems shall be designed and constructed to satisfy the life expectancy requirements of this Schedule 15 - Output Specifications.

(d) Emergency Planning:

(i) Project Co shall be responsible for the preparation, submission and maintenance (including revisions as necessary) of fire safety plan(s), for approval by the authority having jurisdiction, pursuant to Ontario Fire Code, Section 2.8 Emergency Planning, where applicable.

(e) Stations Design shall consider pedestrian circulation as a critical element. Station Designs shall facilitate the transfer of Passengers from one mode of transportation to another by minimizing transfer effort and providing generous capacity under normal operations and to ensure safe and speedy exiting under emergency conditions. Station capacity shall be planned and designed to serve the projected operations contained in this Article. Project Co shall provide calculations and Passenger modeling to demonstrate that generous public spaces have been achieved in Station Design and that a high level of service has been provided for Passenger circulation including calculations for entry and exit volumes. Stations Design shall consider intuitive Passenger flow, minimizing obstacles and pinch-points. Calculations and Passenger modeling shall be submitted according to Schedule 10 – Review Procedure.

(f) Stations Platforms shall be constructed to satisfy the requirements of the Operational Performance Requirements defined in Schedule 15-2 Part 1 Article 2 as follows:

(i) All At Grade Stations shall be constructed to satisfy the requirements of Operating Scenario 2 except Tunney's Pasture Station which will be designed to satisfy the greater of the requirements of Operating Scenario 1 or Operating Scenario 2.

(ii) All Underground Stations shall initially be sized accordingly to accommodate the Passenger carrying capacities of 24,000 pphpd as outlined in Schedule 15-2 Part 1 Clause 2.5 (c).

(g) Stations shall be planned, designed and constructed with provisions for installation of a fare control system including but not limited to fare control turnstile gates and fare vending equipment to be installed by the City.

(h) All Stations shall provide a roof Structure overtop the Platform. Stations are not required to be climate controlled, however provisions shall be made for radiant on-demand heating, wind screens and other Structures to provide comfort for waiting Passengers.

(i) Downtown Underground Stations shall have entrances both on public right-of-way as well as entrances integrated within Third Party Facilities at properties such as Place de Ville and the Rideau Centre.

(i) All utilities and services required for construction and operation of the Station and Station entrance within third party facilities shall be separate and independent of the building(s) services, with the exception of any code related interconnections.

(ii) Project Co shall provide the City with definition of all permanent and temporary property easement requirements necessary to construct all Underground Station entrances where integrated in to Third Party Facilities.

(j) St. Laurent Station shall be converted from a BRT Station to an LRT Station.

(k) The Platform width of the three (3) downtown Stations shall be such as to protect for future installation of Platform edge doors.

(l) Artwork shall be integrated into the Station Designs. Stations shall have adequate and easily understood signage, graphics and markings. Project Co shall work with the City to develop and implement a Wayfinding Signage program.

(m) Five (5) LRT Stations (Tunney's Pasture, Bayview, Lebreton, Hurdman and Train) are located on Federal Government lands and are considered Federally Mandated Stations and therefore are subject to FLUA, and Design approval by the NCC under Section 12 of the National Capital Act. Project Co shall be responsible for advancing the designs of Federally Mandated Stations in accordance with the following:

(i) Background

A. Coordination is needed to plan, preserve and develop an exceptional capital for the Canadians. The National Capital Act makes the National Capital Commission (NCC) responsible for coordinating and approving projects related to federally-owned lands and buildings in Canada's National Capital Region. The NCC is a Crown Corporation and therefore functions at a distance from the federal government, reporting to Parliament through the Minister of Foreign Affairs.

B. All individuals and federal organizations need NCC approval before undertaking projects on federal lands and buildings in Canada's National Capital Region.

C. The NCC's mandate to approve federal land uses, transactions and designs is set out in sections 12 and 12.1 of the National Capital Act.

(ii) City undertaking of Stations requiring NCC Design Approval

A. For complex projects with high symbolic value for the Capital such as the OLRT, the federal land use approval process can be lengthy. To mitigate risk to the project schedule and to provide certainty to Project Co, the City has developed designs for the five (5) Federally Mandated Stations and Campus Station to a conceptual level of design through the Preliminary Engineering phase of the Project.

B. The Federally Mandated Station Designs have received a limited endorsement by the NCC, which is outlined along with conditions, in a letter from the NCC to the City dated February 6, 2012.

(iii) Project Co's approach to the Federally Mandated Stations will be assessed in terms of general compliance with the Federally Mandated Station Drawings and the spirit of the NCC requirements and conditions as outlined in Appendices 1 and 2 of the February 6th NCC Limited Endorsement Letter. Specifically, compliance will be measured on the following criteria:

A. The extent to which connectivity aspects of the Federally Mandated Stations are respected recognizing that the pedestrian connectivity of the Federally Mandated Stations as reflected in the current designs are of particular importance to the NCC; and

B. The extent to which the Project Co's design drawings are consistent with the appearance, quality and overall architectural concept for the Station recognizing that these aspects of the design are of particular importance to the NCC.

(iv) The Sponsors will provide compliance feedback on specific design components of the Federally Mandated Stations as outlined in the RFP.

(v) The functional layout, Platform configuration, and interior layout of the Federally Mandated Stations may be optimized in the design, provided the designs meet all the terms of the Project Agreement.

(vi) Alternative design details that enhance constructability shall be permitted provided the submitted designs satisfy all the terms of the Project Agreement.

(vii) Project Co shall address, incorporate and, or resolve all comments and conditions contained in the NCC OLRT Negotiation Mandate document dated October 25, 2012.

(n) All Stations shall be designed and constructed to permit Emergency Vehicle access. If any new Works are required to ensure Emergency Vehicle access, then these Works shall be the responsibility of Project Co.

(i) At the following stations, Emergency vehicle access can be via the bus transfer area (Tunney's Pasture, Hurdman, Blair, St. Laurent);

(ii) At the following stations, Emergency vehicle access can be via the nearest City street (Bayview, Lebreton, Lees, Train, Cyrville);

(iii) At the following stations, Emergency vehicle access can be via the municipal road ROW adjacent to station entrances (DTW, DTE, Rideau); and

(iv) At Campus Station, Emergency vehicle access can be via the University of Ottawa plaza area on the east side of Campus Station.

(o) All Stations, facilities supporting the OLRT and where applicable, associated Bus facilities, shall be designed and constructed in accordance with Transport Canada rules and regulations.

1.3 Tunney's Pasture Station

(a) Tunney's Pasture is an existing bus transit Station along the BRT that shall be converted to serve as the west terminus of the OLRT and Operating Scenario 1. The existing bus service shall be relocated from its current lower level to a new bus loop at grade to be constructed as part of the OLRT Project.

(b) Tunney's Pasture Station is a Federally Mandated Station. Existing Bridges across the Station shall be refurbished and converted into two new entrances at the upper level, which shall be connected to the Platform level with stairs, elevators and escalators. The western entrance shall provide a direct connection to the reconfigured bus loop. This entrance shall be designed to allow for a non-fare paid connection from Scott Street to Tunney's Pasture Campus when the OLRT is extended and the Station becomes a line Station.

(c) The new Station Design shall facilitate the fast and convenient movement of Passengers between buses and the LRT.

(d) The new Station shall be located within the existing BRT utilizing elements of the existing Station. The western end of the Platform shall be located to allow for the extension of Goldenrod Driveway and provide bus circulation out of the BRT with access to the new Station and access from the new Station to Scott Street. The eastern end of the Platform shall not extend past the eastern side of Holland Ave.

(e) The Station shall be designed as to permit Passengers to transfer between the BRT and LRT without passing through fare control barriers and/ or revalidating fare payment.

1.4 Bayview Station

(a) Bayview Station is an existing Station along the BRT that provides a connection to the existing O-Train. Construction and configuration of the new Bayview Station shall be coordinated with the replacement of the West Transitway CPR Overpass O-Train Bridge. The new Station shall be directly above the relocated O-Train Platform and provide an efficient vertical connection to the OLRT. The O-Train track shall be extended north and a new O-Train Platform shall be provided and shall properly integrate with the LRT Station above as well as protect for a possible future extension of the O-Train corridor north across the Prince of Wales Bridge to Gatineau. Sufficient space and clearance to structural elements at the lower level of the Station shall be provided to allow for a future double-tracked electrified light rail line to replace the O-Train corridor and extend north to Gatineau.

(b) Bayview Station shall be designed such that Alignments for a future extension of the OLRT to the west and a future extension running north-south are protected.

(c) Bayview Station is a Federally Mandated Station.

(d) Enhancing pedestrian connections to this Station shall be incorporated into the Station Design. Several pathways from surrounding communities shall be constructed as part of the Project.

(e) The Station Platform shall be located to provide a direct connection to the O-Train and to provide an at grade entrance from Albert Street at the east side of the existing overpass on Albert Street.

(f) The western entrance shall be located at the lower level of the Station serving as a direct connection to the O-Train. The eastern entrance shall be located at Platform level no more than 20m east of the existing overpass.

(g) The Station shall be designed as to permit Passengers to transfer between the LRT and O-Train without passing thru fare control barriers and/or revalidating fare payment.

1.5 Lebreton Station

(a) Lebreton Station is an existing Station along the BRT. The OLRT Alignment shall be located a short distance south of the existing bus Transitway.

(b) Lebreton Station is a Federally Mandated Station.

(c) The new Station shall be integrated with a new Booth Street Bridge. The Bridge shall be provided to elevate Booth Street through the Lebreton Flats Development project to the east and west of Booth Street. The Station Platform shall be located below the Bridge, along the edge of the existing aqueduct. The Station Platforms shall extend east and west of Booth Street and the Bridge shall provide protection over the Platforms. Pedestrian access shall be provided on both the east and west sides of Booth Street with the ability to descend to the Platforms below. An additional entrance shall be provided at platform level directly under Booth Street Bridge.

(d) Passengers shall have direct visual and physical access to the existing cycling and pedestrian pathways along the aqueduct.

(e) The Station Design shall respect the heritage Designation of both the adjacent Bridge and aqueduct as well as incorporate an Algonquin cultural theme.

1.6 Downtown West Station

(a) Downtown West shall be a new Underground Station that will replace a number of street level bus stations along the BRT. This Station shall provide a principal connection to downtown Ottawa along Queen Street near Lyon Street.

(b) The Station Structure shall be constructed entirely within the City's Queen Street and Lyon Street right of ways with the exception of entrances and entrance connections.

(i) The eastern limits of the Station shall accommodate an entrance located within Place de Ville.

(ii) The western limits of the Station shall accommodate the below grade passageway to the western entrance.

(iii) The Station shall be located to maintain a minimum distance of 300m from leading Platform edge of the Station to the trailing Platform edge of an adjacent Station in both east bound and west bound directions

(c) The Station shall be provided with two (2) entrances.

[REDACTED]

(ii) The western entrance shall be located at the Southeast corner of Queen Street and Lyon Street within the City right of way in front of the Delta Hotel. An elevator entrance, housing two (2) elevators, shall be provided within the City right of way on the south side of Queen Street and configured in such a manner as not to compromise the pedestrian flow on the City right of way.

A. A total of four knock out panels for future below grade Station connectors shall be protected, final location of these features shall be coordinated with the City and private property Owner's during final Design.

(iii) Private property required for entries will be After Acquired Lands.

1.7 Downtown East Station

(a) Downtown East is a new Underground Station; that will replace a number of street level bus stations. This Station shall provide a principal connection to downtown Ottawa along Queen Street. The Platform can be located anywhere between sixty-five (65) metres east of the east limits of Bank Street and thirty (30) meters east of the east limits of Metcalfe Street.

(b) The Station Structure shall be constructed entirely within the City's Queen Street right of way.

(i) The Station shall be located to maintain a minimum distance of 300m from leading Platform edge of the Station to the trailing Platform edge of an adjacent Station in both east bound and west bound directions.

(c) The Station shall be served with a minimum of two (2) Station entrances on Queen Street.

(i) The eastern entrance shall be located within the City right of way near the southwest corner of Queen Street and O'Connor Street in front of the World Exchange Plaza Building.

(ii) Any new structures shall not compromise the view-shed to the Parliamentary Precinct.

(iii) Elevators may be integrated within the western and eastern entrance locations or may be located on City right of way provided pedestrian flow on the City right of way is not compromised.

(iv) [REDACTED]

(v) A total of three knock out panels for future below grade Station connectors shall be provided. Final location of these features shall be coordinated with the City and private property Owner's during final Design.

1.8 Rideau Station

(a) Rideau Station is a new Underground Station; This Station shall provide a principal connection to the Rideau Centre and the Byward Market area along Rideau Street, between Colonel By and Nicholas Street. The Station will remain a significant transfer point from the bus stop on Rideau Street.

(b) The Station Structure shall be constructed entirely within the Alignment Envelope.

(i) The western limit of the Station structure shall not extend past the eastern sideline of the Colonel By/ Rideau Street intersection.

(ii) The Station shall be located to maintain a minimum distance of 300m from leading Platform edge of the Station to the trailing Platform edge of an adjacent Station in the east and west bound direction.

(iii) Private property required for the entries will be After Acquired Lands.

(c) The Station shall be served with a total of two (2) Station entrances.

(i) The eastern Station entrance shall be located within the existing Scotiabank property adjacent to William Street north of Rideau Street, as After Acquired Lands.

(ii) [REDACTED]

(iii) The Station concourse design shall include a non paid fare zone to allow for a connection that transverses Rideau Street. Hence, a knockout panel at concourse level shall be provided on the south the of the Rideau Station eastern concourse.

A. Non fare paid zone shall allow the free unimpeded passage of pedestrians and shall be a minimum of 6m wide; and

B. The fare barriers shall be located as to provide sufficient queuing space for Passengers entering and leaving the station.

i. Fare barrier queuing space shall be in addition to the minimum width of the non fare paid zone.

(iv) [REDACTED]

(v) Project Co shall be responsible for the Design and Construction aspects of the Station entries as follows:

A. Project Co shall be responsible for all aspects of the construction relating to the eastern entrance including the demolition of existing Scotiabank building and foundations.

B. [REDACTED]

C. [REDACTED]

D. Project Co is advised that the NCC possesses covenants on the exterior building façade of the Rideau Centre.

(vi) Existing pedestrian Bridges:

A. Bridges connecting buildings on the north and south side of Rideau Street shall remain through the duration of the Project;

B. Temporary closures of the Bridges during the construction of the Project shall be permitted in accordance with the following:

i. One Bridge shall remain open to the public at all times throughout the duration of the Project;

ii. Temporary closure of a single pedestrian Bridge shall be limited to a single duration of no more than 45 consecutive calendar days. Multiple closures of a single Bridge shall not be permitted;

iii. No closure of any pedestrian Bridge shall occur at any time during the months of September, November and/or December.

iv. The closure of the pedestrian Bridge located above the Friedman Mall entrance shall not be permitted to occur at any time during the period of June 30 to July 2 inclusive, of any calendar year.

v. Pedestrian Bridges are required to be re-opened after the closure period and shall remain open to the public for use in perpetuity.

vi. At least 30 calendar days prior to the commencement of the planned closure, Project Co shall provide the City and the property owners with an advance written notice of request for temporary closure;

vii. Project Co shall be responsible to provide a pedestrian detour and detour signage within the existing buildings to direct pedestrians to alternative routes during the temporary closure period;

1 Project Co's proposed detour plan shall be submitted with the advance temporary closure notice to the City and property owners and shall be approved in writing by the property owners prior to the closure of a bridge;

- The property owners have agreed not to unreasonably withhold or unduly delay the approval of the detour plan and signage specifications.

2 All signage type, graphics, colours, materials shall be pre-approved by the owners. Project Co is encouraged to obtain the property owners' approval of the signage specifications prior to requesting the closure; and

3 All signage shall be installed no later than 72 hours prior to the commencement of the pedestrian Bridge closure.

viii. Project Co. shall be responsible for the removal of all temporary signage and shall repair and/or replace in kind any damaged surfaces to pre-closure condition;

1 All signage shall be removed and all necessary repairs of any surfaces damaged by the installation or removal of the detour signage shall be made no later than 24 hours following the end of the pedestrian Bridge closure period.

1.9 Campus Station

(a) Campus Station is an existing bus transit station along the BRT, which shall be converted to serve as a station along the OLRT. The existing four lanes of Nicholas Street shall remain in their current condition.

(b) Campus Station is located immediately adjacent to the Rideau Canal (a UNESCO World Heritage Site) and an integral component of the University of Ottawa, and final Design of this Station shall be coordinated with the University of Ottawa.

(c) The new Station shall be integrated with the existing underground pedestrian tunnel that connects the University of Ottawa to Colonel By Drive and the Rideau Canal, the Sandy Hill neighbourhood, and the Golden Triangle neighbourhood via the Corktown Footbridge. The existing ramp, stairs and plaza adjacent to the existing station shall be demolished and replaced as part of Project. Project Co's east plaza design shall include safe and efficient cycling and pedestrian connections to the Station from the existing

pedestrian tunnel. A large multi-media display (funded by the City artwork program) shall overlook the east plaza and shall be included in this Project.

(d) The Station Structure shall be constructed entirely within the right of way identified in other parts of this agreement.

(i) The northwestern limits of the Station Platform shall be located no closer than12.5m from the southwest corner of Vanier Hall when measured along the Alignment.

(ii) The southeastern limit of the Platform shall be located so that the future Platform extension does not reduce the available pedestrian sidewalk between Marion Hall and components of the LRT and LRT Station to less than 6m.

(iii) The Station shall be served by two entrances:

A. One entrance location shall be located in the pedestrian plaza formed by Vanier Hall and Careg Hall at Platform level

B. One entrance shall be located below grade accessed from the existing pedestrian connector level.

(e) Project Co shall be required to make modifications to the entrance stairs and railings of Vanier Hall and Marion Hall to ensure sufficient public circulation capacity between the new Station, LRT Alignment right of way and the afore mentioned buildings as follows:

(i) Clear dimension required between the LRT barrier and Vanier Hall shall be no less than 4.0 m clear as indicated on the Reference Drawings; and

(ii) Clear dimension required between the LRT barrier and Marion Hall shall be no less than 4.0 m clear as indicated on the Reference Drawings.

(f) Project Co shall be responsible for all internal or external modifications of the existing buildings necessary to maintain the required egress requirements of the existing buildings and new Station.

(i) The architectural design solution of the entrance modifications shall not diminish the importance of the entrances functioning as main building entries.

(ii) The reconfiguration and reconstruction of the entries shall be respective and complimentary to the existing building architecture.

1.10 Lees Station

(a) Lees Station is situated along the BRT between Highway 417 and the Lees Avenue overpasses and is to be converted to an LRT Station.

(b) Land in the vicinity of Lees Station is contaminated with Coal Tar and there exists a ground water treatment plant on site to treat the contaminated leachate. Any new civil or other works that would involve disturbing the surrounding soil shall be minimized.

(c) The Station Structure shall be constructed entirely within the Lands identified in other parts of this agreement.

(i) The eastern and western limits of the Platform shall accommodate the reuse of existing Infrastructure for the new Station and to protect for future Platform expansion to the northwest along the LRT Alignment.

(d) The Station shall be served by one entrance located on the south side of the existing BRT.

1.11 Hurdman Station

(a) Hurdman is an existing bus transit station along the BRT. A new elevated LRT Station shall be constructed to the north of the existing Station to allow BRT operation to continue throughout the duration of the Construction Activities.

(b) The BRT Transfer Station shall be re-designed to ensure it supports the City operational and lay-by requirements. Hurdman Station shall serve as a major transit transfer point with the new Train Station along the OLRT while continuing to serve as a bus station for the South-East BRT.

(c) Hurdman Station is a Federally Mandated Station.

(d) Hurdman Station shall facilitate pedestrian connections between the termination of the BRT and local buses and the LRT Station. The BRT and local buses shall have a combined Platform on the south side of the LRT Station. Sufficient space shall be allocated at Hurdman Station for circulation, bus drop-off and lay-by areas.

(e) The Station will connect to existing pathways adjacent to the Rideau River and Riverside Drive

(i) The Station, Station structure, bus transfer area, and Guideway structure shall be located to provide for access to the properties north of the Station as required in Schedule 15-2 Part 1.

(f) The Station shall have two entrance locations at the bus platform level.

(g) The Station shall be designed as to permit Passengers to transfer between the BRT and LRT without passing through fare control barriers and revalidating fare payment.

(h) An unpaid pedestrian connection shall be provided from the south side of the Station to the north side of the Station through the Station concourse

1.12 Train Station

(a) Train is an existing bus transit station along the BRT and a new Station shall be built to the west of the current Station; outside of the traffic 'D'.

(b) Train Station is a Federally Mandated Station.

(c) The Design of Train Station shall be coordinated with VIA to ensure connections to the existing VIA station are as efficient as possible and do not preclude future expansion to the VIA station or lands surrounding the VIA station.

(i) Project Co shall provide a knockout panel at Platform level to accommodate a future underground connection to the VIA rail station and future development. Final location of the knockout panel shall be coordinated with the City and VIA during final Design.

(d) The Project includes a pedestrian Bridge spanning the 417 to provide enhanced access to the Station. Refer to Schedule 40 – Highway Work for requirements of this Bridge.

1.13 St. Laurent Station

(a) St. Laurent station is an existing bus transit station along the BRT that is currently located within the existing St. Laurent Shopping Centre. The Station shall be converted to serve as an OLRT Station while maintaining its use as a bus station at the upper level. The lowest level of the existing station shall be converted from a BRT corridor and Station to serve as an LRT Station and Platform.

(b) Project Co shall be responsible for any work that the LRT conversion requires to meet all applicable codes.

(c) The Station shall facilitate the movement of Passengers between local buses, LRT, and adjacent commercial development. Passengers arrive from the local buses or commercial development and descend to the Platform level for the OLRT.

(d) The existing pathway connection from the southwest under Highway 417 shall be maintained, providing access to the Platform. Barriers shall be provided along this connection to prevent pedestrians from accessing track level.

(e) Station systems shall be integrated where necessary to the existing facility.

(f) A private owner is currently planning a grade separated pedestrian connection overtop Highway 417. Project Co shall co-ordinate with the City to ensure access to the site and an efficient pedestrian connection to the upper floor of the Station.

(g) The Station shall be served by existing entrance locations on the mezzanine level and bus transfer levels.

(i) Station Platform shall be located in the east west direction to utilize existing vertical circulation elements and satisfy the trackwork requirements of this Schedule 15 - Output Specifications.

1.14 Cyrville Station

(a) Cyrville Station is an existing bus transit station along the BRT at Cyrville Road, directly northeast of Highway 417, and shall be converted to an OLRT Station.

(b) Protection for future pedestrian connections to and from the "Place des Gouverneurs" located northeast, and Queensway Corporate Complex located northwest of the Station shall be protected.

(c) One entrance from Cyrville Road shall be provided, however, the Station design shall protect for a future additional entrance such that entrances can be located on both sides of Cyrville Road in the future.

(d) The Station Platform shall be located in the east-west direction to allow for future entrance locations on both sides of Cyrville Road while maintaining trackway Design criteria and minimizing the impact of future construction on the operation of the Station.

1.15 Blair Station

(a) Blair Station is an existing bus transit station along the BRT that will be converted to serve as the new eastern terminus of the LRT and hence requires the Construction of an extensive BRT Transfer area to the north of the LRT Station.

(b) Project Co shall work with the City to ensure the new BRT transfer area layout and Design supports the City's bus operations and provides sufficient lay-up area.

(c) The new Station Design shall not prohibit the current pedestrian connections between the LRT, the BRT, the commercial lands to the north and the Ottawa Road 174 pedestrian overpass. The new Platform shall be accessible from both the bus level below and from the existing pedestrian walkway above.

(d) The new station design must maintain a non-fare paid connection at the existing upper level to maintain public access between the commercial lands to the north and the development parcels to the south of Ottawa Road 417 via the existing pedestrian overpass.

(e) The Station shall be designed as to permit Passengers to transfer between the BRT and LRT without passing through fare control barriers and/ or revalidating fare payment. The eastern most edge of the Platform shall be located to provide the following:

(i) Access to the existing vertical circulation cores;

(ii) Protection for the Platform extension to the east;

(iii) Allow for Construction of a TPSS between the rails east of the Platform extension; and

(f) The Station shall be served by two entrance locations at the bus platform level and one vertical connection direct to the Platform from the existing overhead pedestrian connector.

(g) The bus transfer platform and Structures shall be located within the Lands.

1.16 Design Principles and Guidelines

(a) Accessibility

(i) Project Co shall ensure all Stations and all public spaces are designed to be universally accessible including satisfying the requirements of Transport Canada, Canadian Transportation Agency Code of Practice - Terminal Accessibility, AODA and applicable City Guidelines and CSA Standards, including but not limited to CAN/CSA B651. The application of Design guidelines and criteria, standards and practices shall accommodate the needs of persons with physical, sensory, and mental disabilities.

(ii) Accessible interior routes need to be connected to accessible entrances and accessible exterior routes.

(b) Crime Prevention Through Environment Design (CPTED)

(i) Project Co shall Design all Station-related public accessible areas (Platforms, entrances and passageways, sidewalks, parking areas, bus Platforms) using CPTED principles. An independently contracted CPTED review and report of the Project design shall be provided to the City by Project Co as part of each design submittal.

ARTICLE 2 ARCHITECTURAL DESIGN CRITERIA

2.1 Introduction

(a) This Article presents the specific criteria that are necessary for Project Co to carry out the final Design and Construction of the components and elements of LRT Stations and other building-type Structures on the OLRT.

(b) Project Co. shall design and construct buildings in accordance with the all applicable codes and standards.

(c) Code Analysis

(i) Project Co shall perform a code analysis with respect to the OBC and NFPA 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems*. The code analysis for each Station shall address the following minimum requirements:

A. Building Size, Use and Occupancy;

i. Building area and number of storeys;

ii. Mezzanines; and

iii. Description of Stations as either open or enclosed;

B. Structural Design:

i. Including where the existing BRT retaining walls that form part of a Station;

C. Occupant load;

D. Construction requirements;

E. Interconnected floor spaces;

F. Spatial separation;

G. Fire department access;

H. Fire separations and compartmentalization;

I. Egress and exiting;

J. Fire protection systems, Emergency power and communication systems;

K. Emergency Ventilation;

L. Washrooms;

M. Barrier Free Design; and

N. Alternative Solutions:

i. Description of performance; and

ii. Proposed method of compliance.

2.2 Elements of Continuity and Variability:

(a) The design of each Station shall be unique while utilizing a common vocabulary of elements and features that unifies and identifies the systems as a whole maintaining an equal quality of design.

(b) Station Design elements are divided into two classifications: Elements of Continuity and Elements of Variability. Elements of Continuity are standard Designs established for the purpose of System-wide Station identity, functional consistency, and a reduction in capital, operations, and maintenance costs. They shall include System-wide components such as signage, elevators, and escalators; systems Equipment; ancillary facilities. Elements of Variability are not required to be consistent between stations. Where required in this Schedule 15 - Output Specifications, Project Co shall provide Station elements as listed in the following table.

Table 5-2.1

Station Elements of Continuity (C)/Variability (V)	
Element	**C or V**
Information devices, all signs/graphics, including accessibility signs/graphics	C
• Station markers	C
• System and Station vicinity/maps	C
• Bus information	C
• Directional signage and graphics	C
• Identification	C
• Regulatory	C
• Variable message signs	C
Vertical circulation	
• Stairs	C
• Escalators	C
• Escalator cladding, lighting, and detailing	C

• Elevators	C
• Elevator enclosure Design and detailing	C
• Elevator cab Design and detailing	C
Communications	
• Public address speakers	C
• Public address systems for hearing impaired	C
• Emergency telephones	C
• Patron assistance telephones	C
• Patron assistance for hearing impaired	C
• Maintenance telephones	C
Station control and security	
• Intrusion alarms	C
• CCTV Equipment	C
Fare collection Equipment (Provide infrastructure and coordination only)	
• Ticket vending machines	C
• Fare Barriers	C
• Fare collection machines	C
• Emergency exit gates	C
• Accessible gates (for the disabled)	C
Site development plazas	
• Paving	V
• Streets, curbs, and gutters	C
• Walkways	V
• Retaining walls	V
• Bollards, bumpers	V
• Handrails/railings	V
• Landscaping	V
• Fences	C
• Benches	C
• Bus stop shelters	V

• Trash receptacles	C
• Planters	V
• Lighting (lamp)	C
• Lighting (fixture)	V
• Bicycle racks	C
• Bus bays	V
Station Elements	
• Roof form (Design)	V
• Platform seating	C
• Trash receptacles	C
• Public address speaker housing	V
• Doors, gates, and hardware	C
• Floor material	V
• Wall and ceiling finishes public areas	V
• Hose bibs	C
• Lighting (lamp)	C
• Lighting (fixture)	V
• Security gates at Station entrances	V
• Acoustical materials and details	V
• Concourse configuration	V
• Smoke and exhaust enclosure	V
• Handrails—public areas	C
• Guardrails—public areas	C
• Railings/handrails—emergency exits	C
• Linear Platform edge detail and material	C
• Stairway details and materials	V
• Electrical outlets	C
• Platform service gates	C
• Fire hose cabinet	C
• Emergency telephone	C

Ancillary rooms	
• Incoming power room	V
• Train control/communication room	V
• Substations	V
• Auxiliary electrical rooms	V
• Miscellaneous auxiliary rooms	V
• Toilet room—fixtures, accessories materials	V
• Custodial rooms	V
• Staff room	C
• Fan rooms	V
• Storage rooms	V
• Utility boxes	V
• Doors and hardware	V
• Elevator Machine Room	C
• Mechanical grates, louvers, and grilles	V
Artwork	V
C = Elements of continuity *V = Elements of variability*	

2.3 Station Sizing and Capacity

(a) General:

(i) Project Co shall provide Station Designs sized to accommodate the anticipated Passenger volumes as outlined in Part 1 Article 2 – Operational Performance Requirements of this Schedule 15 - Output Specifications for Operating Scenario 2 with the exception of Tunney's Pasture which shall be designed for Operating Scenario 1 with the Station functioning as a terminal Station and the Underground Stations which shall be designed to accommodate the Passenger carrying capacities of 24,000 pphpd as outlined in Schedule 15-2 Part 1 Clause 2.5 (c).

(ii) Project Co shall provide bus transfer stations and platforms satisfying the bus transfer operations.

(iii) Stations, Platforms and circulation elements both horizontal and vertical shall be sized to meet the following minimum requirements:

A. Minimum emergency egress requirements shall satisfy the requirements of both the OBC and NFPA 130.

i. Where requirements conflict, the most restrictive requirement shall apply.

B. A Platform clearance time of no more than 0.8 times the shortest Headway anticipated under normal operations for the ultimate Design capacity.

i. For centre Platform Stations, two Trains arriving at the same time shall be considered as the base case for modeling purposes.

ii. For side Platform Stations with a shared mezzanine level, two Trains arriving at the same time shall be considered as the base case for modeling purposes.

(b) Level of service:

(i) The following levels of service indicated below shall be provided in the Design of public spaces as referenced in other parts of this article:

Location	Level of Service (LOS)	Measure
Platforms (Normal)*	C	$0.8m^2$ per person
Platforms (Emergency)*	D	$0.4m^2$ per person
Waiting Areas	C	$0.8m^2$ per person
Passageways – 1 way	D	50 ppm per metre
Passageways – 2 way	C	40 ppm per metre
Stairways – 1 way	E	55 ppm per metre
Stairways – 2 way	D	35 ppm per metre

**Note: Normal Platform refers to the level of service during the daily peak 15 minutes. Emergency Platform refers to the level of service provided during an Emergency in which an incoming fully loaded Train must evacuate onto a Platform with waiting Passengers at the daily peak 15 minutes.*

(c) As an integral part of the Design, Project Co shall utilize Passenger modeling software to develop and verify the Design of all aspects of the Station circulation including but not limited to the interior circulation, vertical circulation, site circulation and bus platform operations based upon the Operating Scenarios identified in this Article.

(i) The software utilized by Project Co shall be a proven and widely used product in the Design and analysis of rapid transit and intermodal transit facilities.

(ii) Project Co shall provide modeling simulations for each Underground Station utilizing interpolated Passenger data reflecting the Passenger carrying capacities of 24,000 pphpd as outlined in Schedule 15-2 Part 1 Clause 2.5 (c).

(iii) The Design of the Station facilities shall be adjusted based upon the results of the simulation.

(iv) The Passenger simulation analysis shall be submitted in accordance with Schedule 10 – Review Procedure.

(d) Surge spaces, queuing and runoff

(i) Project Co shall be responsible for determining the amount of queuing space required at each element within the Design to meet the level of service required in each area. The calculated requirements shall be equal to or greater than the requirements below for the following items;

A. Runoff provided at the top and bottom of escalators shall be a minimum of 5000mm.

B. Surge space provided at the top and bottom of public stairs shall be a minimum of 5000mm

C. Runoff provided space in front of an elevator shall be a minimum of 3000mm

D. Queuing distance provided at fare barriers, entry and exit sides shall be a minimum of 5000mm.

E. Queuing space provided at a ticket vending machine or automatic teller shall be a minimum 3000mm when facing a wall or obstruction.

F. Queuing space provided at a ticket vending machine of automatic teller shall be a minimum 2000mm when adjoining another queue space.

G. Where two or more elements listed above converge, the surge or runoff spaces shall be cumulative.

(e) Platform Sizing:

(i) Length

A. The minimum finished Platform length shall be as indicated in this article All At Grade Stations are to be implemented to allow an eventual full build out to accommodate the Passenger carrying capacities of 24,000 pphpd as outlined in Schedule 15-2 Part 1 Clause 2.5 (c).

i. During the initial build, Project Co shall construct and finish all Underground Station Platforms to a usable length of not less than 120m.

(ii) Width

A. Platform width shall be calculated in accordance with the requirements of the OBC, NFPA, Passenger data and the Level of Service for the Platform space as required in this article.

B. The final width of the Platform shall be the greater of the following: the minimum required by OBC; the minimum required by NFPA 130; or the minimum width to satisfy the LOS requirements

i. Calculation of Platform width shall be based upon this Part and Part 1 Article 2 – Operational Performance Requirements and operational Headways as determined by Project Co.

ii. Platform width minimums for Stations shall be as follows:

1 Width of Station Platforms shall be sufficient to satisfy the greater of the following:

- The calculated width for Operational Scenario 1;
- The calculated width for Operational Scenario 2; and
- The calculated width for Passenger carrying capacities of 24,000 pphpd. Project Co shall extrapolate the provided Passenger forecast data by 1% per year at each Station until the Passenger carrying capacities of 24,000 pphpd, as outlined in Schedule 15-2 Part 1 Clause 2.5 (c), are satisfied.

2 Both platforms in a side Platform configuration shall be equal in size based upon the greater of the calculated required width per direction.

iii. For centre loading configuration, shelters, equipment and amenities are to be placed in the centre portion of the Platform to maximize the clear Platform area for circulation.

iv. For side loading Platform configurations, shelters, Equipment and amenities are to be placed adjacent to the side walls to maximize the clear Platform area for circulation.

v. Where fixed objects, excluding vertical circulation elements and Passenger convenience items, restrict the Platform width below the calculated minimum, the following shall apply:

1 The total length of the reduced Platform shall not exceed 20% of the total length of the Platform; and

2 The length of any one contiguous Platform reduction shall not exceed 10m in length.

2.4 Circulation and Egress

(a) Vertical Circulation

(i) Elevators:

A. Except where noted in this section, each Station Platform, concourse, and entrance shall be serviced by redundant elevators.

i. To satisfy the redundancy requirements, elevators shall be located no more than 50m apart.

ii. An alternative accessible means of vertical transportation, such as a ramp, shall be permitted, provided the alternative means is within 50m.

B. A minimum of one elevator serving each Platform, and all levels of the Station, shall be sized to allow for an ambulance stretcher and patrons with bicycles. The other elevator shall provide redundancy for accessibility purposes.

C. The following Station specific requirements shall apply:

i. Train Station shall, at a minimum, have one elevator per Platform to grade with protection for an additional future elevator to grade serving each Platform. Project Co shall comply with the following to provide protection for the future installation of elevators:

1. Planning and design of station shall indicate the location of the future elevator;

2. Relocation of building systems or LRT systems for future installation elevator shall not be required;

3. Design and construction of electrical and mechanical services shall protect for future loads in the initial design; and

4. Design and construction of structural systems shall protect for future loads in the initial Design;

ii. Downtown East shall have elevators serving each Platform to the concourse level within the fare paid zone; and elevators serving concourse level to each at grade Station entrance location.

1. Elevators serving concourse level to an at grade Station entrance at a centralized location in conjunction with two at grade Station entrances served only by stairs and escalators, may be substituted for the above concourse to grade requirements; and

iii. Blair Station shall have elevators serving each level of the Station within the fare paid zone, and elevators serving the pedestrian over pass to grade level outside of the fare paid zone on the northern side of the bus transfer area.

D. All elevators shall meet the following general requirements:

i. Conform to all applicable Acts and codes, including the CAN/CSA B44 Safety Code for Elevators and Escalators (latest edition including Appendix E), OBC, NFPA, NBC, AODA, CSA Accessible Design for the Built Environment CAN/CSA B651-04, and City of Ottawa Accessibility Standards;

ii. Be of heavy duty components and construction designed specifically for transportation system usage;

iii. Traction elevators shall be provided where they serve more than 14m of travel; and

iv. No running time, cycle counters or trip counters that would cause the elevators to shut down or alter its operation in any way shall be provided.

E. In addition all new elevators shall have the following:

i. The elevator car walls and hoistway walls shall be constructed utilizing glass. Both elevator cab and hoist way enclosure shall be constructed of glass to the maximum extent possible in all Stations.

1. At a minimum, 50% of the total elevator cab and hoist way's vertical enclosure surface area shall be constructed of glass;

2. Glass surfaces of the elevator and elevator hoist way shall be aligned.

ii. CCTV camera coverage shall be provided within the cab and at each landing;

iii. Access locations to elevators shall be weather protected so as to minimize the infiltration of precipitation into the elevator shafts and or cabs;

iv. Elevator cab flooring shall be aluminum, rubber, or other durable, non-absorbent material with a non-slip surface with coefficient of friction of not less than 0.60;

v. Elevators shall accommodate a minimum capacity of 1180kg, or the heaviest piece of Equipment to be transported between levels for maintenance, whichever is greater;

vi. The minimum inside cab dimensions shall be 1370mm wide x 2032mm deep with 915mm wide x 2135mm high doors or to accommodate the largest unit of maintenance Equipment that must be transported between the levels served, whichever is greater;

vii. Minimum car operating speeds shall be 0.5m per second for elevators with a travel distance of less than 20m and 1.0m per second for elevators with a travel distance of more than 20m;

viii. Elevator machine rooms shall be located as near as possible to hoist ways, but clear of public walking and landing areas, and shall be acoustically treated to minimize noise levels;

ix. Oil heaters shall be installed in the hydraulic elevator storage tank if the elevator is not in a heated area;

x. Elevators shall be equipped with a self-recharging battery pack which will maintain lighting, return the elevator to level of fire department access, open the doors, and render the elevator inoperative in the event of a power failure;

xi. All elevator keying shall match the keying of the existing elevators within the OLRT System;

xii. Shall be equipped with a hands-free telephone connected with TSCC;

xiii. Graffiti-resistant finish material in the cab interior shall be provided;

xiv. Lighting in elevator cabs shall be designed using fluorescent or LED fixtures. Lighting shall be covered with a protective transparent shield to prevent vandalism;

xv. The operating status of the elevator shall be monitored by the BMS system and the TSCC;

xvi. Elevators shall be able to be controlled at the Station only;

xvii. Elevators intended for use in moving Equipment to and from locations within the facility shall be sized to accommodate the intended Equipment

xviii. Elevator pit walls shall be lined with a non-porous material and shall be drained; and

xix. Existing elevators shall be reused and refurbished to meet at a minimum the following:

1. Existing cab doors shall be replaced with full glass doors;

2. Existing control Equipment shall be upgraded if required to be compatible with the BMS and TSCC monitoring requirements;

3. Project Co shall be responsible to make all upgrades to existing elevators in order to obtain certification of the Equipment.

(ii) Escalators

A. Escalators shall meet the following requirements:

i. Conform to all applicable codes and acts including the CAN/CSA B44 Safety Code for Elevators and Escalators (latest edition), OBC, NFPA, NBC, AODA, CSA Accessible Design for the Built Environment CAN/CSA B651-04, and City of Ottawa Accessibility Standards;

ii. Shall be of heavy duty components and construction and shall meet or exceed the requirements for the "Heavy Duty Transportation System Escalator Design Guidelines," published by the APTA; and

iii. No running time, cycle counters or trip counters that would cause the escalators to shut down or alter its operation in any way shall be provided.

B. Where protection for future escalators are indicated, Project Co shall comply with the following:

i. Planning and design of station shall indicate the location of the future escalator;

ii. Relocation of building systems or LRT systems for future installation elevator shall not be required;

iii. Design and construction of electrical and mechanical services shall make protection for future loads in the initial design; and

iv. Design and construction of structural systems shall make protection for future loads in the initial design;

C. In addition, the escalators shall meet the following requirements:

i. Shall have a minimum step width of 1000mm;

ii. The running headroom shall not be less than 2200mm;

iii. All escalators shall have reversing capabilities. A keying device shall be required to change direction;

iv. Shall be capable of operating with a full load at a speed of 0.5m per second in both directions;

v. Shall be designed for continuous operation, 24 hours a day, 365 days a year;

vi. Provide escalators capable of operating with full specified performance capability while exposed to the following climatic and environmental conditions:

1. Exposed exterior installations: Design escalators to operate while exposed to natural elements of weather, including sunlight, rain, slush, snow and ice, all conditions of relative humidity while exposed to road salt, airborne dust and debris; and in dry bulb temperature -40°C to 40°C;

vii. Step chain rollers shall be mounted outside the chain link;

viii. Escalator shall have 3 flat steps at the top and bottom landings;

ix. Escalators shall have brushes along the skirt panels;

x. The sides and bottom of the escalators shall be clad in stainless steel where exposed;

xi. Escalators forming part of the required egress route shall be capable of being interlocked with the fire alarm system and shut down in the event of an alarm;

xii. Escalators shall have a high deck with angled stainless steel balustrades;

xiii. Escalator status to be monitored by the BAS in the Station and at the TSCC;

xiv. Escalators shall be able to be controlled only at the escalator in the Station; and

xv. Escalators shall have provisions for being operated from the TSCC.

D. Project Co shall determine the final quantity of escalators as determined by the outcome of the Passenger modeling results. At a minimum, Project Co shall provide escalators in the following quantities:

i. Tunney's Pasture –one (1) escalator serving each Platform;

ii. Bayview Station –one (1) escalator serving each Platform;

iii. Lebreton Station –two (2) escalators serving each Platform, with provisions for the installation of two (2) additional escalators per Platform;

iv. Downtown West Station – two (2) escalators serving each Platform and one (1) escalator serving each entrance location;

v. Downtown East –two (2) escalators serving each Platform and one (1) escalator serving each entrance location;

vi. Rideau Station – two (2) escalators serving each entry, two (2) escalators serving each level of the Station, two (2) escalators serving each Platform;

1 Project Co shall determine the number of escalators required based upon the proposed design. Escalator quantities shall be based upon Station configuration, Level of Service requirements and in conformance with this and other parts.

vii. Campus Station – None required;

viii. Lees Station – None required;

ix. Hurdman Station – Two (2) escalators serving the Platform level;

x. Train Station – None required, protection for one (1) future escalator at each platform;

xi. St. Laurent Station – Existing escalators shall remain and be refurbished or replaced with new;

xii. Cyrville Station – None required; and

xiii. Blair Station – One (1) escalator serving the Platform level.

(b) Stairs and ramps

(i) Stairs

A. New stairs shall be constructed of precast or cast in place concrete with precast concrete treads with cast in nosings. Tactile warning strips shall be provided at landing areas.

B. Sizing shall be per code minimum requirements and per level of service requirements as noted in other parts of this article.

C. In addition to ensuring that the applicable code requirements are met, the following criteria shall be incorporated into the interior and exterior stairway Design.

i. Open risers shall not be permitted;

ii. Continuous railings shall be provided on both sides of the stairs;

iii. Stairs adjacent to an escalator shall be parallel to the angle of inclination of the escalator and sized to have landings at a common level; and

iv. The Design of exterior stairway landing levels shall include a grated drainable catchment basin to trap grit, water and snow.

v. All public stairs, interior and exterior, shall include a bicycle wheel trough on one side of each flight of stairs.

1 For new construction, the bicycle trough shall be integral with the stair construction.

2 For existing stair construction, the trough is permitted to be surface applied, provided the trough, fasteners and accessories to do not reduce the required egress width.

3 All bicycle wheel troughs shall include textured, non-slip surfaces to provide traction for bicycle wheels.

(ii) Railings

A. Guardrails where required by code shall be provided as follows:

i. The Design and Construction of guardrails for all Stations shall be consistent;

ii. The design of all guardrails shall meet the intent of the details provided in the Federally Mandated Station drawings. The use of other frameless and partially framed glass railing systems shall be acceptable;

iii. All handrails associated with public stairs shall be stainless steel pipe sections which are supported by cast aluminum or stainless steel bracket supported from wall or guard rail system;

iv. Railings and Platform gates shall be provided at the Platform ends, if otherwise unprotected, and shall be set back a minimum of 300mm from the edge of the Platform; and

v. Vertical railing supports are to be welded flush to preinstalled embedded anchor plates.

(iii) Ramps:

A. All interior and exterior ramps shall be designed and constructed to be universally accessible, including satisfying the requirements of OBC, AODA and applicable City Guidelines and CSA Standards, including but not limited to CAN/CSA B651.

(c) Corridors and Passageways:

(i) Public

A. The width of public passageways shall:

i. Meet or exceed exiting requirements set forth in the OBC and NFPA;

ii. Shall be a minimum of 4000mm; and

iii. Shall be sized in order to satisfy the level of service indicated in other parts of this article.

B. Corridors and passageways shall have a minimum clear height of 3500mm, excluding space required for mechanical and electric services. Soffits, not exceeding 2000mm in width when measured perpendicular to the passageway, shall be permitted provided a minimum clear height of 2800mm is provided at the soffit location and soffits are separated by a distance no less than 10000mm.

C. All public corridors and passageways shall have full CCTV coverage.

(ii) Non Public

A. The minimal acceptable width of passageways for non-public use shall be the greater of the following: code calculated minimum, 1200mm, or sized as required to move Equipment for maintenance.

(iii) Public- Use Pedways (Overpass / Underpass)

A. The absolute minimum width shall be 5000mm, unless existing to remain.

B. The minimum clear height shall not be less than 3000mm, unless existing to remain.

(d) All escalators, stairs and escalator/stair groups shall have CCTV coverage from escalator/stair landing to escalator/stair landing.

(e) Emergency Egress:

(i) Egress to Track level from the Platform along the length of the Platform for purposes of satisfying code exiting requirements is prohibited.

(ii) Where required, exit off of the end of the Platform into the Guideway area is acceptable for At Grade Stations in accordance with the following:

A. Doors/ gates protecting the end of the Platform shall be sized appropriately to satisfy code requirements.

B. Doors/ gates at Platform ends shall be equipped with panic device hardware.

C. The position of doors/ gates shall be monitored at the TSCC. Unauthorized opening of the gate shall sound an audible signal in the Station and notify the TSCC.

D. Beyond the Platform end, the egress path shall be segregated from Track level with a fence or railing system to prevent public access to the tracks and or crossing the tracks.

i. Railing system shall be designed to meet the OBC requirements for a guardrail including but not limited to structural capacity and balustrade spacing.

E. The path of travel shall lead to a public way.

F. Crossing of the Tracks to access the public way is strictly prohibited

(f) Station entrances:

(i) Entrances to Stations for use by the public shall be equipped with doors, rolling grilles or ornamental gates or other means to secure the Stations buildings during hours of non-operation.

(g) Wayfinding

(i) Provide tactile floor wayfinding throughout all Stations to OBC and CAN/CSA B651-04: Accessible Design for the Built Environment.

2.5 Functional Requirements

(a) Stations shall meet the functional requirements as indicated in the following table:

Table 5-2.2 – Functional Requirements

	Station Name												
Functional Requirement	Tunney's Pasture	Bayview	Le Breton	Downtown West	Downtown East	Rideau	Campus	Lees	Hurdman	Train	St. Laurent	Cyrville	Blair
Platform Length (m) (*11)													
Finished Platform Length (m) (*11)													
Platform Roof Coverage (m) (*11)				n/a	n/a	n/a					n/a		
Number of Entrances	2	2	3	2	2	3	2	1	2	1	7	2	4
# of Accessible Entrances (*1)	2	2	3	2	2	3	2	1	2	1	2	2	1
Building Connections To (*4):	0	0	0	1		3	0	0	0	0	1	0	1
Bus Operator Building	-	-	-	-	-	-	-	-	1	-	-	-	1+E
Pedestrian Connection To (*4):	4	2	3	2	3	5	3	1	2		6	3	4
Number of PPUDO Spaces (*5)		E	0	0	0	0	0	E	4	0	0,(*7)	E	0,(*7)
Number of Bicycle Racks				Refer to Part 1 Landscaping Article									
Number of Bus Bays (*5)	18	-	-	-	-	-	-	-	11	-	E	-	15
Number of Bus Layby Bays (*5)	-	-	-	-	-	-	-	-	18	-	E	-	20
Bus Supervisor Office	1	-	-	-	-	-	-	-	1	-	-	-	1
Platform Shelter Count (Total) (*3)	2	2	2	0	0	0	2	2	2	2	2	2	1
Platform Shelter Count (Heated)	2	2	2	0	0	0	2	2	2	2	2	1	1
Public Washroom Facilities (*2)	1	-	-	-	-	-	-	-	-	-	-	-	1
Staff Washrooms (Male/ Female) (*9)	1/1	-	-	1/1	1/1	1/1	-	-	1/1	-	E	-	1/1

Notes:

(*1) Accessible entries include only those entries which include appropriate door openers and means of accessible station access (elevators, etc.) beyond. For this escalators are not considered accessible. Future connections are not included.

(*2) Provide Public Washrooms in accordance with OBC

(*3) Platform shelter counts are only inclusive of small, freestanding shelter structures.

(*4) See connections listing below.

(*5) E indicates existing

(*6) There is an indicated "possible location for entry to retail concourse level" at this point. It has been included in this count as a building entry.

(*7) Passenger pick up and drop off will occur at the adjacent mall parking lot as it currently functions

(*8) Not Used

(*9) Separate segregated single occupancy washroom facilities for male and female shall be provided.

(*10) Not Used

(*11) To be determined by Project Co.

(b) As indicated in the table above, the Design and Construction of the Stations shall provide sidewalks, pathways, plazas and MUP's in accordance with the design criteria set forth in Schedule 15-2 Part 1 for the following connections:

(i) Tunney's Pasture Station:

A. Provide new MUP north of Scott Street, south of the Station. The new MUP shall connect to the existing MUPs east and west of the Station. New MUP shall terminate at existing MUP both east and west of the Station within the Lands;

B. Provide new sidewalks, pathways, bus platform area, PPUDO and entry plaza adjacent to the west bound lane of Scott Street, as required. Width of the sidewalk shall be sufficient to accommodate the waiting, loading and unloading of Passengers. New sidewalk and pathway shall extend from Tunney's Pasture Driveway on the east to the extension of Goldenrod Driveway at the west;

C. Provide new sidewalks, pathways and plaza adjacent to the south bound lane of Tunney's Pasture Driveway connecting to the Station entrance. The sidewalk along Tunney's Pasture Driveway shall be continuous from Scott Street to Yarrow Driveway;

D. Provide new crosswalks and sidewalks within the limits of the Lands at the intersections of Tunney's Pasture Driveway and Yarrow Driveway; Goldenrod Driveway and Yarrow Driveway; Goldenrod Driveway and the Transitway (west side only); Goldenrod Driveway and Scott Street; and Scott Street and Tunney's Pasture Driveway;

E. Provide new sidewalk, bus platforms and PPUDO adjacent to the eastbound lane of Yarrow Driveway. Width of the sidewalk shall be sufficient to accommodate the waiting, loading and unloading of Passengers. Sidewalk shall be continuous from Tunney's Pasture Driveway to the extension of Goldenrod Driveway;

F. Provide a new sidewalk adjacent to the south bound lane of Goldenrod Driveway. Sidewalk shall extend from the existing pathway adjacent to Scott Street to the existing sidewalk at the intersection of Yarrow Driveway. Sidewalk shall adjoin the existing pathway and sidewalk within the limits of the Lands;

G. Provide sidewalk bounding the bus platform within the fare paid zone north of the Station. Width of the sidewalk within the bus platform area shall be sufficient to accommodate the loading and unloading Passengers as well as circulation and appurtenances; and

H. Provide pedestrian pathway, for exit purposes only, from the fare paid zone to Yarrow Driveway at the western end of the Bus platform area.

(ii) Bayview Station:

A. Provide sidewalk adjacent to Albert Street serving the PPUDO east of the Station entrance. The sidewalk limits shall extend from the eastern side of the existing bridge on Albert Street for a distance of approximately 150 m to the east. Provide a curb ramp and an access aisle adjacent and parallel to the vehicle pull-up space at the PPUDO;

B. Provide a new 4m wide MUP connection from the Station entry at the O-Train platform level to the existing sidewalk on Bayview Road, south of the Tom Brown Arena parking area. Pathway shall adjoin existing sidewalk within the limits of the Lands. Provide a pedestrian pathway connection between Tom Brown Arena and the MUP to provide direct, convenient and barrier-free access between the arena and Bayview Station;

C. Provide pathways and plaza north of the Station at the O-Train platform level, designed and constructed to provide connection from the Station to future MUP works to the north (Champagne/O-Train Corridor Pathway), west (Scott Street to Ottawa River Connection) and east (future potential MUP). Required pathways shall extend to the limit as defined by the Lands. Termination of the pathways shall be coordinated with the identified City projects;

D. Provide a new 4m wide MUP from south of the Station and east of the O-Train platform level leading to the Station entry at the O-Train level. The new MUP shall extend south of the Station for a distance of approximately 30m beyond Albert Street. The southern termination shall be coordinated with the Champagne/O-Train Corridor Pathway Project and the temporary O-Train station access pathway to the BRT; and

E. Provide a transfer connection from the Platform to the O-Train at O-Train platform level within the fare paid zone.

(iii) Lebreton Station:

A. Provide pedestrian connections comprising of bus platform area and Station entrance plazas integrated with the Booth Street Bridge sidewalks one to either side of Booth Street. Sidewalk and plaza area shall be sized to allow for the loading and unloading of Passengers as well as circulation;

B. Provide a pedestrian pathway connection to and across the Heritage Bridge north the Station from the Station Entry at Platform Level;

C. Provide a new 4m wide MUP along the south side of the aqueduct. The new MUP shall be constructed from the Heritage Bridge extending westerly to adjoin the existing pavement at the Broad Street Bridge, and extending easterly approximately 160m to cross the covered portion of the aqueduct and connect to the existing MUP located on the north side of the aqueduct adjacent to Lett Street, within the limits of the Lands;

D. Provide a new 5m wide MUP at the north side of the aqueduct. The MUP shall be constructed from the Heritage Bridge extending west-northwest to adjoin the existing MUP, new MUP shall extend to the limit of the Lands. Project Co's design and construction shall not preclude for the future extension of the new MUP to the east from the Heritage Bridge; and

E. Project Co's design and construction shall include provisions for a future pedestrian pathway and connection from the Station adjacent to the southern edge of the Guideway extending to the east at Platform level to the limits of the Lands.

F. Project Co shall allow sufficient space to protect for a future 4 m MUP to be constructed south of the alignment, in the vicinity of the Station including but not limited to providing sufficient buffer space between the OLRT right of way fencing and the Structure supporting the Booth Street Bridge.

(iv) Downtown West Station:

A. Provide sidewalks and plaza area to accommodate pedestrian access from street level Station entry within the Place De Ville Podium Building to the public sidewalk on the north side of Queen Street; and

B. Provide sidewalks and plaza area to accommodate pedestrian access from street level western Station entry to the public sidewalks on the south side of Albert Street and the west side of Lyon Street.

(v) Downtown East:

A. All street level Station entrances shall provide pedestrian access to the public sidewalks on the south side of Queen Street.

(vi) Rideau Station:

A. Pedestrian connections to the north and south side of Rideau Street;

B. Pedestrian connections to William Street;

C. Building connection to the future Rideau Centre development; and

D. Future building connections at a location to be determined during final Design.

(vii) Campus Station:

A. Provide pedestrian and cycling connections from the Station entry at the below grade passage to the existing pathway to the west at the limit of the Lands;

B. Provide pathways, stairs, and ramps as required to connect the existing pedestrian underpass to the plaza and Station entry at Platform level;

C. Provide paving from the Station entry to all adjoining surfaces within the lands in the area bordered by Vanier, Careg and Marion Hall;

D. Provide pathways and plazas extending from the new pedestrian plaza adjacent to the Station extending to the sidewalk adjacent to the eastbound lane of Laurier Avenue within the Lands; and

E. Provide a new continuous MUP from the east side of the below grade passage through the new pedestrian plaza to the eastern Station limits, and continuing from the eastern Station limits to Lees Station adjacent to the west bound track of the Guideway.

F. Provide a four (4) metre wide pedestrian pathway from Campus Station to Laurier Avenue and provide a plaza on the south side of Laurier Avenue in accordance with the requirements of Schedule 15-2 Part 1 .

(viii) Lees Station:

A. Provide a new continuous 4m wide MUP located at Platform level outside of the fare paid zone adjacent to the west bound track of the Guideway. The MUP width may be reduced in certain locations outside the Station area in accordance with Schedule 15-2 Part 1. The new MUP shall extend from the below grade passage at Campus Station to the west to Hurdman Station to the east across the Rideau River Bridge adjacent to the west bound Track of the Guideway. Southeast of the Station and north of the Rideau River Bridge where the Guideway rises out of the trench, a pathway with a minimum width of 3.0m, shall be provided from the new MUP adjacent to the west bound track of the Guideway to the University of Ottawa Lees Campus parking lot to the north;

i. Width of the MUP on the Rideau River Bridge Structure shall be, at a minimum, not less than the existing MUP width of 2.4m and shall be maximized where possible; and

ii. MUP on the existing Rideau River Bridge Structure is not required to carry vehicle loads.

B. Southeast of the Station and north of the Rideau River Bridge, where the Guideway rises out of the trench, a new MUP shall be provided adjacent to the eastbound Track of the Guideway connecting from the Rideau River Bridge to the existing paths adjacent to the west side of the trench and along the north side of the Rideau River. The new MUP shall extend across the Rideau River Bridge to Hurdman Station adjacent to the eastbound Track of the Guideway;

i. Width of the MUP on the Rideau River Bridge Structure shall be, at a minimum, not less than the existing MUP width of 2.4m and shall be maximized where possible; and

ii. MUP on the existing Rideau River Bridge Structure is not required to carry vehicle loads.

C. Existing pathway and crossover connections at the north end of the Rideau River Bridge, under the Guideway shall be maintained; and

D. Provide new sidewalks and plaza areas as required to access the Station and associated features at the Station entrance level.

(ix) Hurdman Station:

A. Provide two new MUPs as a continuation of the MUPs on the Rideau River Bridge, one from each side of the Rideau River Bridge at grade. Maintain the existing MUP crossover under the Rideau River Bridge adjacent to the bridge abutment and connect the new MUPs to the crossover;

B. Provide a new MUP crossover at grade under the OLRT Guideway east of the existing crossover at the Rideau River Bridge;

C. Provide new MUP from the new crossover under the OLRT Guideway to the Station entrance on the north side of the OLRT Guideway;

D. Provide a new MUP extending from the Station entrance on the north side of the Station to the existing MUP to the east on the north side of the Guideway. The new MUP shall extend to adjoin the existing MUP within the limits of the Lands to the east;

E. Provide a new MUP from the Station to the existing MUP to the north. New MUP shall adjoin the existing within the limits of the Lands;

F. Provide a new MUP at the new east underpass Structure, connecting the existing MUP south of the Station access road to the MUP adjacent to the west bound Track of the Guideway;

G. Provide plaza, pathways and sidewalks connecting the Station entry to the bus Transfer area and PPUDO to the south of the Station;

H. Provide a new pedestrian connection linking the areas north and south of the Station outside of the fare paid zone;

I. Provide new sidewalks, bus platform areas and all required appurtenances in the fare paid zone adequately sized to support the loading and unloading of Passengers, circulation to and from the Station; and

J. Provide a new pedestrian pathway connection to the south, east of the Transitway, adjoining the existing pathways extending to the limits of the Lands.

(x) Train Station:

A. Provide MUPs connecting the existing MUP south of Tremblay Road and west of the "D"-shaped driveway to the Coventry Multi-Use Bridge and to the southwest corner of the Tremblay Road/VIA Rail Station driveway intersection, limit of work shall be within the Lands. Coordinate the design and layout of MUP with Work contained in Schedule 40, Highway Work;

B. Provide sidewalks and plaza connecting to existing adjoining sidewalks as required to connect the Station entry to the existing pathway network; and

C. Provide covered pedestrian pathway connecting the Station to the VIA Rail Station, weather protection does not need to be continuous at the crossing of the driveway leading to the parking lot between VIA Rail and the Station. Limit of pathway shall extend to the limits as described in the Lands.

(xi) St. Laurent Station:

A. Existing building connection to the St. Laurent Station at the intermediate level shall be maintained;

B. Five existing pedestrian entries to the Station from the bus platform shall be maintained; and

C. Existing pedestrian connection through the tunnel to the south west of the Station shall be maintained and modified to satisfy requirements of the OBC and NFPA 130.

(xii) Cyrville Station:

A. Provide sidewalks and an entry plaza off of Cyrville Road. Sidewalk construction shall extend east and west to adjoin existing construction within the limits of the Lands;

B. Project Co's Design and Construction shall include provisions for future 3m wide MUP connections from the development to the northeast and northwest to provide a continuous pathway connection under the Bridge;

C. Project Co's design and construction shall include provisions for a future continuous MUP to be located adjacent to the Guideway on the west side of the Guideway at Platform level, within the limits of the Lands; and

D. Project Co's design and construction shall include provisions for a future continuous MUP to be located adjacent to the westbound Track of the Guideway under the Aviation Parkway Bridges.

(xiii) Blair Station:

A. Existing building connection to the covered walkway over the Queensway to the south of the Station shall be maintained;

B. Provide a 6m wide pedestrian pathway from the north tower leading to the Gloucester Centre crosswalk within the limits of the Lands;

C. Existing pedestrian entry from the north tower to the bus loop shall be maintained;

D. Existing main pedestrian entry from the centre tower to the bus loop shall be maintained;

E. New pedestrian entry at west of Platform to the bus loop shall be provided;

F. Provide a sidewalk bounding the bus platform area adjacent to the Station. Sidewalk shall be continuous from the eastern limits of the bus platform extending to the mall access road to the northwest. Width of the sidewalk within the bus platform area shall be sufficient to accommodate the loading and unloading of Passengers as well as circulation and appurtenances. Sidewalk shall terminate at the existing sidewalk within the limits of the Lands at the west bus access point;

G. Provide a sidewalk bounding the bus platform area north of the Station. Sidewalk shall be continuous from the northern bus access point at the mall access road to the east extending to the western bus access point. Width of the sidewalk within the bus platform area shall be sufficient to accommodate the loading and unloading of Passengers as well as circulation and appurtenances. Sidewalk shall terminate at the existing sidewalk within the limits of the Lands at both northern and western bus access points; and

H. Provide a pedestrian pathway, including crosswalks, adjacent to the north side of the existing BRT from the eastern limit of the Blair Road Bridge to the sidewalk of the north bus platform area and extend to adjoin the existing to the east within the Lands.

(c) As indicated in Table 5-2.2, the Design and Construction of the Stations shall provide the following minimum bus bay requirements:

(i) Tunney's Pasture Station:

A. Eleven (11) bus bays shall be provided within the fare paid zone;

B. Two (2) bus bays shall be provided on Scott Street; and

C. Five (5) bus bays shall be provided on Yarrow Street.

(ii) Hurdman Station:

A. Eleven (11) bus bays shall be provided within the fare paid zone.

(iii) Blair Station:

A. Ten (10) bus bays shall be provided within the fare paid zone.

(iv) All bus bays shall accommodate articulated vehicles.

(d) Project Co shall provide bus operator buildings as indicated in the above table.

(i) New facilities shall be constructed to meet the requirements of the City's standard bus operator building.

(ii) Program elements within the facility shall include the following:

A. Multiple occupancy male washroom;

B. Multiple occupancy female washroom;

C. Breakroom with kitchenette and casework;

D. Staff work area;

E. Maintenance room with slop sink, accessed from the exterior;

i. Room shall be 60m2, with no side less than 6m

ii. Shall be equipped with a personnel door and a 4m wide overhead door

F. Building entry and maintenance room shall have electronic access control;

G. Mechanical and electrical support rooms;

H. New building shall be designed and constructed with materials compatible with the adjacent Station;

I. Buildings shall be provided with natural light and windows conforming to City's standard bus operator building requirements; and

J. Building shall be equipped with telephone and data services.

(e) Project Co shall provide public washrooms at terminus Stations, within the Fare Paid area, in accordance with the OBC.

(f) Refer to the Functional Program included in Appendix A of this Schedule 15 – Output Specifications for a listing of programmatic spaces.

(i) The Functional Program represents the anticipated programmatic elements required for each typical Station type based upon the Reference Concept. Mandatory program requirements are contained within the main body of this Schedule 15-2. It is the responsibility of Project Co to determine the minimum Station program requirements to provide a fully functioning system

(g) Refer to the Room Data Sheets included in Appendix B of this Schedule 15 - Output Specifications for finish materials, environmental requirements, data outlets, etc.

2.6 Project Elements

(a) Platforms:

(i) Platform Height

A. The finished level of the Platform at Platform edge shall be level with finished floor height of the vehicle.

(ii) Platform Drainage

A. The cross slopes of the Platforms shall not exceed 2% with a minimum of 1% toward the Track.

B. The longitudinal cross slope of the Platform surface shall not exceed 1.5%.

C. The path of travel lanes on the Platform shall comply with all accessibility requirements.

(iii) Platform floor finish

A. The finished floor material shall have a non-slip surface with a coefficient of friction of at least 0.60.

B. A detectable tactile warning strip, comprised of a non-slip, colour contrasting surface shall be placed along the trackside edge of the Platform

C. Floor colour and texture shall be different from the flooring in the areas approaching the Platform.

D. Lighting fixtures shall be installed at the ceiling, signage band or underside of the roof Structure to provide continuous light on the Platform edge warning strip.

(iv) Clearances from Platform

A. Vertical Clearances above Platform Surface

i. Any Station element that could be targeted for theft or vandalism (e.g. light fixtures, speakers, CCTV cameras, etc.) shall be located a minimum of 3050mm above the finished Platform surface. The possible use of benches, waste receptacles etc. by vandals to stand on to reach these elements shall be considered by Project Co in the final Design placement of all items.

(v) Service Outlets

A. Service outlets required for power and water shall be as follows:

i. Electrical – provide 15 A/120 V split receptacles at 20m intervals along the Platform area.

ii. Water Hose Bibs – at a minimum provide one (1) tamper proof hose bib on each Platform.

(vi) Service/Maintenance Personnel Access Requirements

A. Project Co shall provide access from the Platform to Track level at each end of each of the Station. Access off of the end of the Platform shall be restricted by gate with latch and fencing. Provide access as appropriate to the Guideway.

(vii) Platform barriers:

A. All side Platform configured Stations shall be provided with a continuous barrier fence between Tracks.

i. Barrier type shall be as indicated by fence type FE-2 as shown on the Federally Mandated Station Drawings.

ii. The barrier shall extend a minimum of 15m beyond the end of the Station Platform at each end of the Station or shall extend to a fixed divider wall in the case of the Underground Stations.

(viii) The O-Train platform at Bayiew Station shall be designed and constructed to satisfy the following minimum requirements:

A. Platform length shall be a minimum of 40m;

B. Platform width shall be a minimum of 5.0m.

C. Platform height shall be 0.5525m (21 ¾”) above top of rail;

D. Distance of the platform edge to the centreline of the track shall be 1.384 m (54 ½") and shall be constructed in such a manner to maintain a 12.7 mm (½") gap. Final distance of Platform edge to centreline of the Track shall be verified with OC Transpo during the final design; and

E. Project Co shall confirm final dimensions with the City prior to the commencement of construction.

(b) Fare collection and control:

(i) Project Co shall coordinate the future installation of fare collection Equipment with the City.

A. Dimensions, locations and coordination of all fare control Equipment shall be developed and coordinated with the City during the detailed Design and shall be included in the Passenger model simulations.

(ii) Project Co shall be responsible for the coordination of the installation of fare collection Equipment.

(iii) Project Co shall ensure that all building services and feeds are sized appropriately to accommodate the fare collection Equipment.

(iv) Project Co's final Design shall have sufficient space to accommodate fare barriers, including queuing space on the entry and exit side of the barriers for all Stations.

A. Project Co shall plan and design the location of equipment as to ensure the year round operation of the fare Equipment.

B. All fare collection, vending, and control Equipment shall be located within the station structure.

i. If it is not feasible to locate all fare Equipment within in the Station structure, the Equipment shall be fully protected from the elements to ensure year round operation.

C. The fare control line shall have full CCTV coverage for inbound and out bound direction.

(v) Fare Paid Zone:

A. Project Co shall plan, design and construct all Station with segregated fare paid and non-fare paid zones.

i. The fare paid zone of the Station and all fare paid transfer areas shall be segregated from non-fare paid zones by continuous 1.8m fencing or barrier.

ii. Fare paid zones at Tunney's Pasture, Bayview, Hurdman, and Blair Stations shall be planned and designed to allow bus or train Passengers to transfer to the LRT within the fare paid zone of the station.

iii. The following additional requirements shall apply for bus Transfer Stations:

1 Fare paid transfer area of Stations shall be designed to prohibit transferring Passengers from crossing bus traffic; and

2 All islands provided within a bus transfer area shall contain a combination of barriers not limited to fencing, landscaping, other physical elements to prevent Passengers from traversing bus traffic to access the LRT Station and bus platforms.

B. Fare control line for Underground Stations shall be located below grade.

C. Fare control measures at St. Laurent Station are only required where the existing pathway connection from the southwest under Highway 417 enters the Station Platform area.

(vi) All fare vending and fare control Equipment located in public spaces shall be recessed within niches where feasible;

A. Free standing Equipment shall be permitted provided Project Co provides sufficient queuing and circulation space as well as space required for maintenance and re-stocking activities, without compromising Passenger movement through the Station.

(vii) Project Co shall provide all conduits, cable ducts and accessories required for the installation of the fare control Equipment.

(viii) Exposed conduit and cable duct shall be avoided within public spaces to the greatest extent possible.

A. If the use of exposed conduit is required in public spaces Project Co shall paint or otherwise treat the conduit to blend in with the surface to which the conduit is attached.

(c) Weather protection:

(i) Project Co shall provide a study of the building envelope with respect to the micro-climatic and geographical location of each Station to determine the extent of the weather protection required.

(ii) Roof Design features shall include, but are not limited to the following:

A. Skylights to allow natural daylight to reach the Platform surface.

B. Roof accessibility systems such as hatches and retractable ladders, for cleaning and maintenance if required.

C. Fall protection measures that form a permanent part of the roof Structure.

D. Heat traced gutters and downspouts for roof drainage tied directly into a Stormwater Management system.

E. Snow guards shall be provided on all roofs.

i. Project Co shall be responsible for the design of snow guard systems.

ii. Particular attention shall be paid to the design and placement of snow guards on areas of roof above Station entrances and areas of roof adjacent to spaces of public circulation or gathering such as sidewalks and bus platforms to ensure the protection of the public from falling snow and ice.

(iii) Roof requirements:

A. Roof structures shall cover all vertical circulation elements (stairs, escalators and elevators) and Fare Control equipment.

B. Project Co shall provide roof structures covering the Platform area at all Stations with the exception of the Underground Stations and St. Laurent Station:

i. Project Co shall determine the extent of roof coverage required utilizing the Passenger forecast data and the results of the micro climate study for each Station identified in c) i) above;

ii. Roof structures shall cover the entire width of the Platform;

iii. Project Co shall be responsible to determine the applicability of extending the roof coverage beyond the edge of the Platform based upon the results of the micro-climate study for each Station identified in c)i) above; and

iv. Project Co shall determine the appropriate height of the roof structure above the Platform surface based upon the results of the micro-climate study for each Station identified in c)i) above.

C. Project Co shall be responsible for all interfaces and implications of the Platform roof structure, including but not limited to the following:

i. Interface of roof structure with LRT vehicle;

ii. Protection of OCS from falling ice and debris;

iii. Protection/isolation of any roof structure from stray current;

iv. Support of OCS;

v. Integration of lighting and signage requirements: and

vi. Integration of any other station or systems element.

(d) Windscreens:

(i) Project Co shall provide wind screens to provide Passengers protection from the elements. Windscreens shall be predominately constructed of structurally supported glass walls. The Design of all windscreens shall meet the spirit and intent of the details provided in the Federally Mandated Station drawings. The use of other frameless and partially framed systems shall be acceptable.

(ii) At a minimum, windscreens shall be provided at the perimeter edge of the Platform (side Platform) or outside edge of the Guideway (centre Platform).

(iii) Project Co shall provide a study of the building envelope with respect to the micro climatic and geographical location of each Station to determine the extent of the windscreen, including: where windscreens are required, extent of windscreen required, and required height of windscreen.

(e) Taxi Service points:

(i) Project Co shall provide signage with local taxi service phone numbers at all taxi service points.

(ii) Project Co shall provide pathways to support communication infrastructure to allow for multiple direct phone lines to taxi services, wi-fi and cellular technology, in coordination with the City.

(f) Designated Waiting Areas:

(i) Project Co shall provide one (1) DWA at all individual Station Platforms, including connecting bus platforms.

(ii) On LRT Platforms, the DWA shall be located near the centre of the Platform length.

(iii) DWAs shall be provided with the following features:

A. Signage indicating location of DWAs and indicating the amenities available in the DWA, which shall be consistent at all Stations;

B. Each DWA shall have fixed CCTV security coverage, PTZ cameras shall not be used for DWA;

C. Enhanced lighting level of 220 lux;

D. Transit information panels that show scheduled times, maps, and other relevant information shall be included;

E. A clock integrated with the Passenger Information Display shall be viewable from the DWA;

F. Companion seating;

G. Emergency phones at accessible height with handles, braille, and user-friendly directions;

H. Emergency cabinet with fire extinguisher;

I. Infrastructure to support a pay phone;

J. Accessible seating for four including seating with handles and backs;

K. Tinted glass or anything that compromises Safety or sightlines shall be prohibited from use in the DWAs;

L. Garbage and recycling receptacles shall be provided adjacent to the DWA;

M. All DWAs located on Platforms, with the exception of Underground Stations, shall be equipped with timed, Passenger activated heating.

N. DWAs on bus platform shelters shall be provided with timed, Passenger activated heating on bus platforms at intermodal bus transfer Stations; and

O. Location of DWA shall be indicated on the platform floor surface, Platform markings for all DWAs shall extend to the platform edge.

(g) Advertising:

(i) Provide pathways for all Infrastructure to support advertising in the Stations, including conduits, lighting etc.

(ii) Location and type of advertising shall be coordinated with the City.

(h) Public washroom features shall be provided as follows:

(i) CCTV coverage of the exterior of the washroom entrance doorway of each washroom shall be provided.

(ii) Each public washroom shall provide infant changing facilities.

(iii) Toilet partitioning shall be ceiling hung stainless steel panels.

(iv) Toilet stall latch shall be surface mounted dead bolt type.

(v) Coat hooks shall be installed on the stall door above head level.

(vi) Graffiti resistant mirrors shall be provided at each wash basin.

(vii) Soap dispensers, toilet tissue dispensers, towel dispensers and disposal units shall be provided.

(viii) Wash basins shall be built into a counter or vanity.

(ix) Shall be heated and ventilated.

(x) All fixtures shall be vandal-proof and be equipped with automatic water controls.

(xi) Toilet compartments and cubicles door and partition thickness shall be 25mm; pilaster thickness to be 32mm.

A. No system shall contain material capable of supporting growth of bacteria, fungi, mould, etc. or encourage the harbourage of insects or mites. No system shall, to any appreciable degree, develop or shed electrostatic charges.

B. All fasteners shall be concealed or tamper proof.

(i) Staff washrooms shall be provided at Stations as indicated in the functional requirement table above:

(i) Staff washrooms shall be provided with the following:

A. A mirror shall be provided at the wash basin; and

B. Soap dispenser, toilet tissue dispensers, towel dispensers and disposal unit shall be provided.

(ii) Staff washrooms shall be conditioned and ventilated.

(iii) All existing washroom facilities at St. Laurent Station shall remain.

(j) Project Co shall provide a multipurpose room at Downtown East Station for use by transit security and other staff for Emergency response and operational purposes as follows:

(i) Shall have a usable floor area of no less than 12m2;

(ii) Shall be rectangular with a minimum dimension of 3m;

(iii) Shall be provided with a CCTV feed and space for monitoring Equipment for at least one emergency responder to monitor; and

(iv) Entrance door to room shall have electronic access control.

(k) Automatic teller machines:

(i) Project Co shall provide all required infrastructure to support the installation of automatic teller machines and coordinate their location with the City.

(l) Emergency phones shall be provided

(i) Project Co shall provide emergency phones providing direct audio connection to the TSCC as follows.

A. Provide one emergency phone at each entrance;

B. Provide two (2) emergency phones on each LRT Platform;

C. In addition to the emergency phones required on Platforms each DWA shall have an emergency phone;

D. Provide a minimum of one emergency phone at each bus platform in addition to the emergency phone at the DWA; and

E. Provide emergency phones at new PPUDO;

(ii) Provide additional emergency phones as required where identified in the threat and vulnerability study. Emergency phones at outdoor locations shall be identified with a blue marker light.

(m) Payphones:

(i) Project Co shall provide provisions for public pay phones in accordance with the following:

A. Provide conduit and space for one (1) pay phone at every Platform, and located at every DWA;

B. Provide conduit and space for pay phones at new PPDUO's;

C. The City will arrange with a Third Party Contractor for payphone installation and maintenance of public payphones; and

D. All public phones shall meet the requirements of the Ontario Barrier-Free Design and the Accessibility for Ontarians with Disabilities Act.

(n) Transit information panels:

(i) Project Co shall provide at least two transit information panels at every bus and LRT Platform, and one (1) at each DWA per Platform.

(o) Project Co shall provide clocks displaying time of day, with a minimum of one (1) clock per Platform, including bus platforms at Terminal/Transfer Stations.

(p) Trash and recycling receptacles:

(i) Project Co shall provide trash and recycling receptacles in the following locations and minimum quantities:

A. Three (3) on each Platform including one (1) located at the DWA;

B. One (1) located on each mezzanine or concourse level of the Station;

C. All receptacles provided in public spaces shall be transparent to allow visual identification of their contents; and

D. Where provided, all receptacle groups shall be five stream receptacles to separate at source; organics, paper, glass, metal and other refuse.

(q) Platform seating:

(i) Project Co shall provide seating for four (4) on each Platform for each vehicle of the 2031 consist length.

(ii) Project Co shall provide seating for four (4) on each Platform for every two bus bays at Terminal/Transfer Stations.

(iii) Armrests shall be provided on all benches.

(iv) Seating shall be cantilevered from walls to facilitate floor maintenance, where located adjacent to a wall.

(v) The location of Platform seating shall not interfere with access to overhead lighting and Equipment.

(r) Outdoor shelters:

(i) Provide one 4m (nominal) bus shelter for each bus bay at Terminal/Transfer, applicable at Tunney's Pasture, and Blair Stations.

A. Shelters shall be the City standard modular shelter or equivalent as approved by the City.

B. Heating shall be required only in shelters utilized as DWAs.

(s) Bus supervisor's office

(i) Bus supervisor's office shall be provided at the Transfer Stations as indicated in the functional requirement table. The bus supervisor's office shall have the following requirements:

A. Shall be located at bus platform level, within the Station;

B. Shall be located adjacent to the bus transfer platform and contain a line of site to monitor bus operations.

C. Shall be have a minimum area of 12m2 with no side less than 3m;

D. Shall be conditioned;

E. Shall be accessed from the bus platform area; and

F. Shall be equipped with a minimum of two (2) data and two (2) telephone connections.

(t) Retail spaces

(i) Shell space or provisions protecting for future retail use shall be provided in the following Stations:

A. Tunney's Pasture Station, Rideau Station, Hurdman Station and Blair Station

(ii) Protect retail shell spaces or provisions for future retail spaces at Federally Mandated Stations as generally shown in the Federally Mandated Station Design drawings.

(iii) Provide a $15m^2$ shell space at Blair Station accessible from inside of the station at the lowest level.

(iv) Provide a $15m^2$ shell space at Rideau Station located within the non-fare paid zone.

(v) All retail shell spaces shall have electrical and communications services roughed in for the protection of future development.

(vi) All retail spaces shall have water and sanitary services roughed in for the protection of future development.

(vii) At Hurdman Station, where provisions for future retail space have been protected, all utilities referenced in this section shall be accessible from within the identified protected area.

(viii) Once developed and occupied by a tenant, control of retail spaces and revenue generated from the retail space shall belong to the City.

(u) Art display cases:

(i) Rideau Station:

A. Project Co shall provide, at a minimum, 25 lineal metres of fully recessed public art display cases within the non fare paid connector of the Station:

i. Cases shall be provided with full view, vandal resistant, transparent glass panels;

ii. Cases shall be lockable, tamperproof and fully accessible to authorized staff;

iii. Cases shall be located in a continuous and uninterrupted arrangement;

iv. Cases shall be lined in drywall mounted to 13 mm plywood;

v. Lower limit of the display cases shall be located no more than 0.8 m above the finish floor level;

vi. Display cases shall be a minimum of 0.5 m deep;

vii. Height of display case shall be a minimum of 2.0 m high;

viii. Each display case shall be provided with individual lighting system with dimmable lighting controls located in the electrical room;

ix. Lighting system shall support multiple types of luminaries; and

x. Each case shall be provided with one dedicated 120V/ 20A electrical outlet.

2.7 Material Requirements

(a) Architectural cast in place concrete, (ARCH CIP CONC)

(i) Design and performance requirements

A. Provide architectural cast in place concrete in accordance with CSA-A23.1/A23.2.

B. Architectural Cast in Place Concrete Finishes:

i. Staining or discolouration from release agents not permitted.

ii. Maximum of 15 air voids or bug holes for 1m2 of surface area; 5mm maximum size of visible holes; honeycombing not permitted.

iii. Surface sacking or abrasive blasting to conceal surface imperfections not permitted. Patching only permitted upon prior approval of the City.

iv. Form finish is final appearance. Provide smooth forms which do not telegraph plywood grain or other surface imperfections unless otherwise specified.

v. Colour: Light grey.

C. Limit of Concrete Surface Irregularities:

i. Offsets and Fins: 3mm.

ii. Variations in Plane: 3mm in 1.5m.

D. Tie Holes: Uniform profile and diameter, of pattern approved by the City, in symmetrical layout, filled with plugs matching appearance of adjacent concrete.

E. Control Joints: Tapered, 20 x 20mm.

F. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces.

i. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces.

ii. Corners: Square.

(ii) Materials – general

A. Sustainable Design:

i. Design of Mixtures: Provide concrete mixture containing fly ash and other acceptable replacements as needed, to reduce the total amount of portland cement, by not less than 40 percent.

ii. Minimum Recycled Content: Provide steel materials with postconsumer recycled content of not less than 60%.

B. Source Limitations for Concrete: Each colour, size, type, and variety of concrete material and concrete mixture obtained from a single manufacturer with resources to provide consistent quality in appearance and physical properties, for each station.

(iii) Form-facing materials

A. Form-Facing Panels for Smooth-Formed, As-Cast Finishes: Non-Absorptive; as appropriate, and that will provide continuous, true, and smooth concrete surfaces; 1200 x 2400mm size to greatest extent possible. Use one of the following:

i. Exterior-Grade Plywood Panels: Medium-density overlay, Class 1, or better, mill-applied release agent and edge sealed.

ii. Steel.

iii. Glass-fibre-reinforced plastic.

B. Forms for Cylindrical Columns: Metal, glass-fibre-reinforced plastic, paper, or fibre tubes that will provide surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation. Spiral effect created by Sonatube or similar forms not permitted.

C. Form Ties: Factory-fabricated, leak-proof, internally disconnecting ties.

i. Furnish ties with tapered tie cone spreaders that, when removed, will leave holes 25mm in diameter on concrete surface.

ii. Furnish internally disconnecting ties that will leave no metal closer than 38mm, after exposing aggregate, from the architectural concrete surface.

D. Form Release Agents: Commercially formulated, colourless form-release agents that will not bond with, stain, discolour or adversely affect concrete surfaces.

i. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Sealers: Types that that will not stain, discolour or adversely affect concrete surfaces.

F. Fasteners for Form Reglets: Galvanized or approved non-corrosion-resistant steel.

(iv) Accessories

A. Repair Materials:

i. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

ii. Epoxy Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements.

(b) Precast concrete stair units, (PC), Prefabricated stair nosings, (STAIR NSG), Prefabricated tactile warning strips (TWS).

(i) Design and performance requirements

A. Calculate erection forces and structural properties of precast items in accordance with requirements of CSA-A23.3 and CSA-A23.4.

B. Precast Concrete Unit:

i. General: Resistant to water, freeze-thaw cycling, de-icing salts / chemicals, staining, wear and degradation from cleaning substances.

ii. Surfaces Exposed to View: As-cast-finish, non-slip, appearance and finish to match PCC PAVER 1 precast concrete pavers specified for this Project, and as follows:

1. Uniform colour and texture.

2. Free of staining, discoloration, honeycombing, air holes, fins, and protrusions, surface cracking and minor chips or spalling at edges or ends.

iii. Semi-Exposed Surfaces (surfaces not visible to the public): As specified for surfaces exposed to view except as follows:

1. Surfaces may contain small holes caused by air bubbles.

2. Removal of minor protrusions and repairing of honeycombing and air holes is permitted.

iv. Edges and ends ground smooth; chamfers not permitted.

C. Casting Tolerances:

i. Variation in Overall Unit Height and Width: Plus or minus 3mm for units 3m or under; plus zero, minus 3mm for units exceeding 3m.

ii. Variation in Unit Thickness: Plus or minus 3mm.

iii. Local Smoothness: 3mm per 3m.

(ii) Materials - general

A. Sustainable Design:

i. Design of Mixtures: Provide concrete mixture containing fly ash and other acceptable replacements as needed, to reduce the total amount of portland cement, by not less than 40%.

ii. Minimum Recycled Content: Provide steel materials with postconsumer recycled content of not less than 60%.

B. Materials and Construction: Shop produced to CSA-A23.4 and CPCI Precast / Prestressed Concrete Manual.

(iii) Concrete materials

A. Concrete: High density, non-porous, produced from proprietary premixed material requiring the addition of water and admixtures, in proportions recommended by concrete producer to achieve specified performance and appearance requirements, in accordance with CSA-A 23.1, and to the following material standards:

i. Portland Cement: CSA-A5.

ii. Aggregates: CSA-A23.1, Fine and Course gradations.

iii. Water: CSA-A23.1.

iv. Admixtures: ASTM C494; air-entraining agents to ASTM C260, type not detrimental to the concrete.

v. Supplementary Cementing Materials: CSA-A23.5.

(iv) Reinforcement

A. Reinforcing Steel Bars: CSA-G30.18, deformed steel, unfinished, Grade 400R, deformed steel billet bars, unfinished, size commensurate with precast unit design.

(v) Accessories

A. Connection Materials: Conform to requirements of CSA-A23.1/A23.2, and as follows:

   i. Stainless-Steel Plate: ASTM A666, Type 316, of grade suitable for application.

B. Stainless-Steel Bolts and Studs: ASTM F593, Type 316, high strength steel type for structural joints; hex-head bolts and studs; stainless-steel nuts; and flat, stainless-steel anti-vibration washers or lock washers.

C. Concrete Anchors: ASTM A193, Grade B7, high strength stainless steel, Type 316.

D. Setting Materials

   i. Mortar and Grout: CSA A179M, Type M.

   ii. Grout, premixed, non-shrink, non-metallic.

   iii. Setting Shims: Plastic.

E. Concrete Surface Repair Filler: Type as recommended by fabricator, and to conform to design and performance requirements.

F. Prime Paint for Steel Items: CAN/CGSB-1.181, zinc rich.

G. Stair Nosing (STAIR NSG):

   i. 76.2 x 6.4mm high, length equal to full width of stair, extruded aluminum, with black aluminum oxide grit in epoxy base abrasive inserts.

   ii. Product: Model CT-20/3A manufactured by KN Crowder, or approved equivalent.

   iii. Include manufacturer recommended epoxy setting adhesive.

H. Tactile Warning Strips (TWS):

   i. 76.2 x 6.4mm high, extruded aluminum, with black aluminum oxide grit in epoxy base abrasive inserts.

   ii. Product: Model CT-22/3A manufactured by KN Crowder, or approved equivalent.

I. Include manufacturer recommended epoxy setting adhesive, and permanent seal between adjacent elements.

(c) Stone cladding, (Smooth Finish STN 1) (Rough Finish STN 2)

(i) Design and performance requirements

A. Structural Performance: Dimension stone cladding assembly shall withstand the effects of gravity loads, seismic loads, and loads and stresses within limits and under conditions indicated, including wind loads, loads due to maintenance, in accordance with applicable codes.

i. Equipment Loads: Allow for loads of window cleaning and maintenance equipment.

ii. Stone Anchors: Capable of withstanding not less than two times the weight of the stone cladding in both compression and tension.

B. Quality Standards: Perform work in accordance with CSA-A371 and recommendations of Indiana Limestone Handbook published by Indiana Limestone Institute of America, Inc (ILI).

C. General: Design stone anchors and anchoring systems according to ASTM C1242.

D. Form external corners to square joint profile.

E. Stone Coursing: Running, stack or ashlar bond, with a uniform consistent joint width of 10mm.

F. Mortar Joints: Raked and recessed.

G. Tolerances of Installed Work:

i. Maximum Variation from Plane of Wall: 6mm in 6m, 12mm in 12m or more.

ii. Maximum Variation between Face Plane of Adjacent Panels: 1.6mm.

iii. Maximum Variation from Plumb: 6mm in 3m, 10mm in 6m or 12mm in 12m or more.

iv. Maximum Variation from Level Coursing: 3mm in 3m, 6mm in 6m, or 10mm maximum.

v. Maximum Variation of Joint Thickness: 3mm/m.

(ii) Material – general

A. Sustainable Design:

i. Regional Materials: Limestone shall be fabricated within 800 km of Project site from stone that has been extracted within 800 km of Project site.

B. STONE SUPPLIERS

i. Acceptable Stone Suppliers:

1. RGT Cloutier Construction, Pembroke, Ontario, or approved equivalent supplier.

(iii) Limestone

A. Material Standard: Comply with ASTM C568.

B. Provide units having minimal variation in colour with adjacent units and over the full area of the installation; resistant to freeze-thaw cycling; and within colour range indicated on Sample Boards, or as approved by the City.

C. Smooth Finish Stone (STN 1): As Manufactured by RGT Cloutier Construction or approved equivalent.

i. Grade: Select

ii. Colour: Buff

iii. Surface Texture: Smooth matt finish.

iv. Face Size: 200 x 600mm nominal, cut square with square corners.

v. Thickness: 200mm nominal.

D. Rough Finish Stone (STN 2): As Manufactured by RGT Cloutier Construction or approved equivalent.

i. Grade: Select.

ii. Colour: Buff.

iii. Surface Texture: Medium rough matt finish.

iv. Face Size: 200 x 600mm nominal, cut square with square corners.

v. Thickness: 200mm nominal.

(iv) Mortar materials

A. Setting and Pointing Mortar: CSA-A179, non staining, types applicable to specific locations of walls, and to suit bearing capacity and lateral strength of masonry; tested for compliance with performance requirements.

i. Colour: Within colour range of stone indicated on Sample Board, or as approved by the City.

B. Water: Clean and potable.

C. Admixtures: Not permitted, unless otherwise authorized by the City.

(v) Accessories

A. Anchors, Dowels, and Ties: Stainless steel to ASTM A167, Type 304.

B. Sealant: Non staining, type suitable for use where subject to contact with pavement de-icing substances and frequent use of maintenance cleaners.

i. Colour: Within colour range of stone indicated on Sample Board, as selected by the City.

C. Associated Materials: Non staining, including setting buttons, spacers, weeps, cavity vents, joint fillers, back coating for stone, and cleaning solutions.

i. Flashing Colour: Within colour range of stone indicated on Sample Board, or as approved by the City.

(d) Architecturally exposed structural steel, (AESS)

(i) Quality Assurance

A. Requirements specified in the referenced Quality Standard, supplemented as follows:

i. Category 2 AESS: AESS that is within 6m vertically or horizontally of a walking surface and is visible to a person standing on that walking surface.

ii. Category 3 AESS: AESS that is not defined as Category 2 or that can be viewed at a distance greater than that specified in Category 2.

(ii) Design and performance requirements

A. Standard: Perform Work to AISC publication Code of Standard Practice for Steel Buildings and Bridges, Section 10 as supplemented by AISC

publication "AESS Supplement" to "Modern Steel Construction", May 2003.

B. Fabrication - General:

i. Assemble and erect AESS to provide structurally sound, non-corroding assemblies

ii. Fabricate and assemble AESS in the shop to greatest extent possible.

iii. Weld connections.

iv. Detail AESS assemblies to minimize field handling and expedite erection.

v. Design location of field joints in AESS assemblies to occur at concealed locations to the fullest extent possible.

vi. Seal weld open ends of round and rectangular hollow structural section with 9mm closure plates. Provide continuous, sealed welds at angle to gusset plate connections and similar locations where AESS is exposed to weather.

C. Welding: Comply with the requirements of AWS D1.1, and as supplemented by the following requirements:

i. Welds Ground Smooth: Grind welds smooth. For groove welds, make weld flush to surface each side and within plus 1mm and minus 0mm of plate thickness.

ii. Contouring and Blending of Welds: Fillet welds to be ground-contoured or blended, oversize welds as required and grind to provide smooth transition.

iii. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.

D. Piece Marks Hidden: Fabricate AESS such that piece marks are either fully hidden when erected or made with such media to permit full removal after erection; grind off labels and manufacturer markings.

E. Minimized Distortion of Rolled Members:

i. Fully shape items to be rolled to a final curved shape and tie during shipping to prevent stress relieving.

ii. Distortion of the web or stem, and of outstanding flanges or legs of angles shall be visibly acceptable to the City from a distance of 6m under any lighting condition determined by the City.

F. Shop Connections:

i. Bolted Connections: Align bolt heads to greatest extent possible.

ii. Curved Members: Fabricate members to curved shape by rolling to final shape in fabrication shop.

G. Fabrication Tolerances:

i. Distortion of webs, stems, outstanding flanges, and legs of angles to curved surfaces shall not be visible from a distance of 6m, under any lighting conditions.

H. Treatment of Dissimilar Metals:

i. Where applicable, coat surfaces of dissimilar metals in contact with each other with acceptable isolating materials to prevent galvanic corrosion.

(iii) Materials – General

A. Sustainable Design:

i. Minimum recycled content: Provide steel materials with postconsumer recycled content of not less than 25%.

(iv) Materials and assembled units

A. Galvanizing:

i. Structural Steel Components: ASTM A123/A123M, 600 g/sq m coating.

ii. Non-Structural Items: ASTM A123/A123M, 380 g/sq m coating.

iii. Anchor Bolts and Fasteners: ASTM A153/A153M.

B. Finishes:

i. Prepare surfaces and apply shop primer to ungalvanized AESS ready to receive field-applied finish paint specified in PAINTING.

ii. Prepare galvanize AESS ready to receive field-applied finish paint specified in PAINTING.

C. Use special care in handling and shipping of AESS both before and after finishing.

(e) Painted metal fabrications, (MISC MTL PTD)

(i) Quality assurance

A. Welded Steel Construction: CSA-W59.

(ii) Materials - general

A. Sustainable Design:

i. Minimum Recycled Content: Provide steel materials with postconsumer recycled content of not less than 25%.

(iii) Materials

A. Steel Sections and Plates: CAN/CSA-G40.20/G40.21, Grade 300W.

B. Exposed Mechanical Fastenings: Flush countersunk stainless steel screws or bolts; consistent with design of fabricated item, strength and size to suit application.

C. Bolts, Nuts, and Washers

i. For Interior Items: Steel, ASTM A307.

ii. For Exterior Items: Stainless steel, ASTM F738M and ASTM F836M.

D. Welding Materials: Type required for materials being welded.

E. Touch-Up Primer for Galvanized Surfaces: SPCC-Paint 20, Type II Organic zinc rich.

F. Galvanizing:

i. Structural Steel Components: ASTM A123/A123M, 600 g/sq m coating.

ii. Non-Structural Items: ASTM A123/A123M, 380 g/sq m coating.

iii. Anchor Bolts and Fasteners: ASTM A153/A153M.

G. Finishes:

i. Shop prime ungalvanized metal fabrications ready to receive field-applied finish paint specified in Painting.

ii. Prepare galvanize metal fabrications ready to receive field-applied finish paint specified in Painting.

H. Treatment of Dissimilar Metals:

i. Where applicable, coat surfaces of dissimilar metals in contact with each other with acceptable isolating materials to prevent galvanic corrosion.

(f) Stainless steel fabrications

(i) Quality assurance

A. Welded Steel Construction: CSA-W59.

(ii) Materials - general

A. Sustainable Design:

i. Minimum Recycled Content: Provide stainless steel materials with postconsumer recycled content of not less than 60%.

1 Where finish quality may be compromised by the percentage of postconsumer recycled content, provide materials with the maximum postconsumer recycled content acceptable to the selected manufacturer.

(iii) Materials

A. Stainless Steel Sheet: ASTM A240M or ASTM A666, Type 316, stretcher-levelled standard of flatness.

B. Stainless Steel Bars and Shapes: ASTM A276, Type 316L.

C. Exposed Mechanical Fastenings: Flush countersunk stainless steel screws or bolts; consistent with design of fabricated item, of type compatible with material being fastened, strength and size to suit application.

D. Stainless-Steel Bolts and Nuts: ASTM F738M and ASTM F836M.

E. Welding Materials: Type required for materials being welded.

F. Treatment of Dissimilar Metals:

i. Where applicable, coat surfaces of dissimilar metals in contact with each other with acceptable isolating materials to prevent galvanic corrosion.

(iv) Structural glass fittings

A. Fittings for Connecting Glass to Structure: Stainless steel, ASTM A 666, Type 316, cast or machined as specified, point glazing system of brackets and spider design compression fittings, for four point, two point or single point attachment. Provide with bolts, nuts and gaskets as recommended by fitting manufacturer.

i. Product: Series S15 manufactured by Stella Custom Glass Hardware or approved equivalent.

(g) Wood items, (Benches: WD FIN 1) (Exposed Wood Ceilings: WD FIN 2) (Exposed Structural Wood: STRUC WD)

(i) Design and performance requirements

A. STRUCT WD: Prefabricate wood items to greatest extent possible.

(ii) Materials

A. STRUC WD: Ash species sourced from trees infected by emerald ash borer, grade to suit application, cut and appearance to match sample on Sample Board, or as approved by the City.

B. WD FIN 1: Ash species sourced from trees infected by emerald ash borer, clear, knot-free, minimal colour variation, grade to suit application, cut and appearance to match sample on Sample Board, or as approved by the City.

C. WD FIN 2: Ash species sourced from trees infected by emerald ash borer, fire-retardant treated, knot-free, minimal colour variation, grade to suit application, cut and appearance to match sample on Sample Board, or as approved by The City.

i. Fire-Retardant-Treatment: By pressure process, capable of providing a maximum flame spread/smoke development rating required by applicable code when tested to ASTM E84, and using materials acceptable to the authorities having jurisdiction.

(iii) City supplied material:

A. The City is currently removing ash trees within the City of Ottawa affected by the Emerald Ash Borer. In-line with the City's sustainability goals, a portion of this wood material will be processed and made available for use in construction of the Stations and MSF.

B. The City, at no cost to Project Co, will provide up to 300,000 board feet of emerald ash wood for use as secondary members within the soffit of the

timber diamonds or other components of the interior surface as designed by Project Co.

i. Project Co shall use a minimum of 200,000 board feet of the emerald ash bore wood that is visible to the public as part of the station roofs, ceilings or walls or any other manner.

1 Material shall be permitted for use in the ceiling and walls of all Stations outside of the touch zone of the public when measured from adjacent walking surfaces and surfaces that could be utilized to access the material, including but not limited to benches, trash receptacles, etc.

2 The City supports and encourages the use of this material in all Stations and the Maintenance and Storage Facility.

ii. Material description:

1 Species: Ash, (White, Red, Green, European).

2 Visual grade (appearance only): Ash No.2AC as categorized by the National Hardwood Lumber association (NHLA).

3 Total quantity available: 750,000 board feet, (2x4) (38mm x 89mm nominal).

4 Length of Material: 610-1830 mm. Random lengths of which 75% shall be >900 mm.

C. Project Co shall be responsible for ordering, pick-up (within a 50 km radius of the site) and all shipping costs of the material.

D. Project Co shall coordinate the Station construction schedule with the City to identify a production schedule and pick-up schedule. The City will have processed ash wood ready for pick-up by Project Co according to the following schedule which can be amended if both parties are agreeable:

i.	Hurdman Station	July 2015
ii.	Train, Cyrville & Blair Stations	March 2016
iii.	St.Laurent & Underground Stations	June 2016
iv.	Lebreton Station	October 2016
v.	Tunney’s Pasture, Bayview, Campus and Lees	December 2016

E. For design purposes, as secondary members within the soffit of the timber diamonds, the material provided by the City shall have the following minimum properties:

i. Modulus of Rupture: 86 MPa minimum.

ii. Compression parallel to grain: 41 MPa, minimum.

iii. Compression perpendicular to grain: 5.2 MPa, minimum.

iv. Shear parallel to grain: 10.8 MPa, minimum.

v. Modulus of Elasticity: 11000 MPa, minimum.

vi. Properties are test values, not allowable stresses, and represent lumber with 12% moisture content. The values are typical for black ash which is typically the weakest species of ash. It is anticipated the bulk of the lumber available will the white, green or European ash, which should meet or exceed the values listed above.

(h) Prefinished aluminum shingles, (ALUM SHINGLES PREFIN)

(i) Design and performance requirements

A. General:

i. Perform Work in accordance with standard details and requirements of CRCA Roofing Specifications Manual, supplemented by requirements of NRCA Steep Roofing Manual and SMACNA Architectural Sheet Metal Manual.

ii. Fire Hazard and Windstorm Requirements:

1. Provide roofing, flashings, and component materials equivalent to requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system and with Fire Hazard Classification Class A, CAN/ULC-S107.

iii. Roof Assembly Windstorm Classification, Class 1 Construction, wind uplift requirement of I90, in accordance with FM 1 28 - Design Wind Loads.

iv. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer, based on testing and field experience.

B. Aluminum Shingle Roofing:

i. Engineer and specially configure roof panels and drainage channels to comply with performance requirements and achieve uniformity in appearance and layout.

ii. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes at the location of the place of the work, to prevent buckling, opening of joints, overstressing of assembly and other components, failure of joint sealants, failure of connections, and other detrimental effects.

iii. Aluminum Sheets:

1. Accurate to profile, free from distortion or defects detrimental to appearance or performance.

2. Appearance of Finished Work: Variations in appearance of adjacent panels are not acceptable. Noticeable variations in the same panel not permitted. Maintain orientation and location of panel finish and appearance variations during production and installation.

iv. Attachment Requirements: Shingles attached by concealed fastener and clip system; fasteners and other penetrations to be sealed with a layer of roof membrane or waterproofing mastic; achieve water tight seal.

v. Installed Shingle Roofing Performance: Weathertight; folded seams shall not trap or retain moisture.

(ii) Materials - general

A. Sustainable Design:

i. Minimum recycled content for Aluminum: 50%.

(iii) Aluminum shingle roofing materials

A. General: Custom fabricate aluminum sheet shingle roofing to comply referenced quality standards that apply to design, panel width dimensions, geometry, metal thickness, and other characteristics of installation. Fabricate roofing panels and accessories in shop to greatest extent possible.

B. Aluminum Sheet: ASTM B209M, alloy and temper to suit application and performance requirements; smooth, flat, 1.29mm minimum thickness; Shop pre-coated with high performance coating.

C. Shingle Shape and Dimensions: With hemmed edges designed to securely mechanically engage sheet with cleat.

D. Finish:

i. Exposed Finish: Three-coat fluoropolymer, AAMA 620; fluoropolymer finish containing not less than 70% PVDF resin by weight in both colour coat and clear topcoat; preparation, pretreatment and finish coat application to coating and resin manufacturers' written instructions.

1. Colour: Custom colour; to match Alucobond Series C, Titanium C3010-DXLE or as approved by the City.

ii. Concealed Finish: Pretreat with manufacturer's standard white or light-coloured acrylic or polyester-backer finish system.

E. Drainage Mat:

i. Provide continuous Enkamat 7010 three dimensional multi-use drainage mat, 11.43mm thickness, made of continuous nylon filaments fused at their intersections, manufactured by Colbond, or approved equivalent.

F. Cleats: Intermittent attachment devices for mechanically securing shingle hems; aluminum of thickness and shape to comply with performance requirements.

G. Cleat Fasteners: Stainless steel, of type recommended by referenced quality standards and to comply with performance requirements.

(iv) Flashing materials

A. Sheet Flashings for Shingle Roofing: Prefinished aluminum sheet, same specification as aluminum sheet for shingles except 3mm thickness.

(i) Snow guards, (SNOW GUARDS)

(i) Design and performance requirements

A. Provide snow guards in accordance with manufacturer’s requirements.

(ii) Manufacturers

A. Original Metal Snow Guard manufactured by Sno-Gem or approved equivalent.

(iii) Snow guards

A. Prefinished aluminum, 63.5mm high, 89mm wide, 89mm deep.

B. Attachment Method: Directly to shingles using permanent adhesive supplemented by rivet fasteners without penetrating roofing membrane.

C. Finish: Coating and colour as specified for prefinished aluminum shingles.

(j) Overhead coiling grilles, (OCDR)

(i) Manufacturers

A. Overhead coiling grille model 671 series manufactured by Overhead Door Corporation or approved equivalent.

(ii) Materials

A. Sustainable Design:

i. Minimum Recycled Content:

1. Provide steel materials with postconsumer recycled content of not less than 60%.

2. Provide aluminum materials with postconsumer recycled content of not less than 25%.

B. Grille: Conforming to the following:

i. Curtain Material: Stainless steel, ASTM A666, Type 316.

ii. Curtain consisting of a network of minimum, 8mm diameter horizontal rods, or rods covered with tube spacers.

iii. Interconnect rods by vertical links approximately 16mm wide and rotating on rods.

iv. Space rods at approximately 38mm o.c.

v. Space links approximately 150mm apart in a straight in-line.

C. Endlocks: Continuous end links; locking and retaining grille curtain in guides against excessive pressures, maintaining grille alignment, and prevent lateral movement.

D. Bottom Bar: Stainless Steel tube, finished to match grille.

i. Astragal: Equip each grille bottom bar with a combination astragal of replaceable, adjustable, continuous, compressible gasket of

flexible vinyl, rubber, or neoprene as a cushion bumper and safety edge.

E. Grille Curtain Jamb Guides: Stainless steel angles, of profile to retain grille in place, fitted with integral wear stripping to prevent metal-to-metal contact and to minimize operational noise; include with removable stops on guides to prevent overtravel of curtain.

i. Mounting Brackets: Stainless steel.

F. Roller Shaft Counterbalance: Aluminum pipe and helical steel spring system, capable of producing torque sufficient to assure smooth operation of grille from any position; with adjustable spring tension.

G. Hood Enclosure: Stainless steel, Type 316, minimum 0.65mm thick, internally reinforced to maintain rigidity and shape, closed ends, removable soffit.

(iii) Electric Operator:

A. General: Provide electric operator assembly of size and capacity recommended and provided by grille manufacturer for grille and operation-cycle requirements specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control Stations, control devices, integral gearing for locking grille, and accessories required for proper operation.

B. Electrical Components, Devices, and Accessories: Listed and labelled as defined in NFPA 70, Article 100, by CSA or ULC as applicable.

i. Motor Mounting: Side-mounted.

ii. Speed: Minimum 0.2 m/s, maximum 0.3 m/s.

(iv) Control Station: Standard three button (OPEN STOP CLOSE) control for each operator; 24 volt circuit; surface mounted, weatherproof type. Provide two keys per station.

i. Provide connection for off-site remote control by Operations and Maintenance Centre.

(v) Safety Edge: Located at grille bottom bar, full width, electro mechanical pneumatic sensitized type, wired to immediately stop grille upon striking object, and reverse downward grille travel; hollow covered seal.

(k) Glazed aluminum curtain walls, (CTW)

(i) Design and performance requirements – UNINSULATED WALLS

A. Quality Standard: Perform Work in accordance with AAMA Aluminum Curtain Wall Design Guide Manual.

B. Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with applicable code, as measured in accordance with ASTM E330.

C. Design and size components to withstand seismic loads and sway displacement as calculated in accordance with applicable codes, and with deflections not less than.

   i. Deflection Normal to Wall Plane: Limit mullion deflection to L/175, with full recovery of glazing materials.

   ii. Deflection Parallel to Glazing Plane: L/360 of clear span or 3mm, whichever is smaller.

   iii. Reduce deflection values when performance of structural glazing or water tightness will be compromised, or when detrimental effect to system components will occur.

D. Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.

E. Assembly to accommodate without damage to components or deterioration of seals, movement between components and between perimeter framing and adjacent structures, dynamic loading and release of loads, deflection of structural support framing, and movements of adjacent structure.

F. Surface Temperature: System to be capable of withstanding metal surface temperature range of 110°C over a 12 hour period, without buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance.

G. Design glass attachments and joints to achieve weathertight seals.

H. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, vibrations caused by train movements, loosening, weakening, or fracturing of attachments or components of system.

I. Water Leakage at Sealed Joints: None, when measured in accordance with ASTM E331, at pressure differential of 720 Pa.

J. Joints: Accurately fitted and secure joints and corners; joints flush, hairline, and weatherproof.

K. Fasteners and Attachments: Concealed from view.

(ii) Design and performance requirements – INSULATED WALLS

A. In addition to the requirements specified for uninsulated curtain wall assemblies include the following requirements.

B. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 1.64 W/sq. m x K (0.29 Btu/sq. ft. x h x°F) as determined according to NFRC 100.

C. Sound Transmission of Wall System (Exterior to Interior): Value as required by applicable code, when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.

D. Air Infiltration: Limit air infiltration through assembly to 0.0003 cu m/sq m of wall area, measured at a reference differential pressure across assembly of 720 Pa as measured in accordance with ASTM E283.

E. Water Leakage: None, when measured in accordance with ASTM E331, at pressure differential of 720 Pa.

F. Condensation Resistance: Prevent condensation and frost on inside surfaces of system when subject to outside temperature of minus 25°C and 24 kph wind speed and inside temperature of 21°C when interior relative humidity is 50%.

G. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

H. Air and Vapour Seal: Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound. Locate air seals to prevent contact between interior humid air and exterior cold air and structure components, and to prevent moisture accumulation on these surfaces during cold weather.

(iii) Materials - general

A. Sustainable Design:

i. Minimum Recycled Content: Provide aluminum materials with postconsumer recycled content of not less than 50%.

1 Where finish quality may be compromised by the percentage of postconsumer recycled content, provide materials with the maximum postconsumer recycled content acceptable to the selected manufacturer.

(iv) Curtain wall glazing system

A. Subject to conformance with requirements, design curtain wall assemblies based on:

i. Model 1600 Wall System 2 Structural Silicone Glazed SSG Curtainwall manufactured by Kawneer for uninsulated curtain walls.

ii. Model 1600 Wall System1 manufactured by Kawneer for insulated curtain walls.

(v) Materials

A. Extruded Aluminum: ASTM B221/B221M.

B. Sheet Aluminum: ASTM B209/B209M. Facings AA 5005-T6, minimum 3mm thick; flashings AA 5005-H14, minimum 2mm thick.

C. Fasteners: Compatible with aluminum as per manufacture's recommendation.

(vi) Components

A. Uninsulated Mullion Profile: Glazing stops sufficient size to provide bite on glass; drainage holes, deflector plates and internal flashings to accommodate internal weep drainage system; internal mullion baffles to eliminate "stack effect" air movement within internal spaces.

i. Mullion Caps: Aluminum, finish to match curtain wall mullion sections, secured with concealed tamperproof fastening method.

B. Insulated Mullion Profile: Thermally broken with interior tubular section insulated from exterior pressure plate matching stops and glass fibre pressure plate of sufficient size and strength to provide bite on glass; drainage holes, deflector plates and internal flashings to accommodate internal weep drainage system, internal mullion baffles to eliminate "stack effect" air movement within internal spaces.

i. Mullion Caps: Aluminum, finish to match curtain wall mullion sections, secured with concealed tamperproof fastening method.

C. Flashings: 3mm thick aluminum, finish to match mullion sections where exposed, secured with concealed fastening method.

(vii) Glass and glazing materials

A. Glass and Glazing Materials:

i. Glazing Materials: Type to suit application to achieve weather, and moisture infiltration performance requirements.

(viii) Sealant materials

A. General: Sealants to be compatible with other materials and products in curtain wall assembly and adjacent construction.

B. Structural Silicone Sealant for Glass-to-Glass Joints

C. Exposed and Concealed Sealants (Not Used for Glazing): Type as recommended by curtain wall manufacturer, and reviewed by manufacturer to suit Project requirements.

D. Colours of Exposed Sealants: As selected by the City.

(ix) Finishes

A. Exposed Aluminum Surfaces:

i. Finish Coatings: Conform to AAMA 611.

ii. Clear Anodic Coating, Type CI: Class I, AA A41 anodized to 0.018mm thickness, prepared with a mechanical M12, chemical C22 pre-treatment.

B. Concealed Aluminum Surfaces: Mill finish.

(l) Skylight glazing system, (SKLT) (SKLT NO CAPS)

(i) Summary

A. Section Includes:

i. Site-assembled, sloped, self-supporting, factory prefinished, glazed aluminum tube framing system with captured mullions (SKLT).

ii. Site-assembled, sloped, self-supporting, factory prefinished, glazed aluminum tube framing system with butt-glazed lites and structural silicone sealant-filled joints on four sides, on exterior side; capless mullions. (SKLT NO CAPS).

iii. Associated flashings and sealants.

(ii) Design and performance requirements

A. Quality Standard: Perform Work in accordance with AAMA Aluminum Curtain Wall Design Guide Manual.

B. Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with applicable code, as measured in accordance with ASTM E330.

C. Design and size components to withstand seismic loads and sway displacement as calculated in accordance with applicable codes, and with deflections not less than.

i. Limit framing deflection to L/200 or 12mm.

ii. Limit flexure of glass to L/120 or 6mm.

D. Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.

E. Assembly to accommodate without damage to components or deterioration of seals, movement between components and between perimeter framing and adjacent structures, dynamic loading and release of loads, deflection of structural support framing, and movements of adjacent structure.

F. Design glass attachments and joints to achieve weathertight seals.

G. Ensure no vibration harmonics or wind whistles.

H. Water Leakage at Sealed Joints: None, when measured in accordance with ASTM E331, at pressure differential of 720 Pa.

I. Design sloped glazing to freely drain and prevent accumulation of water at lower extremities of glazing at mullion.

J. Fasteners and Attachments: Concealed from view.

(iii) Materials - general

A. Sustainable Design:

i. Minimum Recycled Content: Provide aluminum materials with postconsumer recycled content of not less than 50%.

1. Where finish quality may be compromised by the percentage of postconsumer recycled content, provide materials with the maximum postconsumer recycled content acceptable to the selected manufacturer.

ii. Provide glass products with postconsumer recycled content of not less than 25%.

(iv) Sloped glazing system

A. Subject to conformance with requirements, design sloped glazed assemblies based on model 1600 SG manufactured by Kawneer.

(v) Materials

A. Extruded Aluminum: ASTM B221/B221M.

B. Sheet Aluminum: ASTM B209/B209M. Facings AA 5005-T6, minimum 3mm thick; flashings AA 5005-H14, minimum 2mm thick.

C. Fasteners: Stainless steel.

(vi) Components

A. Mullion Profile with Caps: Matching stops and pressure plate of sufficient size and strength to provide bite on glass; drainage holes, deflector plates and internal flashings to accommodate internal weep drainage system.

B. Capless Mullion Profile: Glazing stops of sufficient size and strength to provide bite on glass; drainage holes, deflector plates and internal flashings to accommodate internal weep drainage system.

C. Glazing Panel Configuration: Triangular, or diamond shaped.

D. Flashings: 3mm thick aluminum, finish to match mullion sections where exposed, secured with concealed fastening method.

(vii) Glass and glazing materials

A. Glass and Glazing Materials:

i. Glazing Materials: Type to suit application to achieve weather, and moisture infiltration performance requirements.

(viii) Sealant materials

A. General: Sealants to be compatible with other materials and products in sloped glazing assembly and adjacent construction.

B. Structural Silicone Sealant for Glass-to-Glass Joints

C. Exposed and Concealed Sealants (Not Used for Glazing): Type as recommended by sloped glazing assembly manufacturer, and reviewed by manufacturer to suit to suit Project requirements.

D. Colours of Exposed Sealants: As selected by the City.

(ix) Finishes

A. Exposed Aluminum Surfaces:

i. Finish Coatings: Conform to AAMA 611.

ii. Clear Anodic Coating, Type CI: Class I, AA A41 anodized to 0.018mm thickness, prepared with a mechanical M12, chemical C22 pre-treatment.

B. Concealed Aluminum Surfaces: Mill finish.

(m) Glass and glazing, (GL)

(i) Design and performance requirements

A. Quality Standards: Comply with applicable requirements of GANA (Glass Association of North America) Glazing Manual, and GANA Laminated Glazing Reference Manual, for design and fabrication of glazing and installation methods.

B. Glass Deflection: Unless otherwise specified, limit glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less.

C. Glass Panels: Sizes required to fit openings with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, and to comply with system performance requirements.

D. Heat-Treated Glass: Fabricated by horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed.

E. Butt-Glazed Lites: Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with minimal chamfers at junctions of edges and faces.

F. Exposed Edges and Corners:

i. Grind smooth and polish exposed glass edges.

ii. Radius 90-dgree corners 12mm; 19mm at all other angles.

G. Holes and Cutouts: Sized to receive hardware fittings and accessories before tempering glass. Provide minimal chamfers to exposed glass edges.

(ii) Glass products – general

A. Sustainable Design:

i. Minimum Recycled Content: Provide glass products with postconsumer recycled content of not less than 25%.

ii. VOC Content: For sealants used inside of the weatherproofing system protecting interior spaces, not more than 100 g/L.

(iii) Flat glass materials

A. Float Glass: CAN/CGSB-12.3 or ASTM C1036.

B. Safety Glass: CAN/CGSB-12.1 or ASTM C1172, and ANSI Z97.1, laminated, tempered, laminated and tempered.

i. Laminated Float Glass: Two sheets of clear float glass, as specified, with a fully-bonded, high-impact, UV-resistant, clear polyvinyl butyl interlayer 1.52mm (0.060 in) minimum thickness.

ii. Tempered Laminated Float Glass: Two sheets of fully tempered clear float glass fully-bonded, high-impact, UV-resistant, clear polyvinyl butyral interlayer 1.52mm (0.060 in) minimum thickness.

C. Ceramic-Coated (Back-Painted or Fritted) Glass: Ceramic bake solid coating to prevent adhesive or substrate being visible through glass. Colours, textures and patterns as selected by the City.

(iv) Sealed insulating glass

A. General: CAN/CGSB-12.8, double pane; total unit thickness of 25mm minimum. Inner and outer pane types subject to requirements and as scheduled.

i. Interpane Space: Dry hermetic air, kept dry with a dehydrating agent.

ii. Edge Seal Construction: Dual seal, silicone foam warm-edge spacer system with high-performance acrylic adhesive structural seal, backed with moisture vapor seal. Edge seal colour to be selected by the City.

iii. Super Spacer by Edgetech IG.

B. Vision Glass Units Performance: Subject to conformance to requirements, provide sealed insulating glass units with minimum performance values based on units comprising an outer lite of 6mm clear float glass, 13mm air

space and, inner lite of 6mm clear float glass with Low E coating on third surface.

i. Visible Light Transmittance: 69%.

ii. Winter Nighttime U-Factor: 0.29.

iii. Shading Coefficient: 0.44.

C. Low Emissivity (Low E) Glass Coating: Soft, sputtered applied to third surface; hard, pyrolitic coating on second surface for over-size glass units.

i. Product: Solarban 70 XL manufactured by PPG.

(v) Glazing sealants

A. General:

i. Provide glazing sealants that are compatible with one another and with other materials they will contact, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

ii. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for conditions existing at time of installation.

B. Structural Silicone Sealant for Glass Joints: Structural silicone sealant, ASTM C1184, Grade NS, Class; non-sagging, non-staining, fungus-resistant, non-bleeding; 138 kPa minimum tensile strength.

C. Colours of Exposed Sealants: As selected by the City.

(vi) Glazing accessories

A. Lock Strip Gaskets: ASTM C542, ozone-resistant precision extruded neoprene or EPDM compound. Use gaskets with separate locking strips that are 10-points higher Shore A durometer hardness value than gasket body. Fabricate gaskets in accordance with recommendations of ASTM C716.

B. Setting Blocks: Neoprene, EPDM or silicone, 80 to 90 Shore A durometer hardness tested to ASTM D2240. Maximum compression set to ASTM D395 and ASTM C864

C. Spacers: Neoprene EPDM or silicone, 40 to 60 Shore A durometer hardness tested to ASTM D2240; quantity and location in accordance with

IGMAC standards and as recommended by the frame and glass manufacturer.

D. Glazing Tape: Preformed butyl compound, UV resistant, self-adhering, coiled on release paper, service temperature range of minus 40°C to plus 50°C, colour as selected by the City.

E. Pre-Shimmed Glazing Tape: Pre-formed butyl tape, UV resistant, self-adhering, integral continuous serrated synthetic rubber shim and release paper, 10 to 15 Shore A durometer hardness, service temperature range of minus 54 to plus 104°C, designed for 25 to 50% compression, colour as selected by the City.

F. Glazing Wedges and Splines: Precision extruded neoprene or EPDM compound, UV resistant, 55 to 65 Shore A durometer hardness.

G. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

(vii) Glazing schedule

A. GL 1- Windscreens and Guardrails: Clear, single tempered, glass.

B. GL 2 - Curtain Walls, Uninsulated: Clear, single float glass; tempered or laminated where required by code.

C. GL 2A – Curtain Walls, Insulated: Clear, sealed insulating glass, tempered or laminated where required by code.

D. GL 3 - Not used.

E. GL 4 – Skylights with Mullion Caps: Clear, single tempered laminated.

F. GL 5 – Skylights with Capless Mullions: Clear, single tempered laminated glass.

(n) Lime-based plastering

(i) Plastering system

A. Subject to conformance with requirements, provide lime plastering system based on Lime Plaster manufactured by Eco Stucco, a division Mediterranean Colors, LLC, www.ecostucco.com, or approved equal.

B. Provide manufacturer's trowel-applied scratch and brown coats, and smooth finish coat similar to manufacturer's Fossil finish, thicknesses to be not less than manufacturer's recommended value.

i. Provide bonding compounds as recommended by plaster manufacturer to attain full adherence to concrete substrates.

C. Finish Coat Colour: Closely match colour of adjacent architectural cast in place concrete finish or lighter to promote light reflection, as approved by City' Representative.

D. Accessories:

i. Corner beads and trim to terminate exposed edges or type recommended by plaster manufacturer and approved by the City.

ii. Sealer: Type that will not change appearance of plaster, as recommended by plaster manufacturer and approved by the City.

(o) Platform edge tiling, (PE)

(i) Design and performance requirements

A. Installed Tiles: True to line and level, and square to platform edge.

B. Retained tiles at platform edge with metal angle, height adjustable to suit tiles.

C. Installation Tolerances:

i. Vertical Tolerance: Minus 5mm, plus 0mm variation of dimension required by the City, to top of guideway rail.

ii. Horizontal Tolerance: Plus 5mm, minus 0 variation of dimension required by the City, to centreline of guideway rail.

(ii) Manufacturers

A. Detectable Warning Surfaces for Pedestrian Crossings, 'Cast in Place Replaceable Tactile' model, manufactured by ADA Solutions Inc, or approved equivalent.

(iii) Platform edge tile

A. Homogenous glass and carbon reinforced composite which is colourfast and UV stable, ADA/AODA compliant truncated domes, integral colour.

i. Dimensions: 600 x 1200mm long; length applied parallel to platform edge.

ii. Dome Pattern: In-line pattern; nominal 23mm diameter, 5.1mm high, 60mm spacing.

iii. Compression Strength: 980 kg/m 2, ASTM D695.

iv. Flexural Strength: 993 kg/m 2, ASTM D790.

v. Flame Spread Index for 6mm Thickness: Less than 25, ASTM E84.

vi. Freeze-Thaw Durability: No Disintegration ASTM C 1026.

vii. Colour: Federal Yellow #33538 lusterless.

(iv) Accessories

A. Tile Anchors and Fasteners: Manufacturer's standard rust resistant cast in place type, with stainless steel countersunk screws.

B. Platform Edge Angle and Anchors: Continuous steel angle, slotted holes for anchors; steel M20 bolts, nuts, and plate washers; galvanised steel for interior applications; stainless steel for exterior locations.

C. Floor Finish Termination Angle: 75 (varies dependent on depth of mortar bed) x 50 x 3 x 2480 continuous galvanized angle as protection for anti-fracture membrane under edge tile adjustable set screw.

D. Sealants: Compatible with substrates; salt and freeze-thaw-resistant. Include closed cell foam backer rod.

i. Between Platform Edge Tiles: Polyurethane elastomeric sealant.

ii. Between Platform Edge Tile and Platform Edge Angle: Hybrid epoxy/urethane type.

(p) Painting, (PTD)

(i) Materials

A. Paint for architecturally exposed structural steel and painted metal fabrications on galvanized and shop-primed surfaces, exterior and interior application, and where compliance with flame spread fire performance is required. Paint system dry film thickness of 11 mils minimum.

i. Primer coat - Epoxy Zinc Primer:

1. Meet requirements of SSPC Paint 20 Type II.

2. Minimum Dry Film Thickness: 3 mils.

3. Products:

- International Paint; Interzinc 52
- ICI High Performance Coatings; Catha-Cote, 313 Organic Zinc, or approved equivalent.

ii. Intermediate Coat - High Build Epoxy Coat:

1. Minimum Dry Film Thickness: 6 mils.
2. Products:
   - International Paint; Intergard 475HS
   - ICI High Performance Coatings; Bar Rust 236 New Technology Epoxy or approved equivalent.

iii. Polyurethane Finish Coat - Polyurethane, Two-Component, Pigmented, Gloss:

1. Minimum Dry Film Thickness: 2 mils.
2. Gloss level: Satin.
3. Products:
   - International Paint; Interthane 990.
   - ICI High Performance Coatings; Devthane, 379 (H) UVA. Acrylic Urethane or approved equivalent.

iv. Adjust coating formula where flame spread fire performance is required; provide minimum Class A surface burning characteristic. Increase number of coatings as recommended by paint manufacturer for non galvanized surfaces.

(ii) Colours

A. PTD 1: To match paint colour of prefinished aluminum shingles.

B. PTD 2: Base white.

C. PTD 3: ‘Overcoat’ CC-544 by Benjamin Moore.

D. PTD 4: ‘Citrus Blast’ 2018-30 by Benjamin Moore.

E. Final Colours to be reviewed by the City to ensure colour scheme is integrated with the revitalized City Brand.

(q) Graffiti-resistant coatings, (GRAF)

(i) Materials

A. Graffiti-Resistant Coating to be applied to all porous opaque surfaces including but not limited to concrete and stone that are reachable to tag:

i. Polymer, siloxane, silane blend; colourless; containing 10 % minimum solids by volume weight, airless spray type.

ii. Water Transmission Reduction after Application: 5% maximum.

iii. Acceptable Product: Fabrishield Paint Repellent PR 60 for limestone; 61 for other surfaces, by Fabrikem Manufacturing Ltd.

(r) Bird protection devices, (BPW)

(i) Design and performance requirements

A. Design system of bird control using specified devices to prevent pest birds from landing, roosting, nesting or climbing on horizontal surfaces at Stations, except for the roof exterior, tops of windscreens, security fences, handrails, guardrails, stone, and architectural concrete.

B. Attaching Hardware:

i. To allow for removal and reinstallation without causing damage to the installation surface, the bird barrier or mounting system.

ii. Design clips and brackets for maximum concealment from view.

C. Installed Devices: Aligned, accurately and tightly fitted and fastened, free of defects to surfaces.

(ii) Manufacturers

A. Subject to conformance to requirements provide FliteLine Post and Wire Deterrent manufactured by Nixalite of America, www.nixalite.com or approved equivalent product; bird spikes are not permitted.

(iii) Wire bird barrier

A. Wire: UV coated stainless steel aircraft cable, 0.8mm diameter; 50 kg breaking strength.

B. Posts: Manufacturer's standard posts with two line capacity of type to suit substrate application.

C. Mounting Hardware:

i. Stainless steel, designed to suit installation substrate.

ii. Provide custom fabricated devices for attaching barrier to substrates where standard means of attachment is not possible.

(iv) Finishes

A. Factory finish components of bird control devices including accessories, with manufacturer's standard paint system.

B. Colour: Colour as selected by City`s Representative.

(s) Floor grilles, (FLR GR)

(i) Design and performance requirements

A. Design floor grilles to withstand the minimum following loads without deformation:

i. Uniform Floor Load: 14.36 kN/sq. m.

ii. Wheel Load: Minimum 160 kg, 1000 passes without damage, solid 50mm wide polyurethane wheel.

B. Maximum Deflection: 1/180th of span.

C. Grille Direction: Bars perpendicular to direction of user travel, to greatest extent possible.

D. Installed Grille: Grille wearing surface flush with adjacent floor finish; bars and frames square, rigid with tight joints at corners; assembly free of deformities and rattle.

i. Maximum Gap Formed at Recessed Frame from Grille Size: 6mm.

(ii) Manufacturers

A. Entrance floor grille model BSA-1-3 HL, modified as specified, manufactured by Bolar, www.bolar.com, or approved equivalent.

(iii) Materials - general

A. Sustainable Design:

i. Provide stainless steel materials with postconsumer recycled content of not less than 60%.

B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 316.

(iv) Entrance floor grilles

A. General: Provide manufacturer's stainless steel floor-grille assemblies modified to comply with Heavy Load product line, consisting of treads joined together by cross members, and with support legs and other components needed to produce a complete installation. Include locking device for each panel and lifting hooks.

B. Floor Grille:

i. Tread Rails: 4.7mm wide x 50mm deep 'T' profile, 3mm thickness.

ii. Maximum Span: 610mm, or as recommended by the manufacturer.

iii. Maximum Individual Panel Size: 1200 x 1200mm.

iv. Finish: No. 4 finish.

v. Frames: Manufacturer's standard frames, including perimeter frames, of size and style for grille type, for permanent recessed installation in floor, complete with installation anchorages and accessories; same material and finish as grilles. Provide concealed frameless supports except at perimeter frame.

C. Support System: Manufacturer's special deep-pit stainless steel frame and support system with intermediate support beams, sized and spaced as recommended by manufacturer and equipped with vinyl support cushions.

D. Drain Pan: Stainless steel sheet, 1.5mm minimum thickness, welded construction, bottom surface with positive slope to drain; holes cut for drain and equipped with adaptors for connection to drain lines; bottom of pan with protective coating as recommended by manufacturer; provision for heat-traced drainage.

(v) Design and performance requirements

A. Pavers: High density, resistant to freeze thaw, salt and moisture, durable and capable of withstanding loads of heavy snow removal equipment, and high volume pedestrian and vehicular traffic.

(vi) Materials – General

A. Sustainable Design:

i. Regional Materials: Provide concrete pavers that have been manufactured within 800 km of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 800 km of Project site.

(vii) Materials

A. Pavers: Solid interlocking paving units complying with ASTM C936 and resistant to freezing and thawing when tested according to ASTM C 67, made from normal-weight aggregates.

B. PCC PAVER 1:

i. Face Size: 300 x 600mm.

ii. Colour: To match Cambrian Black Buffed by Transpavé, Saint-Eustache QC.

iii. Edge: Square, chamfered edges are not permitted.

C. PCC PAVER 2:

i. Face Size: 300 x 600mm

ii. Colour: To match Beige Grey by Transpavé, Saint-Eustache QC.

iii. Edge: Square, chamfered edges are not permitted.

D. Setting Materials: Sand layer of suitable physical properties, moisture content and density to allow setting and compacting of pavers. Geotextile membrane as recommended by manufacturer.

ARTICLE 3 STRUCTURAL DESIGN CRITERIA

3.1 Introduction

(a) This Article presents the structural Design criteria and performance requirements for Station Structures including: foundations and superstructures for above grade Stations; retaining walls appurtenant to above grade Stations; interior structural elements contained within the exterior Shell of underground cut-and-cover Station box Structures; interior structural elements contained within the Permanent Lining of mined Tunnel Stations; and renovation of existing buildings impacted by the Station Construction.

3.2 Reference Documents

(a) The structural Design shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) OBC;

(ii) NBC;

(iii) User's Guide – NBC: Structural Commentaries (Part 4);

(iv) CAN/CSA S6 - CHBDC*;

(v) CAN/CSA A23.1/A23.2 - Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete;

(vi) CAN/CSA A23.3 - Design of Concrete Structures;

(vii) CAN/CSA O86 - Engineering Design in Wood;

(viii) CAN/CSA S16 - Design of Steel Structures;

(ix) CAN/CSA S304.1 - Design of Masonry Structures;

(x) CAN/CSA S413 - Parking Structures;

(xi) CAN/CSA S136 – North American Specification for the Design of Cold-Formed Steel Structural Members;

**Note: Portions of the Station that support Vehicle loads shall be considered Train Structures. Train Structures shall be designed to satisfy the requirements of this Article and Schedule 15-2, Part 1, Article 21 and shall meet or exceed the applicable building code(s) and the CHBDC.*

(xii) Canadian Foundation Engineering Manual;

(xiii) CAN/CSA S478 – *Guideline on Durability in Buildings;*

(xiv) ACI 201.2R – *Guide to Durable Concrete*;

(xv) AREMA Manual for Railway Engineering hereinafter referred to as the AREMA Manual

(xvi) ACI 360R – *Design of Slabs on Grade*;

(xvii) CSA S448.1 – *Repair of Reinforced Concrete in Buildings and Parking Structures*; and

(xviii) AISC/CISC Steel Design Guide Series 11 – *Floor Vibrations Due to Human Activity*.

3.3 Federally Mandated Station Requirements

(a) Stations located on Federal Government lands subject to the regulations of the NCC shall meet the requirements of both the OBC and the NBC. Stations outside of Federal Government lands need only meet the requirements of the OBC.

3.4 Durability

(a) Develop and submit results from a durability model of the concrete Structure using a widely accepted software package such as Life365 or Stadium. The model shall be used to demonstrate expected life cycle performance consistent with the Project requirements. Refer to ACI 201.2R. Results shall be submitted according to Schedule 10 – Review Procedure.

(b) Time-dependent Design calculations, including corrosion, fatigue and creep shall be based on the required Design Life.

3.5 Station Structural Loads

(a) Dead Loads

(i) Dead loads or permanent loads shall be as specified in OBC, NBC and CAN/CSA S6, as applicable.

(ii) Mass densities for materials shall be standard unless analysis or testing indicates that other criteria shall be used. Perform a sensitivity analysis for the actual weight where a variation might affect the adequacy of the Design or in cases where the Construction may vary from normal practice.

(b) Live Loads

(i) Live loads include the LRT Vehicle Design loads and highway vehicular loads specified in Part 1 Article 21 – Civil Structural Design Criteria as well as all floor and roof live loads as described in the Design codes and standards specified earlier in this Article.

(ii) Design electrical Equipment rooms, pump rooms, machinery rooms, storage rooms, service rooms, battery rooms and fan Equipment rooms containing fire ventilation Equipment for a specified live load of 12 kPa, or the actual Equipment load where greater than 12 kPa, applied uniformly over the entire area, or on any portion of the area, whichever produces the most critical effects in each member.

(c) Environmental Loads

(i) Snow, rain, ice, ice accretion, wind and earthquake loads shall be as described in the Design codes laid out earlier in the article using the Importance Category of "Normal" with the building code and "Emergency Route" within CHBDC.

(ii) Include allowance for the build-up of ice on Track slabs and the build-up of compacted snow on vertical faces of barrier walls and Platform support walls adjacent to Track slabs at exposed parts of above grade Stations where the potential for such build-up exists. The magnitude of these loads shall suit the planned snow removal system.

(iii) Station Structures, partitions and affected non-structural elements shall be designed to resist the piston effect wind pressures from transit Vehicles. The minimum uniform Design pressure for these elements shall be 2.0 kPa in either the positive or negative direction.

(d) Fatigue Loading

(i) Ridership criteria shall be assessed to determine the expected number of Trains the Structure will support during its Design Life. A service load analysis for fatigue shall be applied to affected structural elements and is generally based on the number of full loading cycles that are applied to the Structure. The loading cycles applied to each member and connection shall include the number of Vehicles, trucks or wheel load passes, whichever produces the most critical effect.

(e) Earth Loading

(i) Vertical and horizontal earth pressures acting on retaining walls and Underground Station Structures: refer to Part 1 Article 12 – Geotechnical/Foundation Design Criteria, Part 1 Article 21 – Structural Design Criteria and Requirements and Part 3 Article 2 – General Structural Design Criteria.

(ii) Structures which retain earth shall be designed for horizontal earth pressure due to earth against the Structure and load surcharges resting on the soil above or beside the Structure.

(f) Water/Buoyancy/Flood Loading

(i) The effects of water pressure and buoyancy shall be considered whenever groundwater is present. Establish high and low water tables for the life of the Structure with due consideration given to the possibility of future changes in groundwater elevation.

(ii) The Design shall take into account the effect of water pressures during the Construction sequence.

(iii) During Construction and backfill operations, the elevation of the groundwater shall be observed and controlled so that the calculated total mass of Structure and backfill shall always exceed the calculated uplift due to buoyancy by a safe margin. The backfill shall be considered as the volume contained within vertical planes defined by the outside limits of the Structure.

(iv) Local flooding may also add load to underground Structures. Design of the Structure shall make allowance for flood elevations based on 100 year flood data.

(g) Adjacent Structure/Additional Surcharge Loading

(i) Horizontal and vertical distribution of loads from foundations of existing buildings shall be determined by Project Co.

(ii) Determine the minimum and maximum loads which can be transferred to the underground Structure. Where possible, these loads shall be based on the actual Design loads for the Adjacent Structure. In the absence of this information, use a rational approach to evaluate probable loading of the existing Structure.

(iii) When performing the above analyses, determine the need for all permanent underpinning of buildings or Structures.

(h) Thermal, Shrinkage, and Creep Loading

(i) The secondary effects due to the stresses and movements resulting from temperature changes, thermal gradients, creep and shrinkage shall be considered in the Design. Determine these loads and the appropriate Design solution in accordance with the requirements of OBC, NBC, CAN/CSA S6 and AREMA, as applicable.

(i) Other Loads and Effects:

(i) as applicable to the use and occupancy for the Structure or element under consideration;

(ii) as required by the Design codes, standards and references listed in this Article;

(iii) refer to Part 1 Article 21 – Structural Design Criteria and Requirements for loads pact; horizontal impact (hunting or nosing force); centrifugal force; rolling (rocking) force; longitudinal force; rail direct fixation temperature forces; OCS thermal forces; derailment load; Vehicle collision, emergency braking, broken rail forces, ice accretion on the roof of LRT Vehicles and any other load or load combination required by the LRT Vehicle manufacturer;

(iv) Construction loads, Construction staging loads and maintenance loads;

(v) loads due to fan induced airflows during operation of fire ventilation fans;

(vi) loads induced on the Structures by tolerable differential settlement;

(vii) loads to protect for future expansion where applicable; and

(viii) other loads and effects specified in Part 1 Article 21 – Protection of Existing Adjacent Structures and Part 3 Article 2 – General Structural Design Criteria where applicable.

3.6 Load Combinations

(a) Load factors, resistance factors and load combinations shall be in accordance with the applicable building and Bridge codes for the particular Station and structural element under consideration.

(b) Refer to Part 1 Article 21 – Structural Design Criteria and Requirements for load factors, resistance factors and load combinations for Station Structures supporting LRT Vehicles.

(c) For Structures carrying more than one Track, determine the combination of LRT Vehicle axle loads on one or more Tracks which produces the most critical effect.

3.7 Design Considerations for Retaining Walls

(a) Design considerations and factors influencing the behaviour of retaining walls are provided in CAN/CSA S6. The Design of any retaining wall is site specific, necessitating the need for specific geotechnical input and an understanding of wall construction methods. Provide architectural enhancement of walls where specified in the architectural Design.

(b) Retaining walls shall be designed to resist the following loads:

(i) Superimposed surface and subsurface loads (Adjacent vehicles and Structures);

(ii) System imposed forces (trackway vicinity);

(iii) Earth or rock pressures and hydrostatic pressures;

(iv) Earthquake lateral pressures;

(v) Wind Loads, where required;

(vi) Self-weight;

(vii) Loads during Construction;

(viii) Thermal, shrinkage, and creep loads; and

(ix) Other retaining wall loads. specified in Part 1 Article 12 – Geotechnical/Foundation Design Criteria and Part 1 Article 21 – Structural Design Criteria and Requirements.

(c) Retaining Walls shall be analyzed for:

(i) Stability against sliding;

(ii) Stability against bearing failure and overturning;

(iii) Settlement;

(iv) Overall stability;

(v) Structural strength;

(vi) Protect for future wall repair when locating retaining walls;

(vii) Provide Compensating Construction where existing retaining walls are impacted by the Station renovations as required by OBC and NBC, as applicable; and

(viii) Other requirements specified in Part 1 Article 12 – Geotechnical/Foundation Design Criteria and Part 1 Article 21 – Structural Design Criteria and Requirements.

3.8 General Design Considerations

(a) Design the structural foundations, superstructures, systems, elements and connections to meet all of the requirements stipulated in the codes, standards and references listed in this Article.

(b) Slope structural members to provide drainage where required.

(c) Deflection and Vibration Control

(i) All structural members shall have adequate stiffness to limit deflections which may adversely affect the strength and serviceability of the Station Structure.

(ii) In members supporting Train loads, deflections due to live load, including dynamic factors, shall not exceed 1/1000 of the span for interior spans and 1/300 for cantilever arm length.

(iii) The maximum total (dead and live load) long term total deflection considering creep and cracking for members supporting Train loads shall be limited to 1/500 of the interior spans and 1/180 of cantilever arm length.

(iv) Members not supporting rail loads, such as roofs, concourse and Platform slabs, shall be designed to standard acceptable engineering practices for serviceability taking into consideration the flexibility, or lack of flexibility, of the materials supported by the Structure.

(v) Members and systems supporting the light rail System shall be proportioned so that the natural frequency of the first mode of vertical vibration is greater than 2.5 Hz.

(vi) Design floor systems susceptible to vibration in accordance with AISC/CISC Steel Design Guide Series 11 – *Floor Vibrations Due to Human* Activity, to meet the acceptance criteria for indoor footbridges.

(d) Settlements

(i) Foundations shall be designed so that total and differential settlements do not adversely affect the strength or serviceability of the Station Structures.

(ii) Structural members and systems supporting LRT Vehicles shall be designed so that total and differential settlements do not adversely affect the operation and serviceability of the LRT Vehicles.

(e) Seismic Design for Elements of Structures, Non-Structural Components and Equipment

(i) Design elements and components of buildings, non-structural components and Equipment for earthquake loads and effects as required by OBC and NBC.

(f) Waterproofing

(i) Underground pits, shafts and rooms shall be sealed to prevent water ingress. The Design measures shall provide zero leakage for the Design Life of the Structure.

(g) Fire Protection

(i) Structural elements and load bearing assemblies shall be of the required type of construction and shall have fire resistance ratings as required by the code analysis and the architectural Design.

(ii) Provide concrete cover to reinforcing steel in reinforced concrete elements as required to provide the required fire resistance rating for the element or assembly.

(iii) Provide intumescent paint where the architectural Design utilizes exposed structural steel assemblies that require a fire resistance rating.

(iv) Adhesive anchors shall not be used for connections for structural assemblies required to have a fire resistance rating.

(h) Protect for the future replacement or addition of elevators, escalators, transformers, ventilation fans and other large/heavy Equipment without strengthening and/or temporary removal and replacement of structural members.

3.9 Existing Structure Considerations

(a) Renovation of Existing Buildings:

(i) Comply with OBC and NBC as applicable.

(ii) Comply with the Heritage Act as applicable.

(iii) Obtain reference drawings, specifications and Construction records for the affected Structures.

(iv) Perform as built surveys to verify the accuracy of the reference drawings.

(v) Excavate test pits to verify the size and depth of existing foundations.

(vi) Conduct destructive investigations to verify existing conditions.

(vii) Conduct materials testing to determine and verify existing material properties.

(viii) Comply with the requirements for Basic Renovation or Extensive Renovation as determined by the Code Analysis at each location.

(ix) Provide Compensating Construction as required by OBC and NBC, as applicable.

(x) Perform selective demolition in accordance with OBC and NBC as applicable,

(xi) Repair any damage caused by the Work to the satisfaction of the property owner.

(b) Interface Between Existing and New Deck Structures Supporting Pedestrian and Vehicular Traffic

(i) At locations where new framed floors are built adjacent to existing floor/Bridge Structures, the new Structure shall be designed and constructed in a manner that minimizes the vertical differential movement at the interface between Structures so that normal serviceability of the Station is maintained under permanent and transient loads. Joints between new and existing slabs shall be flush with no vertical offsets that could create pedestrian tripping hazards or bumps under wheel loading. The Design shall address: long term deflection (creep) of concrete; differential live loading; total and differential footing settlement; beam and slab camber; expansion joint cover Design; and other effects where applicable.

(c) Where existing Structures are incorporated into or form part of the Station Structures, rehabilitate the existing Structures as required to meet the required Design Life.

3.10 Reinforced Concrete

(a) This Subsection applies to reinforced, prestressed, and precast concrete Structures.

(b) Design concrete Structures in accordance with CAN/CSA A23.3 and CAN/CSA S6, where they are applicable.

(c) Concrete materials, testing methods, and Construction practices for plain and reinforced concrete shall conform to the following standards:

(i) CSA

A. CAN/CSA A23.1/A23.2

B. CAN/CSA-S6 where applicable

C. CAN/CSA S413 -– for structural elements that will be exposed to deicing salts

D. CAN/CSA A3000 - (Consists of A3001, A3002, A3003, A3004, A3005)

E. ASTM International Standards referenced in the CSA Standards.

(d) Provide materials, details and protection systems to meet or exceed the specified requirements for durability: refer to Subsection 3.4 in this Article.

(e) All concrete exposed to freezing and thawing cycles shall be air entrained.

(f) All non-prestressed reinforcement and testing methods shall conform to the following standards:

(i) CSA

A. G30.18-M92-Billet-Steel Bars for Concrete Reinforcement

B. W186-M1990-Welding of Reinforcing Bars in Reinforced Concrete Construction

(ii) ASTM International Standards referenced in the CSA Standards.

(g) All bent reinforcing bars shall meet the bend test requirements of CAN/CSA G30.18.

(h) The finish of exposed concrete Structures shall comply with the architectural specifications.

(i) Provide a nonslip surface finish in accordance with CAN/CSA A23.1 at exterior slabs subject to pedestrian traffic and at other locations required by the architectural articles.

(j) Provide hardener at exposed concrete floors.

(k) Fatigue

(i) Train Structures, including ground-supported slabs, shall meet CHBDC standards for fatigue.

(l) Joints in Structures

(i) Provide expansion joints, contraction joints and construction joints: in accordance with the all applicable codes and standards and in accordance with good industry practice; to control shrinkage stresses and minimize shrinkage cracking; and to meet or exceed the requirements for durability specified in Subsection 3.4 of this Article.

(ii) Provide waterstops in all joints below grade.

(iii) Construction joints locations shall be planned in advance in order to minimize the number of joints while still keeping the length of individual concrete pours within standard acceptable maximum lengths. The shape of the pour as well as the amount of reinforcement in the section shall be taken into consideration when determining joint location and spacing.

(iv) Co-ordinate the location of joints and joint details with the architectural Design.

3.11 Structural Steel

(a) The Code of Standard Practice for Structural Steel published by the CISC shall be referenced with respect to the furnishing of structural steel.

(b) Design of structural steel Structures shall be in accordance with CAN/CSA S16 Design of Steel Structures and CAN/CSA S6 Canadian Highway Bridge Design Code, where they are applicable.

(c) Design of cold formed steel Structures shall be in accordance with CAN/CSA-S136 North American Specification for the Design of Cold-Formed Steel Structural Members.

(d) Provide materials, details and protection systems to meet or exceed the requirements for durability.

(e) Steel materials, testing and Construction requirements shall conform to the following standards:

(i) CAN/CSA S16

(ii) CAN/CSA G40.20/G40.21

(iii) CAN/CSA-S6, where applicable

(iv) CAN/CSA S413 -– for structural elements that will be exposed to deicing salts.

(v) ASTM International Standards referenced in the CSA Standards.

(f) Provide concealed connections where required by the architectural Design.

(g) Protection of Steelwork

(i) Project Co shall endeavour to make all parts of a Structure accessible for inspection, cleaning and maintenance. Where this is not possible, consideration shall be given to concrete encasement of steelwork, use of special protective coatings or the use of atmospheric corrosion resistant steel.

(h) Protective Coatings

(i) Structural steel members and connections exposed to weather, high humidity or water spray shall be protected against corrosion. Localized corrosion likely to occur from entrapped water, excessive condensation, or from other factors shall be minimized by suitable Design and detail. Provide positive means of drainage to prevent standing water on steel surfaces.

(ii) Co-ordinate the protective coating systems with the architectural Design.

(iii) The minimum protection system shall be painting with a high performance coating system.

(iv) Where hot dip galvanized protection system is utilized, the following shall apply:

A. Bolts, nuts and washers used with galvanized Structures shall also be galvanized in accordance with CAN/CSA G164

B. Protection must be restored when damage to the galvanized coating has occurred during welding or as a result of rough handling or abrasion.

C. Where exposed to public view, all galvanized surfaces shall be finish painted.

(i) Steel deck shall not be used for Structures exposed to the exterior or to deicing salts.

(j) Fatigue

(i) Structural members and components shall be sized for the effects of fatigue due to repeated applications of load. Guideways which are subjected to frequent Vehicle passes and certain types of Equipment support shall be evaluated for the effects of

fatigue. Evaluation for the effects of fatigue shall include consideration of out-of-plane stresses and secondary effects.

3.12 Masonry

(a) Design of masonry Structures shall be in accordance with CAN/CSA S304.1

(b) The Design and Construction of reinforced and unreinforced masonry shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) CSA

A. CAN/CSA A23.1/A23.2

B. CAN/CSA A165

C. CAN/CSA A179

D. CAN/CSA A370

E. CAN/CSA A371

F. CAN/CSA G164

G. CSA G30.18

(c) Horizontal joint reinforcing shall be galvanized.

(d) Masonry Structures shall be designed to resist all applied vertical and lateral loads as required by the OBC (and the NBC where applicable). This requirement applies to load-bearing and non load-bearing masonry.

3.13 Concrete Slabs on Grade

(a) Design Track slabs in accordance with AREMA, CAN/CSA S6 and ACI 201.2R.

(b) Design Platform and other slabs on grade in accordance with CAN/CSA A23.3 and ACI 201.2R.

(c) Remove existing fill material below slabs on grade and replace with engineered fill to a depth and extent as required to meet the limitations for settlement specified in Subsection 3.8 (d) of this Article. Reuse of existing excavated fill material is subject to the same limitations.

(d) Design and construct the interface between Track slabs and Platform slabs to maintain the vertical distance between top of rail elevation and finished Platform elevation as required by the LRT Vehicle with short and long term differential settlements not to exceed the tolerance specified by the LRT Vehicle manufacturer for vertical offset between the Track and finished Platform elevations.

(e) Provide control joints or other measures to prevent uncontrolled shrinkage cracking.

(f) Where the location and spacing of transverse joints in Track slabs does not match the location and spacing of joints in the adjacent Platform slabs, provide connection Design and detailing at the interface between slabs to address differential concrete shrinkage.

(g) Provide measures to prevent frost heave.

(h) Design joints to prevent vertical differential movement between slab panels.

(i) Provide slopes to drain slabs and prevent ponding.

(j) Provide subdrainage systems below slabs at locations where the potential exists for the groundwater elevation to reach the underside of the slab subbase.

ARTICLE 4 MECHANICAL DESIGN CRITERIA

(a) This Article contains mechanical requirements developed for the OLRT. These requirements govern the functional requirements, operation and control of the heating systems, ventilation systems, air conditioning systems, water and sewage systems, drainage systems, fire protection systems, emergency fire/smoke ventilation, and building temperature control / automation systems.

(b) These requirements are intended to promote uniformity of Design and standardization of Equipment, and its location throughout the OLRT System. The information contained in these sections is not intended to conflict with the minimum requirements of the current codes and standards adopted by the OBC. If a conflict is found, the most stringent shall apply.

4.1 Reference Documents

(a) The Design and Construction of mechanical components shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) OBC*;

(ii) NBC*;

(iii) OFC;

(iv) OESC;

(v) CSA;

(vi) CEC;

(vii) CAN/CSA B139;

(viii) OHSA;

(ix) ARI;

(x) AMCA Standard 210 ;

(xi) AMCA Standard 300 ;

(xii) AMCA Standard 301;

(xiii) ANSI;

(xiv) ASHRAE Handbooks;

(xv) ASHRAE Standard 90.1;

(xvi) ASHRAE Standard 62.1;

(xvii) MNECB;

(xviii) Green Energy Act;

(xix) ASPE;

(xx) ASME;

(xxi) ASTM;

(xxii) APTA, Rail Transit Committee, "Guidelines for Design of Rapid Transit Facilities";

(xxiii) DOT "Recommended Emergency Preparedness Guidelines for Rail Transit Systems";

(xxiv) NEMA;

(xxv) SMACNA;

(xxvi) TIAC;

(xxvii) PDI;

(xxviii) UL;

(xxix) ULC; and

(xxx) Underwriter's Laboratories, Inc. – UUKL-864.

(b) Particular references shall be made to the following sections of NFPA:

(i) NFPA Standard 10, "Portable Fire Extinguishers";

(ii) NFPA Standard 13, "Installation of Sprinkler Systems";

(iii) NFPA Standard 14, "Standpipe, Private Hydrant, and Hose Systems";

(iv) NFPA Standard 20, "Installation of Stationary Pumps for Fire Protection";

(v) NFPA Standard 70, "National Electrical Code";

(vi) NFPA Standard 90A,"lnstallation of Air-conditioning and Ventilating Systems";

(vii) NFPA Standard 101, "Life Safety Code";

(viii) NFPA Standard 130, "Fixed Guideway Transit and Passenger Rail Systems";

(ix) NFPA Standard 204, "Smoke and Heat Venting";

(x) NFPA Standard 502, "Standard for Road Tunnels, Bridges and Other Limited Access Highways";

(xi) NFPA Standard 1963, "Fire Hose Connections"; and

(xii) NFPA Standard 2001, "Clean Agent Fire Extinguishing Systems".

**Note: Federally Mandated Stations are subject to the regulations of the NCC and shall meet or exceed the requirements of both the OBC and the NBC.*

4.2 General Requirements

(a) All engineering and Design of mechanical systems shall be provided by Professional Engineers educated in mechanical engineering having the prerequisite experience in the building systems contained within this Article.

(b) Mechanical Design, Equipment, and installation shall comply with local Authorities Having Jurisdiction.

(c) Provide temperature, pressure, and velocity control to provide an acceptable level of comfort for both Passengers and operating and maintenance personnel. Provide the necessary environmental controls required for the optimum performance of the transit System.

(d) Place floor-mounted Equipment on heavy-weight reinforced concrete housekeeping pads with chamfered edges.

(e) Provide a BAS for each Station to control the systems and Equipment in this Article. Provide one OWS for each Station, complete with GUI, all computer hardware and software. Each workstation shall be connected to the TSCC, and communicate with other control systems. System shall be expandable to protect for future system expansion. Mechanical Equipment shall have standalone control, and shall be controlled and monitored by the BAS.

(f) The analytical Design of the ventilation systems serving the Tunnel and the public areas of the Stations shall be carried out by the use of a certified applicable computer modeling program.

(g) All Equipment, ductwork, pipes, supports, accessories, and their connections to the Structure, shall be designed to resist seismic force and to accommodate building seismic deflection in accordance with OBC 4.1.8.17. Additionally, where mechanical infrastructure crosses expansion joints, or other places where differential lateral

displacement may occur, the piping, ducts etc shall be attached in a manner that accommodates the differential movement.

(h) Project Co shall coordinate all locations of louvers, HVAC Equipment and ductwork visible in public areas with the architect and may be subject to NCC approval.

4.3 Design Requirements

(a) Scope

(i) The following shall be provided with heating and cooling systems based on criteria set forth in this Article. All spaces listed here may not be included in each Station:

A. Staff Washrooms;

B. Public Washrooms;

C. Communications/Telephone Rooms;

D. Elevator Machine Rooms;

E. Escalator Machine Rooms;

F. Emergency Power Rooms (UPS);

G. Fare Equipment Rooms;

H. Lunchroom;

I. Multi-purpose rooms;

J. Bus supervisor's office;

K. All spaces within bus operators buildings;

L. Passenger Station Electrical Rooms (if not feasible to heat and ventilate to maintain space conditions); and

M. Traction Power Substations when constructed within the limits of a station; underground; combined with an entrance facility or within an existing building.

(ii) The following areas require heating and ventilation based on criteria set forth in this article:

A. Emergency Generator Rooms;

B. Fire Pump Rooms;

C. Janitor Closets / Rooms;

D. Passenger Station Electrical Rooms (if feasible to heat and ventilate to maintain space conditions);

E. DWAs;

F. Sewage Ejector Rooms;

G. Storage and maintenance Rooms;

H. Sump Pump Rooms;

I. Ventilation Rooms; and

J. Valve Rooms.

(b) Design Conditions

(i) Indoor Design Conditions:

A. Air conditioning Design parameters for Station spaces shall be as detailed in Table 5-4.1.

Table 5-4.1: Indoor Design Conditions

Space/Room (See Note 1)	Minimum Temperature (ºC)	Maximum Temperature (ºC)	Outside Air per Occupant(l/s)	Air Filtration (MERV)	Humidity Summer / Winter (%RH)
Fare Equipment Room	18	26	12	12	50/30
Lunch Room	22	24	17	8	50/10
Bus supervisor's	18	24	17	8	50/10

office					
Multi-purpose Room	18	24	17	8	50/10
Public Washrooms	22	5.5 (See Note 2)	(See Note 3)	8	-

Notes for Table 5-4.1:

i. For spaces not listed, Project Co shall be responsible to determine the indoor environmental requirements in compliance with all codes standards and equipment requirements Ventilation Design shall maintain space temperature Design for 5.5°above outside ambient summer Design temperature.

ii. Ventilation Design shall maintain space temperature Design for 5.5°above outside ambient summer Design temperature. Space may be included in central air handling system that provides heating and cooling if justified by first cost as add-on to space(s) that require mechanical cooling.

iii. *Provide mechanical exhaust system at exhaust rate as required by the OBC. Provide outside air for exhaust air make-up. Recirculation of supply air to this space is not permitted.*

(ii) Air Distribution System Design Velocities

A. Design velocities shall be selected to suit system performance requirements and to minimize noise, drafts, and intake of dust particles. The maximum recommended velocities in air distribution systems are:

B. <u>Sheet Metal Ducts</u>

i. Branch supply duct: 6m/s (1,200ft/min)

ii. Fresh-air intake duct: 6m/s (1,200ft/min)

iii. Main exhaust and return ducts: 6m/s (1,200ft/min)

iv. Branch exhaust and return ducts: 2.5m/s (500ft/min)

v. Transfer duct: 1.25m/s (250ft/min)

C. Air Outlets and Intakes

i. Supply registers and diffusers: 3.56m/s (700ft/min) neck velocity

ii. Exhaust and return grilles: 2.5m/s (500ft/min) through the net core area

iii. Transfer grilles: 1.25m/s (250ft/min) through the net core area

iv. Transfer louvers: 1.25m/s (250ft/min) through the net core area

v. Intake and discharge louvers: 2.5m/s (500ft/min) through the net core area

4.4 System Requirements

(a) System concepts shall be based on the energy conservation guideline of the MNECB, OBC – Supplementary Standard SB-10 (including all revisions) and ASHRAE 90.1 (current OBC adopted version).

(b) Economizer cycles shall be included for individual systems requiring mechanical cooling greater than 16 kW, except for spaces requiring critical indoor environmental control, such as, communication/telephone Equipment rooms. Economizer cycles shall be designed to vary the outside air from minimum air requirement based on ASHRAE Standard 62.1 (OBC currently adopted version) to 100% air requirement to meet space cooling needs when exterior conditions are acceptable.

(c) Spaces requiring heating only shall have ventilation systems (as a separate system or a combined heating and ventilating system if deemed size appropriate) that provides cooling by introducing ambient (outside) air at a rate to limit the maximum space temperature to 5.5°C above ambient (outside) temperature.

(d) Mechanical cooling shall be considered for heating and ventilation applications where the air flow rates become impractical to utilize ventilation to maintain the room temperature (such as Passenger Station Electric Rooms).

(e) Outside air intakes shall be located to avoid the introduction of dirt, debris, fumes, odours, noise, irritants and biological agents from traffic and other external sources into the station rooms, and to avoid short circuiting of Station exhaust air. The height to the bottom of the intake shall be a minimum 3 meters above pedestrian accessible walking surface or Station site grade level.

(f) The air conditioned rooms which service Equipment that requires reliability, such as, communication/telephone rooms, signal rooms, elevator machine rooms, shall also be positively pressurized to mitigate infiltration of contaminants such as brake dust from adjacent spaces.

(g) The air filters shall be standardized in type and sizes to the extent possible.

(h) Natural gas-fired Equipment shall not be permitted inside underground facilities.

4.5 HVAC Equipment

(a) General

(i) To the extent practical, heat from condensing units shall be rejected to atmosphere at grade level. At a minimum, heat shall be rejected to outdoor areas remote from the public.

(ii) Condensing units shall not be located in Tunnels, shafts, or any other areas subject to brake dust and debris.

(iii) To the extent possible, condensing units serving the underground Stations shall be located at grade level.

(iv) Air for ducted condensing units shall be taken from a location free from brake dust and debris.

(v) Heat recovery systems as well as free cooling shall be utilized where practical for energy conservation.

(vi) The level of fresh air supplied to occupied spaces shall be automatically controlled for energy conservation.

(vii) All Equipment, ductwork, pipes, supports, accessories, and their connections to the Structure, must be designed to resist seismic force and to accommodate building seismic deflection in accordance with OBC 4.1.8.17. Additionally, where mechanical Infrastructure crosses expansion joints, or other places where differential lateral displacement may occur, the piping, ducts etc shall be attached in a manner that accommodates the differential movement.

(viii) HVAC Equipment and piping shall not be located directly above any electrical device or Equipment.

(b) Air Handling Units

(i) AHUs shall be provided for the following typical spaces:

A. Staff Washrooms**;

B. Communications/Telephone Rooms;

C. Elevator Machine Rooms**;

D. Escalator Machine Rooms**;

E. Emergency Generator Rooms*;

F. Emergency Power Rooms (UPS);

G. Fare Equipment Rooms**;

H. Fire Pump Room*;

I. Janitor Closets / Rooms*;

J. Lunchroom**;

K. Multipurpose room**;

L. Staff Washroom **;

M. Public Washrooms*;

N. Passenger Station Electrical Rooms;

O. Sewage Ejector Rooms*;

P. Storage and maintenance Rooms**;

Q. Sump Pump Rooms*;

R. Traction Power Substation;

S. Ventilation Rooms*; and

T. Valve Rooms*.

** Provide heating and ventilation for this space as the minimum requirement. This space may be heated and cooled by a central air handling system if justified by first cost when combined with a space (or spaces) requiring both heating and cooling versus an independent heating and ventilating only system. Local space temperature control shall be provided.*

*** This space may be heated and cooled by a central air handling system if justified by first cost when combined with a space (or spaces) requiring both heating and cooling versus an independent heating and cooling system. Local space temperature control shall be provided.*

(ii) AHUs shall be provided with the following:

A. Mixing plenum.

B. Opposed-blade motor-operated dampers or parallel low-leakage blade dampers with high-quality neoprene blade seals.

C. Replaceable filter section, with differential pressure gauge across each filter bank.

D. Direct-expansion cooling coil and electric or gas heating coil section. Provide with stainless steel, double sloped, IAQ drain pan in cooling coil section.

E. Fan section: fans shall be non-overloading air foil type or backward inclined blades. Each fan shall be complete with adjustable pitch V-belt drive, electric motor, vibration isolators for mounting of fan and motor base, belt guard, magnetic starter, local hand-off-auto fan switch, space thermostat. The fan power requirement at any point of the fan power-capacity curve of the selected electric motors shall not exceed the maximum KW rating of the motors without using the motor safety factor. Fan outlet velocity shall not exceed 11.0 m/s.

F. Controls to include SCR controller for the electric heating coil and VFD control. AHUs to be controlled and monitored by the BAS system.

G. The unit casing shall be double-walled, G-90 galvanized steel, walls shall be a minimum of R-15 insulation, with hinged insulated access doors, interior lighting and water proof electric outlets, drain trap, stainless and steel condensate drain pan.

H. Single zone AHUs shall be controlled by a room thermostat activating either heating or DX cooling coil based on the temperature setting.

I. Where multiple zones are served from a single AHU, single temperature control shall be provided in the most critical rooms.

J. Where multiple critical zones are served from a single AHU, provide each zone with thermostats and VAV boxes.

(c) Ductless Split Air Conditioning Units

(i) Split Ductless Air Conditioning Units shall be provided (when not part of a central air handling system as described above) for the following spaces:

A. Staff Washrooms;

B. Elevator Machine Rooms;

C. Escalator Equipment Rooms; and

D. Lunchrooms.

(ii) Split Ductless Air Conditioning Units shall include the following components:

A. Indoor, wall mounted or ceiling mounted, direct expansion fan coil unit consisting of a cooling coil, supply fan, fan motor, integral temperature sensing, all mounted in a unit cabinet, wired remote wall-mounted controller.

B. Air cooled outdoor unit with a propeller fan, high efficiency rotary or scroll type compressor, outdoor coil, refrigeration components, controls and safeties, all installed in a unit cabinet. Head pressure control for low outdoor ambient of -18ºC operation. System shall be fully charged with refrigerant R-410a.

C. Field installed accessories, such as, low ambient temperature kit and winter start control.

(d) Heat Rejection

(i) Air-Cooled Condensing Units

A. Outdoor, air-cooled condensing units consisting of rotary scroll compressors, condenser coils, condenser fans (minimum one per compressor), refrigeration specialties, (sight glass, isolation valves, head pressure controls, charging valves, etc), operating controls, painted steel frame, electrical components (overloads, safeties, starters, etc).

B. Units shall utilize R-410a refrigerant.

C. Powder coated steel housing and structural frame.

D. Compressors and condenser fans shall be provided with vibration isolation.

E. Accessories shall include, low ambient control (where required for proper operation), hot-gas bypass (to evaporator coil) for capacity control, phase-loss protection, brown-out protection, condenser coil hail guards and condenser fan guards.

4.6 Heating Equipment

(a) These criteria cover the heating systems and Equipment for the following typical areas:

(i) Staff Washrooms;

(ii) Communications/Telephone Rooms;

(iii) Elevator Machine Rooms;

(iv) Escalator Machine Rooms;

(v) Emergency Generator Rooms;

(vi) Emergency Power Rooms (UPS);

(vii) Fare Equipment Rooms;

(viii) Fire Pump Room;

(ix) Janitor Closets / Rooms;

(x) Lunchroom;

(xi) DWAs;

(xii) Public Washrooms;

(xiii) Passenger Station Electrical Rooms;

(xiv) Sewage Ejector Rooms;

(xv) Storage and maintenance Rooms;

(xvi) Sump Pump Rooms;

(xvii) Traction Power Substation;

(xviii) Ventilation Rooms; and

(xix) Valve Rooms.

(b) System Concepts

(i) Heating systems shall be integral with cooling systems where space cooling system are provided. Electric resistance heating coils shall be provided as an integral part of the air handling Equipment or zoned duct mounted electric resistance heating coils may be used if the cooling ductwork system is serving multiple spaces.

(ii) Heated and ventilated spaces shall be heated with electric resistance unit heaters (cabinet type for finished spaces or ceiling suspended projection type for unfinished spaces), where heating and cooling air handling units are not provided for the space. The electric heating coil shall be an integral part of the air handling unit or supply air duct mounted downstream of the air handling unit, where heating and cooling air handling systems are provided.

(iii) Indirect gas-fired unit heaters may be provided in lieu of electric unit heaters if natural gas is readily available and combustion venting is easily achieved with the Design of the Station.

(iv) Warming shelters for Passengers shall be heated with electric infrared heaters suspended from the ceiling or Structure. The units shall be thermostatically controlled.

(c) Heating Equipment

(i) Electric Duct Heaters

A. Duct heater coils shall be of the slip-in type with open-type nickel chromium wire elements and designed to slide into ducts.

B. Duct heaters shall be interlocked with supply fans so they do not operate when the fan is off, and equipped with pressure airflow switches wired into the control circuit.

C. Duct heaters shall be sized so that the minimum air velocity through the coil complies with the heater manufacturer's requirements based on the kilowatts per unit area requirements and the coil enter air temperature.

(ii) Electric Unit Heaters

A. Shall be ceiling or Structure suspended type.

B. Electric Unit heaters shall have integral fan coils.

C. Electric heating element shall be open-type nickel chromium wire type.

D. Unit casing shall be factory painted steel with integral inlet and outlet louvers.

E. Units shall be provided with high temperature safety switches.

(iii) Electric Heating Coils for Air Handling Units

A. Factory installed by the air handling unit manufacturer.

B. Open-coil configuration with elements constructed of nickel-chromium wire.

C. Safeties included shall be:

i. Three-pole disconnect contactor;

ii. Airflow switches;

iii. Automatic reset high-temperature limit; and

iv. Step controller to control the stages of heat.

(iv) Electric Radiant Heater

A. Heaters shall be UL/ULC listed for horizontal outdoor surface and suspended mounting.

B. Enclosures shall be a minimum 20 gauge cold rolled steel finished with powered coated paint.

C. Reflectors shall be one-piece construction and a minimum 0.030 gold anodized aluminum with the proper angle to reflect infrared heat.

D. Elements shall be infrared quartz tube with high thermal shock characteristics.

E. Heaters required on platforms and shelters:

i. Each individual unit shall be rated at 6,000W minimum; and

ii. Each individual unit shall be independently controlled by a patron activated switch, controlling a rated contactor with a maximum run time of 15 minutes. Contactor shall have a hand-off-auto selector switch with pilot light.

(v) Gas Fire Unit Heater

A. Heaters shall be ETL listed for horizontal suspended mounting.

B. Heaters shall be 90% or greater combustion efficiency.

C. Heaters shall have indirect gas-fired separate combustion / intake section with power venting fan.

D. Burner shall be stainless-steel, one piece construction.

E. Enclosures shall be galvanized steel finished with powered coated paint.

F. Provide with all controls, gas-valves, direct spark ignition and safety limits switches.

4.7 Ductwork

(a) Ductwork materials, construction, joints, fittings and accessories shall be in accordance with the latest SMACNA standards and the OBC.

(b) Ducts shall be sized by the static regain method, or for an equal pressure drop of 0.85 Pa per meter of duct, as appropriate. Maximum velocities shall not exceed those specified.

(c) Sheet metal ducts shall be constructed of galvanized steel unless otherwise specified, designed for medium or high air pressure operation with airtight joints to suit the application, and sufficiently stiffened and supported to avoid sagging and vibration.

(d) Flexible ductwork shall not be used in Stations.

(e) All Equipment, ductwork, pipes, supports, accessories, and their connections to the Structure, shall be designed to resist seismic force and to accommodate building seismic deflection in accordance with OBC 4.1.8.17.

(f) Ductwork shall be concealed from public view.

4.8 Supply Air Diffusers

(a) Supply air diffusers shall be selected to provide the required throw and spread with the least amount of draft and noise.

(b) Supply air diffusers shall be provided with opposed blade damper, adjustable from the face of the diffuser.

4.9 Exhaust / Return Registers and Grilles

(a) Exhaust and return air registers shall be sized for the velocities indicated in this Article. They shall be equipped with fixed, non-see-through blades or louvers, or the duct behind them shall be painted black.

(b) Registers shall be equipped with opposed-blade, adjustable-volume dampers, key-operated through the face.

(c) Registers and grilles shall be constructed of aluminum with factory applied finish.

(d) Registers and Grilles shall be located out of the reach of Passengers.

(e) Registers and Grilles shall be provided with removable, cleanable insect screens.

4.10 Supply Registers and Grilles

(a) Supply air registers shall be sized for the velocities indicated in this Article. They shall be equipped with fixed, non-see-through blades or louvers, or the duct behind them shall be painted black.

(b) Registers shall be equipped with opposed-blade, adjustable-volume dampers, key-operated through the face.

(c) Registers and grilles shall be constructed of aluminum with factory applied finish.

(d) Supply registers and grilles shall be located out of the reach of Passengers.

4.11 Intake and Exhaust Wall Louvers

(a) Wall louvers shall be weather resistant extruded aluminum construction.

(b) Wall louvers shall be tested and certified in accordance with AMCA Standard 500-L for certified air and water penetration performance ratings. The certified ratings to indicate the following:

(i) Water penetration of 0.003 kg /m2 or less at a free area velocity of 305 meters per minute; and

(ii) The maximum air pressure drop shall be 0.381mm hg at 305 meters per minute for intake mode.

(c) All louvers shall have baked enamel finish.

(d) Louvers shall have bird screens.

(e) Louvers shall have insect and bird screens when used for intake out without downstream air filters.

4.12 Volume Dampers in Branch Ducts

(a) Adjustable volume dampers shall be provided for all branch ducts serving more than one outlet.

(b) The dampers shall be equipped with locking quadrants, and blades sufficiently stiffened at the edges to effectively close off the duct with no vibration under any condition of operation.

4.13 Fire / Smoke Dampers

(a) Fire dampers and/or smoke dampers or combined fire/smoke dampers shall be provided in ducts where required by NFPA, OBC and local codes, whichever is more stringent. Fire dampers shall be Type B or C and UL/ULC approved.

4.14 Air Filtration

(a) Replaceable media filter sections shall be arranged in banks.

(b) Filter media shall have a MERV rating as indicated in Table 4-1, when evaluated under the guidelines of ASHRAE Standard 52.2.

(c) Initial resistance to airflow shall not exceed 62 Pa at a velocity of 2.5m/s.

(d) The air filter material shall be classified by Underwriters' Laboratories as UL Class 2.

(e) Differential pressure gauges shall be provided cross each filter bank.

4.15 HVAC Piping

(a) Refrigerant piping

(i) Piping sizes greater than 5/8" O.D. shall be hard copper complying with ASTM B280, type ACR.

(ii) Piping sizes 5/8" 0.D. or smaller may be either hard copper complying with ASTM B280, Type ACR or annealed copper complying with ASTM B280, with minimum wall thickness as per CAN/CSA B52 and ASME B31.5.

(iii) All piping fittings shall meet ASTM B16.22 shall be brazed with silver solder. All joints shall be brazed with silver solder. Valves and refrigerant specialties shall be flared, flanged or brazed connections.

(b) Condenser Water (Glycol) Piping

(i) Piping shall be ASTM A53 Grade B.

(ii) Piping joints NPS2 and smaller shall be screw joints and fitting.

(iii) Piping joints NPS2-1/2 and larger shall be welded joint and fittings.

(iv) Screwed fittings shall meet ASME B16.3 Class 150.

(v) Piping flanges shall meet ASME B16.5.

4.16 Thermal Insulation

(a) Externally applied thermal insulation shall be provided for the following ductwork:

(i) All outside air ductwork and outside air louver plenums to air handling Equipment (air handling units, make-up air units and supply air fan inlets);

(ii) All supply and return air ductwork transporting supply or return air that is above or below the conditioned space Design or in an unconditioned space;

(iii) Exhaust ductwork from a shower area where ductwork is in an unheated space;

(iv) Exhaust ductwork 3m from the exhaust air louver where ductwork is in an unheated space; and

(v) All supply, return, exhaust and relief air plenums.

(b) Thermal insulation shall be provided for the following piping systems:

(i) Refrigerant – Suction and hot-gas piping;

(ii) Condenser water; and

(iii) Piping exposed in public spaces or to public view shall have a rigid aluminum jacket.

(c) Ductwork and plenum insulation shall be the following:

(i) Concealed and Round Duct: Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Complying with ASTM C553, Type III with factory-applied FSK jacket;

(ii) Exposed Ductwork: Mineral-Fiber Rigid Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied FSK jacket; and

(iii) Insulation thickness and R-value shall be per the requirements of ASHRAE 90.1.

(d) Piping insulation shall be the following:

(i) Flexible Elastomeric Insulation: Closed-cell, sponge or expanded rubber materials. Comply with ASTM C534, Type I for tubular materials;

(ii) Mineral-Fiber, Preformed Pipe Insulation: Type I, 454°C Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C547, Type I, Grade A, with factory-applied ASJ; and

(iii) Insulation thickness and R-value shall be per the requirements of ASHRAE 90.1.

4.17 Acoustic Lining

(a) Interconnecting ductwork between men's and women's washrooms shall be acoustically lined to prevent cross-talk.

4.18 Building Automatic System

(a) Temperature Control Systems

(i) Provide an open-protocol industrial control system for each Station. The system shall connect to the CTS via a station gateway and be controlled from the BAS server location at the TSCC. Dual redundant links to the station gateway shall be provided. The BAS shall provide additions interfaces to support the controlled and monitored equipment. In the event of loss of CTS the BAS shall maintain local control and monitoring functionality until the CTA is reconnected..

(ii) When controlling smoke management (emergency ventilation) fans through the BAS, all control devices and the control network shall be UUKL-864 listed for smoke control systems.

(iii) All systems shall utilize electronic/electric actuators. Pneumatic systems and/or actuators shall not be permitted.

(iv) All sensors shall be electronic. All sensors, in public spaces, shall have vandal/tamper resistant housing and mounting.

(b) Single Zone Heating and Cooling Systems

(i) Single Zone Heating and Cooling Air Handling Systems

A. Utilize room thermostat to control the heating coil(s), cooling coils and condensing units in order to maintain the maximum air temperature setting in the room.

B. Utilize direct digital controls to determine use of 100% outside air economizer cooling versus mechanical cooling.

(c) Heating and Ventilation Systems

(i) Single Zone Heating and Ventilation Air Handling Systems

A. Utilize room thermostat to control the heating coil(s) and outside air dampers for economizer cooling.

B. The supply air temperature required shall be based on room temperature and outside air temperature.

(ii) Separate Heating Units and Ventilation Systems

A. Utilize room / space thermostats to control heating units and ventilation system.

B. Simultaneous heating and ventilation shall not be permitted beyond minimum outside air requirements for the space.

(d) Variable Air Volume Heating and Cooling Systems

(i) Utilize duct temperature sensors to control the pre-heating coil(s), cooling coils and condensing units in order to maintain the maximum air temperature setting for the supply duct.

(ii) Utilize room / space temperature to modulate the variable volume supply terminal boxes and heating cool to maintain the room / space temperature set point.

(iii) Utilize direct digital controls to determine use of 100 % outside air economizers versus mechanical cooling.

(iv) Provide verification that the outside air flow minimum requirements are being met at all times.

(e) Emergency Ventilation Systems

(i) Provide controls to automatically operate the emergency ventilation system based on smoke detection and/or fire sprinkler system activation.

(ii) Emergency Ventilation Systems shall be controlled by UUKL listed control system.

(iii) Provide fire fighters control panel for manual control of the system.

4.19 Emergency Ventilation Systems

(a) Design Criteria

(i) Provide emergency ventilation systems for the following Stations and associated Tunnels:

A. Downtown East;

B. Downtown West;

C. Rideau;

D. St. Laurent; and

E. Any Station (in addition to the above listed) or Tunnel requiring emergency ventilation per the OBC and / or NFPA-130.

4.20 Plumbing

(a) General Design Requirements

(i) Each Station shall be serviced by one municipal water connection split at the property line for two building connections. One connection shall be metered for potable water and one metered to serve the fire protection system.

(ii) All valves and accessories shall be arranged in places accessible for operation without the use of chain wheel valve operation or additional access platforms.

(iii) To the extent possible, piping shall not be embedded in concrete Structure.

(iv) Sleeves shall be provided wherever pipes penetrate Structures.

(v) Piping shall not be routed through areas containing electrical, communication, signaling Equipment, or any other Equipment essential for the safe operation of

the transit System, with the exception of water supply to the emergency eye/face wash stations servicing the room.

(vi) Equipment requiring drainage shall not be located directly over critical Equipment rooms such as communication rooms, signal rooms, and electrical rooms.

(vii) Rooms with lavatories, sinks, mop sinks and eyewash stations shall be provided with cold and hot water services. These rooms shall include but not limited to:

A. Washrooms;

B. Lunchrooms;

C. Janitor's Rooms;

D. Battery Rooms;

E. HVAC Rooms; and

F. Sump Pump and Sewage Ejector Rooms

(viii) Isolation valves shall be provided at, but not limited to, the following locations:

A. On each pressure main at building entrances, at a location approved by the Relevant Authority;

B. On the inlet and outlet side of each water heater;

C. On each branch of distribution mains;

D. At each Station floor level or area requiring isolation;

E. At each plumbing fixture or a group of fixtures; and

F. On both sides of in-line accessories and Equipment that requires removal or isolation from the piping system for maintenance purpose.

(b) Piping Systems

(i) Pipes and Fittings

A. Water distribution piping embedded in Structures shall be soft annealed copper tubing Type K with no buried joints. Embedded Type K copper piping shall be protected from direct contact with the concrete by use of a piping jacketing material (such as rubber). However, embedded piping shall be avoided where possible. Water piping within Structures shall be hard drawn-copper tubing Type L with wrought brass or copper fittings.

B. Water service entrances shall be ductile iron grooved joint for 75mm diameter and larger.

C. Water service entrances shall be Type K soft copper for 50mm diameter and less.

D. Drainage pipes 50mm and smaller within Structure shall be copper tube Type DWV or hard Type M copper. Drainage pipes 75mm and larger within Structure shall be heavy weight cast iron pipe with one layer of protective coating, bell and spigot fittings, below ground; and service-weight, no-hub, above ground. Plastic pipe is only permitted for below ground. All piping material listed herein shall meet the OBC. All piping slopes as required by the OBC.

E. Vent pipes 50mm and smaller within Structures shall be copper tube Type DWV or hard Type M copper. Vent pipes 75mm and larger shall be galvanized steel threaded pipe or no-hub service-weight cast iron pipe and fittings.

F. Forced mains shall be ductile iron pipe with grooved joints or standard-weight galvanized steel pipe with joints of a size and type and as approved by the local Authorities Having Jurisdiction.

G. Main pumped discharge pipes to the City sewer and main vent pipes to grade level or roof shall be one size larger than required by the OBC.

H. Domestic cold water incoming service lines shall be one size oversized and shall not be less than 50mm in diameter or as indicated in the City of Ottawa Design Guidelines.

I. The minimum size of fixture drainage piping installed beneath floor slabs shall be 50mm; the maximum size of waste pipe installed in structural slabs shall be 50mm.

J. Above-ground natural gas piping system less than 6.9 kPA shall be ASTM A53 Grade B Schedule 40 with threaded fittings (ASTM A197) for piping sizes 51mm and less. Pipe sizes 64mm or larger shall be ASTM A53 Grade B seamless piping with welded fittings (ASTM A234) and welded joints.

K. Above-ground natural gas piping system over 6.9 kPA shall be ASTM A106 Grade B Schedule 40 with socket weld fittings (ASTM A105) for piping sizes 51mm and less. Pipe sizes 64mm or larger shall be ASTM A53 Grade B Schedule 40 seamless piping with welded fittings (ASTM A234) and welded joints.

L. Fuel-oil piping systems shall comply with CAN/CSA B139 and shall be black steel ASTM A53 with welded joints and fitting for above ground piping. Buried piping shall be double wall (complying with UL971) PVDF complying with ASTM D3222 for carrier pipe with mechanical couplings to seal carrier, and PE pipe complying with ASTM D4976 for containment piping. Provide transition sump Structures between buried and above ground piping.

M. Dielectric couplings shall be provided for the connection of pipes of dissimilar metals, and in all metallic piping entering a facility.

N. Corrosion control measures shall be provided for buried pipes and pipes contained in the Tunnel subject to DC stray currents.

O. Above ground combustible pipe materials such as ABS, PVC, CPVC, polyethylene, and polypropylene shall not be permitted.

P. Piping exposed to freezing temperatures shall be insulated and provided with electric heat tracing cable system as per this Article.

(ii) Cold Water Service

A. The domestic cold water shall be metered per the City of Ottawa requirements.

B. Fire water service connections shall be metered per the City of Ottawa requirements.

C. Each service shall have a main shut-off valve immediately inside the Structure wall.

D. Cold water for retail areas shall be separately metered.

E. Backflow preventers shall be provided to conform to local code requirements.

F. Where service water pressure is above 550 kPa at the water service room, pressure reducing valve assemblies shall be provided which include a pressure reducing valve, three-valve bypass and strainer.

G. Minimum fixture service requirements shall be calculated from the following water supply fixture unit values:

i. Flush valve water closet: 10;

ii. Flush valve urinal: 5;

iii. Lavatory: 2;

iv. Service (mop) sink: 3; and

v. Kitchen Sink: 2.

(iii) Hot Water Service

A. Potable water heater shall be commercial grade electric or natural gas-fired meeting the requirements of ASHRAE 90.1 / OBC SB-10 or MNECB (the most stringent). Water heater shall be sized based on 38.9º C temperature rise and in accordance with ASPE or ASHRAE, and sized to meet the demands of the fixtures that are served by the heater.

B. Combination pressure-temperature relief valves shall be provided in accordance with code requirements with the discharge piped indirectly to 152mm above a nearby floor drain or a mop sink.

C. Thermal expansion of the water shall be accommodated by providing a bladder type expansion tank designed for use with potable water.

D. Hot water circulation pump shall be provided where the supply piping exceeds 15m in length. Provide time-clock function to control operating period of each circulation pump.

E. When water heaters are located above the floor or if not located on the lowest floor in the facility, set the water heater in a secondary drain pan with an indirect drain connection to the nearest floor drain.

F. Provide a thermostatic mixing valve to deliver a maximum of 43.3°C (110°F) hot water to any hand-washing lavatory or sink.

(c) Insulation and Freeze Protection

(i) Piping insulation shall be the following:

A. Flexible Elastomeric Insulation: Closed-cell, sponge or expanded rubber materials. Comply with ASTM C534, Type I for tubular materials.

B. Mineral-Fiber, Preformed Pipe Insulation: Type I, 454 deg C Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C547, Type I, Grade A, with factory-applied ASJ.

C. Insulation thickness and R-value shall be per the requirements of ASHRAE 90.1.

(ii) The following piping shall be insulated:

A. Cold water piping;

B. Hot water piping and hot water circulation piping;

C. Portions of drainage piping subject to freezing;

D. Portions of drainage piping subject to sweating; and

E. Electric heat traced piping.

(iii) Electric Heat Tracing Cable

A. Piping exposed to ambient temperatures at or below freezing shall be provided with electric heating tracing cable system as indicated herein in addition to thermal piping insulation:

B. Provide a complete ULC Listed system of heating cable and components approved specifically for pipe heat tracing. The heat tracing system shall conform to ANSI/IEEE Standard 515.1.

C. The self-regulating heat cable shall consist of two nickel-plated copper bus wires embedded in a radiation cross-linked semi-conductive polymer core.

D. The heat cable shall be capable of varying its heat output along its entire length, allowing the heat cable to cross over itself without overheating.

E. The heat cable shall be covered by a polyolefin dielectric jacket rated 300 VAC at 105°C and a tinned copper braid (12 AWG equivalent wire size).

F. In addition to a tinned copper braid, the heating cable shall be covered by a polyolefin outer jacket for protection from aqueous inorganic chemicals.

G. The heat cable shall operate on a line voltage of (110-120 or 208-277) VAC without the use of transformers.

H. The heat cable shall be suitable for use on metallic and non-metallic piping.

(d) Plumbing Fixtures and Specialties

(i) Fixtures shall be water conserving type and shall meet the consumption outlined in the OBC, ASHRAE 90.1 or the requirements herein or the requirements of Relevant Authority. The most stringent of these shall apply.

A. Water closets shall be wall-hung, of the siphon-jet, elongated-bowl type, and shall have a flush valve. Water closets shall be constructed of vitreous china complying with ASME A112.19.2. / CAN/CSA B45.1. Water closets shall be designed for 4.8 Lpf. Provide with concealed floor mounted fixture carrier. Provide with heavy-duty open-front seat with self-sustaining check hinges.

B. Urinals shall be wall-hung, of the washout type, and shall have a flush valve. Urinals shall be constructed of vitreous china complying with ASME A112.19.2. / CAN/CSA B45.1. Urinals shall be designed for 1.9 Lpf. Provide with concealed floor supported fixture carrier. Waterless urinals shall not be provided for any OLRT Station.

C. Flush valves shall be diaphragm oscillating type, manually operated Design for low consumption in staff areas, hard wired electronic infrared in public washrooms.

D. Lavatories shall be wall-hung or counter top; hard wired electronic infrared "No Touch" faucets for public areas.

E. Water supplies to fixtures shall have loose key-operated service valves.

F. The pipe connection shall be designed for the pressure recommended by the fixture manufacturer; the pressure, however, shall not be less than 207 kPa for flush valves, and not less than 138 kPa for other fixtures.

G. The water supply to lavatories and flush-valve fixtures shall be provided with water hammer shock-absorbing devices.

H. Shock-absorbing devices shall also be provided at each pipe riser and in accordance with standard PDI-WH201.

I. Vacuum breakers shall be installed on all outlets with hose bib and wall hydrant connections and submerged inlets.

J. Mop sinks complete with both hot and cold water service shall be provided in janitor's rooms.

K. Lunchrooms shall be provided with stainless steel sink units, mounted in counter-top assemblies.

(ii) Emergency Eye / Face Wash Stations

A. Emergency eye wash station shall be provided in the following spaces:

i. Electrical Battery Rooms or any other room containing acid batteries;

ii. Janitorial Rooms or any other rooms containing chemicals; and

iii. HVAC Equipment Rooms.

B. Emergency eyewash / face wash stations shall meet ANSI Standard Z358.1

C. Eyewash stations shall be wall or pedestal mounted.

D. Eyewash stations may be combined with emergency showers where both are required in the same space.

E. Emergency eye / face wash shall be provided with tempered water through a thermostatic mixing valve.

(iii) Emergency Shower Stations

A. Emergency showers shall be provided for the following spaces:

i. Battery Rooms or other rooms containing acid batteries or chemicals; and

ii. Where required by local Authorities Having Jurisdiction.

B. Emergency shower stations shall meet ANSI Standard Z358.1.

C. Emergency showers may be combined with emergency eye / face wash where both are required in the same space.

D. Emergency showers shall be provided with tempered water through a thermostatic mixing valve.

(iv) Hose Bibs and Wall Hydrants

A. Provide hose bibs for the following spaces:

i. Washrooms;

ii. HVAC Rooms;

iii. Janitor's Rooms;

iv. HVAC Rooms;

v. Fire Pump Rooms;

vi. Refuse Rooms; and

vii. Sump Pump and Sewage Ejector Rooms.

B. Provide non-freeze wall hydrants for the following areas:

i. Concourse Level;

ii. Platform Level; and

iii. Public Areas.

iv. Bus transfer platforms

C. Hose bibs shall be as follows:

i. Brass construction, DN 20 size, Brass wheel handle;

ii. Teflon impregnated packing;

iii. DN 20 hose connection;

iv. Integral backflow preventer meeting ASSE-1052 requirements; and

v. Soldered inlet (exposed supply).

D. Wall hydrants shall be as follows:

i. Freeze-proof faucet, bronze casing;

ii. Recessed hinged, locking polished bronze (nickel) box and cover;

iii. Self draining;

iv. Integral backflow preventer meeting ASSE-1052 requirements;

v. DN 20 size; and

vi. Length as required.

(v) Drinking Fountains

A. Provide frost resistant drinking fountains in public spaces.

B. Drinking fountains shall be as follows:

i. Standard: Comply with NSF 61;

ii. Unit designed for mounting on exterior of building with valve and waste located in adjacent heated space;

iii. Designed to operate without draining into ground;

iv. Wall mounted rectangular, stainless steel;

v. Receptor: Rectangular, stainless steel with bubbler. Barrier-Free units where required;

vi. Push-button control;

vii. Supply Fittings: Remote air operated shutoff and flow-control valve assembly; and

viii. Drain: Grid type NPS DN 32 with remote P-trap for frost-resistance.

(vi) Trap Primers

A. Per the OBC, all floor drains, without a permanent source of water, shall have an automatic trap sealing device to maintain the water seal.

B. Project Co shall provide one of the following methods of maintaining trap seal prime. The methods below are in order of acceptability:

i. Indirect draining of drinking fountains to floor drain (when available and practical).

ii. Using waste water from sinks or lavatory drains by providing specially designed tail-piece or P-Trap with trap primer connection and extending to floor drain P-trap primer connection. Use this when lavatories or sinks are available to prime the nearby floor drain traps.

iii. Using vacuum breaker type trap primer connection from specially designed flush valve riser tubing. Extend to floor drain traps.

iv. When a, b or c above is not available, use automatic trap primer valves designed to meet maintain the trap water seal by allowing water flow when the pressure drops in the cold water supply line at a water closet or urinal. Connections to the automatic trap primer valve must be made at a flush valve, mop sink or sink faucet.

(vii) Floor Drains

A. The following areas (but not limited to) shall be provided with floor drains:

i. HVAC rooms at air handling Equipment (for condensate disposal);

ii. Elevator machine rooms (for condensate disposal);

iii. Escalator machine rooms(for condensate disposal);

iv. Emergency generator rooms;

v. Emergency power rooms (UPS) (for condensate disposal);

vi. Fare Equipment rooms (for condensate disposal);

vii. Fire pump room;

viii. Janitor closets / rooms;

ix. Lunchroom (for condensate disposal);

x. Staff washroom;

xi. Public washrooms;

xii. Sewage ejector rooms;

xiii. Sump pump rooms;

xiv. Ventilation rooms;

xv. Valve Rooms;

xvi. Top and bottom of stairs of Station entrances (trench drains);

xvii. Bottom of stairs (trench drains);

xviii. Escalator lower pits;

xix. Platform areas, where drainage to track level is not achievable;

xx. Track level within the stations;

xxi. Concourse levels, along the edge of the perimeter wall;; and

xxii. Connecting passageways, along the edge of the perimeter wall;

(viii) Sewage Ejector

A. Where the waste discharge from plumbing fixtures is located below the invert level of the City's gravity sanitary piping system, provide a package sewage ejector to lift with discharge of these fixtures that are below the City's sanitary main to the sanitary sewer main.

B. Sewage ejectors shall be packaged units with duplex electric motor-driven centrifugal pump units completely assembled and tested at the factory as described below:

i. Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal sewage pump, cast iron housing;

ii. Impeller: Statically and dynamically balanced, ASTM B584, stainless steel, non-clog, open, or semi-open Design for solids handling;

iii. Pump and Motor Shaft: Stainless steel. Mechanical seal; and

iv. Motor: Hermetically sealed, capacitor-start type with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

(ix) Sump Pump

A. Where the storm water discharge from below grade inlets (such as area drains, trench drains and structural foundation drainage is located below the invert elevation of the City's gravity storm sewer piping system, provide a package sump pump to lift the subsurface water to the City's storm sewer main.

B. Sump pumps shall be packaged units with duplex electric motor-driven centrifugal pump units completely assembled and tested at the factory as described below:

i. Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal sump pump, cast iron housing;

ii. Impeller: Statically and dynamically balanced, ASTM B584, stainless steel, non-clog;

iii. Pump and Motor Shaft: Stainless steel. Mechanical seal; and

iv. Motor: Hermetically sealed, capacitor-start type with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

4.21 Fire Protection

(a) General Design Requirements

(i) Project Co shall provide complete automatic dry standpipe system for all Stations and portions of Tunnels within 20m of the Platform. The automatic dry standpipe system shall meet the requirements of, but not limited to, the OBC, NFPA-130 and NFPA-14.

(ii) Project Co shall provide complete automatic sprinkler system for areas of each Station required by the OBC. These areas shall include but are not limited to the following:

A. Booths and kiosks that are non-mercantile occupancy with floor area greater than 20m2;

B. Public area if leased space exceeds 15% of public area;

C. Service rooms;

D. Escalator enclosure; and

E. Roofing if required fire resistance rating per OBC.

(iii) Sprinkler systems shall be wet type if not subject to freezing weather conditions; otherwise dry-pipe systems shall be required.

(iv) Project Co shall evaluate cost and performance impact between providing automatic dry-pipe sprinkler system in Platform level of enclosed Stations to control the fire / smoke development and the reduction in the emergency ventilation system required airflow and Equipment versus not providing sprinklers in the Platform level and the required emergency ventilation system without sprinklers.

(v) The exception to item 4.21(a) (iii) above is St. Laurent Station. St Laurent Station has an existing dry-pipe sprinkler system on the Platform level. This system shall be revised by Project Co as required to meet the requirements of NFPA-13.

(vi) Project Co shall perform/obtain water flow / pressure test for each Station for use in Designing fire sprinkler and standpipe systems.

(vii) Provide clean agent fire suppression system for all communications Equipment rooms. Comply with NFPA-2001.

(viii) Project Co shall provide electric or diesel engine driven fire pumps, as required, to maintain standpipe system flow and pressure required by the OBC and the Relevant Authority Fire pumps shall be installed in accordance with NFPA-20.

(ix) All sprinkler system shall be designed and installed per the requirements of NFPA-13.

(x) All standpipe system shall be designed and installed per the requirements of NFPA-14.

(xi) Project Co shall provide a fire department connection for each Station at the location determined by the Relevant Authority.

(xii) Project Co shall provide portable fire extinguishers as required by the OBC and the Relevant Authority throughout each Station.

(b) Sprinkler Systems

(i) Automatic wet piping system

A. All systems shall be hydraulically evaluated for the most cost and performance effective Design.

B. All sprinkler zones shall be with NFPA-13 and ULC alarm valve assembly.

C. Systems shall be designed for the water density required by NFPA-13 for the area hazard group classification.

D. Provide sprinkler head guards for upright sprinklers in service spaces and where sprinkler heads are susceptible to damage.

E. Piping shall be black steel meeting the requirements of NFPA-13. Plastic (non-metal) and copper piping shall not be utilized for OLRT Structures.

F. Joints shall be either screwed, welded or roll-groove joints with ULC approved rigid-coupling system.

G. All piping fittings shall be ULC approved use in wet sprinkler systems.

H. Valves shall be ULC listed for fire sprinkler service.

I. Piping hangers shall be ULC listed for fire sprinkler piping systems.

J. All fire sprinkler systems shall be designed and installed with seismic anchoring, support and bracing based on the seismic criteria for Ottawa, Ontario, Canada.

K. Provide a double-detector check valve for incoming fire water service.

L. Buried water piping shall be outside coated, cement-mortar lined, ductile – iron piping and fittings per the requirements of NFPA-24. Provide required restraints or thrust blocks.

M. Provide wall or post-indicating valve on incoming fire water service main. The location of this valve shall be per the requirements of the Relevant Authority. Valves shall be ULC listed.

N. Provide alarm check valve for each system. Alarm check valve shall be ULC listed for fire service.

(ii) Automatic dry piping system

A. All systems shall be hydraulically evaluated for the most cost and performance effective Design.

B. All sprinkler zones shall be with NFPA-13 and ULC dry-pipe alarm valve assembly.

C. Provide with an air-compressor assembly

D. Systems shall be designed for the water density required by NFPA-13 for the area hazard group classification.

E. Provide sprinkler head guards for upright sprinklers in service spaces and were sprinkler heads are susceptible to damage.

F. Piping shall be galvanized steel meeting the requirements of NFPA-13. Plastic (non-metal) and copper piping is prohibited for OLRT Structures.

G. Joints shall be either screwed, welded or roll-groove joints with ULC approved rigid-coupling system.

H. All piping fittings shall be ULC approved use in dry sprinkler systems.

I. Valves shall be ULC listed for fire sprinkler service.

J. Piping hangers shall be galvanized steel and ULC listed for fire sprinkler piping systems.

K. All fire sprinkler systems shall be designed and installed with seismic anchoring, support and bracing based on the seismic criteria for Ottawa Ontario, Canada.

L. Provide a double-detector check valve for incoming fire water service.

M. Buried water piping shall be outside coated, cement-mortar lined, ductile – iron piping and fittings per the requirements of NFPA-24. Provide required restraints or thrust blocks.

N. Provide wall or post-indicating valve on incoming fire water service main. The location of this valve shall be per the requirements of the Relevant Authority. Valves shall be ULC listed.

(c) Standpipe Systems

(i) Standpipe systems shall be automatic dry-type, Class III with both 38mm and 65mm hose connections.

(ii) Standpipe systems shall be provided with two (2) hose connections (38mm and 65mm) at each location. Locations shall be based upon maximum spacing allowed by the OBC with hose stream length allow by the Relevant Authority.

(iii) Standpipe systems shall be hydraulically calculated to provide the flow and pressure required by the OBC at the most hydraulically remote hose valve connection. The minimum piping diameter shall be 100mm.

(iv) Automatic dry standpipes shall be constructed of hot-dipped galvanized steel ASTM A53 piping meeting the requirements of NFPA 14.

(d) Clean Agent Fire Suppression Systems

(i) Provide clean agent fire suppression system for all Station communications rooms.

(ii) The suppression agent shall be HFC-227ea.

(iii) Project Co shall provide complete Design and installation of each clean agent system in accordance with NFPA-2001.

(iv) Provide each system with electric push button override.

(v) Piping shall be hot dipped galvanized (inside and outside)steel in accordance with NFPA-2001.

(vi) Pipe joints for 50mm and small diameter shall be screwed. Piping joints larger than 50mm diameter shall be welded. Piping threads shall meet ANSI B1.20.1.

(e) Fire Pumps

(i) Provide a packaged ULC CSA listed / labeled fire pump where required to meet the flow and pressure requirements of the OBC for Rapid Transit Station standpipes. Project Co shall confirm all flow and pressure requirements of the standpipe systems with the Relevant Authority.

(ii) Packaged fire pumps may be diesel engine driven or electric motor driven as deemed cost efficient for actual Station application and installation.

(iii) Provide a ULC CSA listed electrically driven jockey pump for pressure maintenance.

(iv) Provide pump controller for fire pump and jockey pump.

(v) Provide all accessories to meet the requirements of NFPA-20.

(vi) Provide above ground, indoor, double wall fuel storage tank for diesel engine driven fire pumps. Provide fuel storage tanks that shall following minimum requirements:

A. Meeting the requirements of CAN/CSA B139-000;

B. Tank capacity shall meet the required run time of the fire pump during a fire. Project Co shall determine the fire pump run time with the Relevant Authority. Provide reserve tank volume for weekly testing of the fire pump;

C. Constructed of steel;

D. Double wall construction for secondary containment. The secondary containment volume shall be a minimum of 110% of the total primary volume capacity;

E. Remote fill connection with automatic shut-off and over-fill containment;

F. Level monitor by mechanical visual meters and electronic measuring means;

G. Provide with fuel level alarms and tank interstitial containment space monitoring and alarm; and

H. Venting of both the primary and secondary containment volumes to the outdoors.

(vii) Provide ULC listed fire pump controller.

(viii) Provide ULC listed fire pump test header.

(f) Portable Fire Extinguishers

(i) Portable fire extinguishers shall be provided in accordance with NFPA 130, NFPA 10, OBC, OFC, and as modified by these Design criteria.

(ii) Station rooms containing a significant amount of electrical, electronic, and signal Equipment shall be provided with CO2 fire extinguishers, in addition to dry chemical fire extinguishers.

(iii) An additional Class A fire rated water pump tank extinguisher shall be provided within the refuse storage rooms.

(iv) Extinguishers in public area shall be enclosed in recessed stainless steel cabinets with solid covers.

(g) Fire Department Connections

(i) Free standing or wall mounted siamese connections constructed of polished bronze or chrome plated bronze. Verify the type required with the Relevant Authority.

(ii) Shall meet the requirements of NFPA 13 and ULC listed.

(iii) Free standing type shall be freeze resistant with drain down pit / tank.

(iv) Provide thread type required by the local fire department. Project Co shall verify the required thread pattern with the Relevant Authority.

(v) All fire department connections shall be properly label with a permanent size stating the system(s) being served by the connection.

ARTICLE 5 ELECTRICAL DESIGN CRITERIA

5.1 Introduction

(a) This Article presents the basic electrical Design guidelines, codes, and standard references that Project Co shall follow throughout the electrical Design process of LRT Stations.

(b) Electrical spaces shall be properly located and sized to facilitate the installation and maintenance of Equipment.

(c) The Design of the Station electrical systems shall provide for safe, reliable, and continuous operation.

(d) Accessibility shall be provided to permit removal and replacement of major Equipment. These requirements are intended to promote uniformity in the Design approach and to standardize the type of Equipment and its location throughout the system.

(e) Electrical power distribution Equipment shall be heavy duty construction and selected to provide Equipment longevity in condition of frequent electrical switching, shall be designed to provide lower Arc Flash potential during maintenance and shall be designed to provide high arc flash energy dispersion.

(f) For the Design of all electrical systems, sustainable Design elements shall be utilized where applicable and practical.

(g) The electrical distribution system shall distribute power for Passenger Station lighting, heating, ventilation and other Equipment and systems. Power and circuit requirements for signal and communication systems are subject to other Articles.

(h) All electrical Equipment shall be individually identified by unique number matching Equipment schedule designation. The label shape, letter size, color coding and background color shall be standardized for the Project. Project identifying labels shall be designated for: cable trays, conduits, junction boxes, cables/wires and all electrical and electronic Equipment. In addition to the identification labels approval labels shall be provided as required per CSA, ULC, or Hydro Ottawa.

5.2 Reference Documents

(a) The electrical Design and Construction shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) OBC*;

(ii) NBC*;

(iii) Ontario Electrical Safety Code, 24th Edition;

(iv) Canadian Electrical Code, Part I, 21st Ed: Safety Standard for Electrical Installations;

(v) ANSI;

(vi) ULC;

(vii) NEMA;

(viii) CSA;

(ix) IESNA Lighting Handbook;

(x) ASHRAE 90.1;

(xi) City of Ottawa Standards;

(xii) NFPA 130: Standard for Fixed Guideway Transit and Passenger Rail Systems;

(xiii) NFPA 110: Standard for Emergency and Standby Power Systems;

(xiv) ASME A17.1: Safety Code for Elevators and Escalators;

(xv) IEEE;

(xvi) IEC; and

(xvii) Hydro Ottawa Specifications.

**Note: Federally Mandated Stations shall meet the requirements of both the OBC and the NBC.*

5.3 Basis for Design

(a) Electrical Load Classification

(i) Normal systems include loads which, if de-energized, would have no effect on Passenger Safety or adverse effect to facility systems. This load classification includes all non-essential Station loads and the majority of Station lighting. These loads can tolerate occasional prolonged power outages and do not require a backup power source.

(ii) Emergency systems classed per NFPA 130 and NFPA 110

A. Level 1 systems include loads such as emergency egress lighting, communication systems (if used in Emergency response procedures) and fire alarm systems that cannot tolerate normal electrical supply outages and require an Emergency power supply.

B. Level 2 systems include loads such as fire pumps, emergency ventilation and smoke removal systems, sewage pumps, and elevators that require a reliable power source, feeders from two separate and distinct utility substations or combination of sources as approved by the AHJ.

**Note: Project Co shall perform FMEA and vulnerability/system assurance/reliability analysis in order to determine any other Safety Critical loads that require emergency power.*

(b) Calculations

(i) Project Co shall perform short-circuit calculations to determine the AIC rating of the electrical distribution system based upon the actual available short-circuit value or per-unit impedance values obtained from the Hydro Ottawa at the electric service entrance or point of connection.

(ii) System device coordination and selectivity shall be based on calculated short-circuit values and used for selection of ratings and settings of protection devices.

(iii) Voltage drop calculations shall be completed for maximum loads, long run circuits and feeders, and under motor starting conditions. Motor circuit calculations shall be based on an 85% lagging power factor. Branch circuit voltage drop from service entrance distribution Equipment to point of utilization shall not exceed 5%.

(iv) Lighting-level calculations shall be completed for all interior and exterior spaces in conjunction with architectural and/or landscaping Design. The point-by-point method utilizing computer generated calculations shall be used to validate adequate illumination levels and boundaries. The software used shall be industry recognized and the calculations shall follow IESNA procedures. Calculation results shall include maximum, minimum, and average illumination levels along with the appropriate uniformity ratios and lighting power densities per ASHRAE 90.1. Calculations shall also include luminaire locations, mounting heights, manufacture catalog data sheet with product selections and options indicated, lamp data sheet, wattage, lumens, color rendering index, color temperature, room surface reflectance values, light loss factors, and photometric file used. Lighting fixture color rendering temperature shall be consistent for the Station and shall be "warm white" coordinated with the architectural/landscaping Design.

(v) Arc flash hazard calculations shall be completed for Equipment that is required to be field marked for arc flash warning per CAN/CSA Z462. Hire a licensed professional engineering firm to perform calculations based on actual distribution

system installed, actual minimum and maximum available utility short circuit current and according to IEEE 1584 and CAN/CSA Z462. Values to be calculated shall include, but not be limited to: (a) flash protection boundary in units of centimeter from Equipment; (b) incident energy at 45.72cm working distance from Equipment in units of calories per square centimeter (cal/cm2). The calculated values shall be permanently displayed on Equipment arc flash hazard warning labels.

(vi) Computations for service, feeder and branch circuit loads shall be based on the nominal system voltage used and applicable demand factors in accordance with the Canadian Electrical Code.

(vii) Protection for future growth for all major electrical Equipment and Hydro Ottawa service feeders is required. Before determining the size of service an economic analysis shall be made to determine the most feasible way of protecting for the future growth. Special consideration must be given to requirements for load growth, for anticipated usage and life expectancy with particular attention to the possibility of adding heavy loads such as elevators and escalators, electric heating etc.

(c) Electrical Safety Provisions

(i) EGFP shall be provided as required by the latest applicable codes. Ground fault "annunciation only" shall be provided where EGFP is required by code for Equipment or feeders serving Level 2 Emergency Systems.

(ii) PGFP shall be provided on branch circuits that have Equipment or outlets for which personnel protection is required by either the latest applicable codes or Good Industry Practice.

(iii) Arc flash hazard warning labels shall be provided on the Equipment as per required code. Flash boundary and incident energy values shall be displayed.

5.4 Functional Requirements

(a) Electrical Service

(i) The secondary voltages described herein are the basis of the Reference Concept electrical distribution design. Project Co may select alternative voltages for secondary distribution system.

(ii) At Underground Stations, where pad-mounted primary equipment cannot be installed at grade, a Primary switching room shall be provided for incoming service and shall be:

A. designed in partnership with HOL and in accordance to HOL Specification GCS0002: Primary Voltage Service Specification;

B. at grade or within five (5) meters below grade with two walls on the outside to allow ease of access for HOL incoming feeders and designed for a three (3) hour fire envelope;

C. dimensions as outlined in the "Hydro Ottawa Information to Support the City of Ottawa's Proposed light Rail System – Phase 1" report, provided in the Data Room; and

D. coordinated with HOL in terms of switchgear location and placement within the rooms.

(iii) At-Grade Stations shall be provided with a single underground service feeder from Hydro Ottawa at 600VAC, 3phase, 60Hz. Design shall be a transformer installed on an exterior pad or installed within a vault. The demarcation point between Hydro Ottawa and Project Co responsibility shall be the secondary terminals of the on-site 13.2/.6kV transformer. Project Co shall coordinate with Hydro Ottawa, as referenced in the Hydro Ottawa Planning Reports, all requirements related to the installation of the on-site transformer and underground duct-banks.

A. At-Grade Passenger Stations shall be provided with 600VAC main switchboard, revenue class metering, associated downstream power distribution panels, feeders to 600VAC and 208/120VAC Equipment and (if applicable) transfer switch for the emergency power distribution. Main electrical room will contain, in addition LV transformers, UPS (if applicable), LV lighting control cabinet, heating controls, etc.

B. In the event of power outage emergency lighting, fire alarm and other emergency Equipment loads shall be connected to UPS or batteries as required by OESC.

C. Connection for a mobile generator shall be provided in all At-Grade Stations. The portable generator system shall be used only for stand-by operation during prolonged Utility outages and is independent of the required emergency (UPS or battery) power supply systems.

(iv) At Underground Stations where on-site power generation is not feasible, provide feeders from two separate and distinct Utility substations or combination of sources as approved by the AHJ to serve Emergency systems classified as "Level 2" and used for emergency ventilation or fire suppression Equipment. Provide two incoming service feeders at a supply voltage no less than 13.2kV, 3-Phase, 60 Hz from the Utility. Circuit each incoming service feeder from a separate and independent Utility source or TPSS that is electrically and physically isolated from each other. All power sources shall be as approved by the AHJ and in conformance with the applicable code.

A. For Underground Stations, provide two service feeders from Hydro Ottawa at 13.2kVAC. The service feeders shall be electrically and physically separated and approved by the AHJ for use as an emergency power source. The demarcation point between Hydro Ottawa and Project Co responsibility shall be the cable terminations of the service feeders at Hydro Ottawa owned disconnection equipment.

B. One of the service feeders shall be located at Downtown West Station and connected to double ended SWGR with main/tie/tie/main breakers and revenue class metering located in the medium voltage electrical room, adjacent to the Downtown West hydro power room at grade level. The second service feeder shall be located at Rideau Station and connected to the double ended switchgear with main/tie/tie/main breakers and revenue class metering located in the medium voltage electrical room, adjacent to the Rideau hydro power room at grade level. Downtown East Station shall be provided with similar double ended medium voltage Switchgear. All three switchgears shall be interconnected with tie cables running from Downtown West to Downtown East and to Rideau feeding power bus “A” in each Station, similar tie cables shall connect Rideau to Downtown East and Downtown West feeding power bus “B” at each Station.

C. Automatic Transfer Switch consisting of two circuit breakers connected to bus “A” and bus “B” shall provide power to the Station downstream distribution system.

D. Downstream distribution for each Station shall also include two (2) 13.2kV/600VAC redundant dry type transformers feeding double ended 600VAC switchgear located in 600VAC electrical room and additional two (2) 600/208/120VAC dry type transformers feeding double ended 208VAC switchboard located in the 208VAC Room. Redundant circuit feeders shall be in physically separated raceways.

(v) Electrical protection devices shall be automatically coordinated with upstream/downstream LRT distribution system in order to minimize disruption to the LRT operations.

(vi) Provide electric heat tracing where required by the mechanical and architectural Design.

(vii) All emergency service raceways/feeders shall be fire rated in accordance with applicable codes requirements. Main feeder raceways shall be embedded in concrete slabs/walls and shall be rated for at least two hours.

(viii) The superstructure and substructure shall accommodate all required embedded ducts for interior and exterior electrical services as applicable.

(b) Metering and Monitoring

(i) Utility revenue metering shall be provided as required by Hydro Ottawa.

(ii) Remote monitoring system shall be provided for:

A. Station main switchboard breakers position;

B. Voltage availability at the main buses; and

C. Customer energy metering at main service and for services as listed and described in Schedule 8 – Energy Matters.

(c) Duct banks, Manholes and Handholes

(i) Duct banks and manholes shall be designed in accordance with the seismic criteria defined for the Project. Duct banks shall be designed to include at least 25% spare capacity to protect for future growth and expansion. Refer to Paragraph 5.3 (b) (vii) above for direction. In addition, space is to be provisioned for a 24 way fibre to be installed for a separate highways IT network in coordination with the City Highway Operations Department. All ducts to be roped.

(ii) Underground ducts shall be sloped to manholes to provide adequate drainage. Provide concrete encasement where required by applicable code.

(iii) Manholes and/or handholes shall be designed as per City Standards, sufficiently sized and provide access to cable where necessary.

(d) Electrical Rooms

(i) Main electrical room shall be located as close as practicable to the point of connection of Hydro Ottawa's electrical service Equipment.

(ii) Electrical rooms shall have sufficient space to house all required Equipment. Adequate space shall consider minimum working clearances, conduit entry points and routing, Equipment removal / replacement, building repair and ventilation requirements.

(e) Grounding and Bonding

(i) The Station electrical distribution system shall be solidly grounded, designed to meet OESC.

(ii) The grounding electrode system shall be supplemented and bonded together with an embedded ground grid on each side of the Tracks for side Platform Stations. The Passenger Station grounding grid shall not be interconnected with any Traction Power (DC) grounding system. Project Co shall coordinate interconnection grounding points with signal and communication systems to avoid noise propagation.

(iii) All non-current-carrying metal enclosures and all alternating current Equipment shall be securely connected/bonded to the Station grounding system.

(iv) Each metallic equipment housing shall provide a welded boss for attaching a protective ground connection and shall be sized for expected trip currents

(v) Grounding of the Platform edge doors for Underground Stations and other metal surfaces within 2 meters of the Vehicle stopped at the Platform shall be coordinated with Traction Power Design in order to prevent or limit possible excessive touch potential in tolerable values as specified in OESC.

(vi) Avoid natural gas piping and pipe connected to an active cathodic protection system with the exception where required by the corrosion protection

(f) Emergency and Standby Power Sources

(i) Power sources shall be selected based on efficiency, reliability and most economic life cycle cost.

(ii) Emergency and standby power sources are identified as follows:

A. Standby on-site internal combustion engine generator;

B. *Mobile generator;

C. UPS system;

D. Central battery system or battery packs for unit Equipment; and

E. **Second utility power source – Dual/redundant utility power source for loads classified emergency Level 2.

**Note: Provisions for quick connection for a mobile generator shall be provided in At-Grade Stations and where practical for underground Stations. The mobile generator system will be used only for stand-by operation during prolonged utility outages and is independent of the required emergency power supply systems.*

***Note: Authorities having Jurisdiction shall review the Design and approve the dual redundant utility service feeders as emergency power supply source.*

(iii) When standby fixed mounted engine generators are to be installed outdoors, a completely enclosed weatherproof/sound attenuated housing to protect the generator from adverse weather conditions and reduce sound levels for surrounding residential neighbourhoods shall be provided. Enclosure shall have critical grade silencing suitable for residential installation. Project Co Design shall follow NEMA/IEC enclosure/environmental protection standards.

(iv) When second Utility power source is selected, emergency lighting, fire alarm and other emergency Equipment loads shall be connected to a UPS or battery system as required for loads classified as "emergency level 1".

(g) General Purpose Receptacles

(i) In public areas, general purpose receptacles shall be GFI and provided at 30m distance, and shall have lockable covers. No more than six outlets shall be connected to a branch circuit.

(ii) GFI receptacles shall be provided also for Station sign boxes and art elements where required.

(iii) In non-public areas general purpose receptacles shall be provided at 7m apart and shall be supplemented where needed for fixed Equipment. No more than five outlets shall be connected to a branch circuit.

(iv) A flush-mounted duplex ground fault type receptacle with weatherproof lockable cover shall be provided close to hose bibs.

(h) Lighting

(i) The lighting systems for Stations, park and ride areas, pedestrian walkways, trackway, Tunnels and portals shall be coordinated with architectural/landscaping and signage/wayfinding Design objectives. Lighting Design shall be consistent across all Stations. Standardization of lighting system components is required for perceptual unity and to simplify maintenance.

(ii) Lighting levels shall define and differentiate between task areas, decision and transition points, Platform edges and areas of potential hazard. In addition to quantity of light, it is essential that lighting be designed to minimize glare and provide uniform distribution. Luminaires shall be selected, located, and/or aimed to accomplish their primary purpose while producing a minimum of objectionable glare and/or interference with task accuracy, vehicular traffic, and neighbouring areas.

(iii) Luminaires that emit light above the horizontal plane shall be avoided. Light spill-over onto adjacent properties shall be minimized. Fixture types that minimize light trespass onto adjacent properties shall be used. Refer to IESNA TM-11-2000, Light Trespass.

(iv) The lighting system shall be energy-efficient using high-efficiency light sources and auxiliary Equipment. Luminaires shall have integral ballasts and fuses unless special considerations dictate otherwise. Lighting Equipment shall be vandal-resistant where within reach of the general public.

(v) Lighting shall be designed to consider security, AODA, CPTED, CCTV and CAN/CSA B651 requirements.

(vi) Minimum illumination levels shall meet the criteria listed below:

Table 5-5.1: Station Interior

Location	Average Minimum (Lux)	Uniformity (Ave./Min.)	Emergency (Lux)
Station Rail Platform	200	3 : 1	10
Station Building (Public Areas)	200	3 : 1	10
Ticket/Information Kiosk	300	2.5 : 1	10
Stairs, Ramps, Escalators	200	2 : 1	10
Pedestrian Tunnels and Concourse	100	2.5 : 1	10
Service Rooms	500	3 : 1	10
Designated Waiting Areas	220	3 : 1	10
Washrooms	300	3 : 1	10

**Note: Emergency lighting illumination levels shall be designed to meet security, AODA, CPTED, CCTV and CAN/CSA B651 requirements.*

(vii) Provision of emergency lighting systems is required by code. Emergency power shall be available at stable system voltage within 10 seconds or less. All batteries shall be sized to continuously carry the rated illumination for a minimum time required for evacuation and as required by applicable code.

(viii) Emergency lighting fixtures shall be the same model and type as the rest of the lighting fixtures with the addition of emergency battery pack.

(ix) Lighting system shall be designed so that the failure of any single luminaire or lighting circuit in areas accessible to the public does not leave an area in total darkness.

(x) Lighting layout shall be coordinated with other building elements so as not to affect the illumination.

(xi) BAS system shall monitor and control Station lighting system. Where Facility remote control system is not provided, the following controls shall be provided:

A. Station central key / timer control system including override switches for service areas;

B. Exterior luminaries, including luminaries in signage, shall be group controlled by photo-cell and/or the facility BAS system. Exterior light control shall include a maintenance bypass switch (Hand-Off Auto) located on external wall of the facility for night services such as snow plow and cleaning;

C. Exterior Lighting areas as required for Safety and comfort shall meet requirement of City Standards and ANSI/ASHRAE/IESNA Standards 90.1 Exterior Lighting Section;

D. Adopt site lighting criteria to maintain safe light levels while avoiding off-site lighting and night sky pollution. Use computer software to model the site lighting. Technologies to reduce light pollution include full cutoff luminaires, low-reflectance surfaces and low-angle spotlights; and

E. Exterior lighting shall be designed to consider security, CPTED, AODA and CCTV requirements.

(xii) Minimum illumination levels shall meet the criteria listed below:

Table 5-5.2: Exterior Areas

Location	**Average Minimum (Lux)** **See *Note below.**	**Uniformity (Ave./Min.)**	**Emergency (Lux)** **See *Note below.**
At-grade Pedestrian Crossings	100	3 : 1	N/A
Station Bus Platform & Bicycle Parking Area	100	3 : 1	N/A
Shelter and Ticket/Information Area	100	2.5 : 1	N/A
Exterior Station Building (Public Areas)	150 or 200 where operating devices or reading is required	2.5 : 1	N/A
Stairwell	150	2 : 1	N/A
Pedestrian Underpasses and Overpasses	100	2.5 : 1	N/A
Pathways in the Vicinity of Busways	20	3 : 1	N/A

**Note: Average minimum and emergency lighting illumination levels shall be designed to meet security, AODA, CPTED, CCTV and CAN/CSA B651 requirements.*

(i) Fire Detection and Alarm System

(i) All Stations shall be provided with a fire detection and alarm system in accordance with the applicable codes.

(ii) The fire detection and alarm system shall be a zoned, non-coded, addressable, microprocessor-based system with automatic alarm initiation, addressable smoke detectors, and automatic multi-detector algorithm for alarms initiated by smoke detectors.

(iii) Fire panels shall include the ability to verify alarms (2 stages) prior to evacuation. The fire alarm wiring system shall be electrically supervised. The system shall be designed such that the TSCC is notified to validate the event and determine if the fire department is to be dispatched when an alarm signal takes place.

(iv) The fire detection and alarm system shall be provided with an emergency power supply, consisting of either a generator and/or battery source. The emergency power supply shall power the supervisory function of the fire alarm system for no less than 24 hours and full function for no less than 30 minutes. Upon failure of the normal power source, immediate transfer to the emergency power supply shall take place with no loss of information in the process.

(v) The fire detection and alarm system shall be connected to and monitored by the TSCC at.

(vi) A fire alarm annunciator panel with a flush mounted vandal resistant polycarbonate shield shall be provided at every LRT Station in a readily accessible location to fire fighters upon entering the Station. A second annunciator shall be located where required by the City. The annunciator panels shall be monitored simultaneously at the TSCC.

(vii) Manual pull stations need not be installed in areas accessible to the public.

(viii) Visual signal devices shall be installed such that the signal from one device is visible throughout the floor area in which they are installed.

(j) Power for systems and communication Equipment

(i) Provide power or conduit complete with pull wire as required.

(k) Conduits and Raceway

(i) Conduits installed in finished areas of new Construction shall be concealed in walls, below or in slabs, or above suspended ceilings. Exposed conduits shall not be run on the exterior surface of buildings. Conduits shall not be run through structural members across pipe shafts or ventilation duct openings.

(ii) Conduits in concrete slabs shall be placed between the bottom and top reinforcing steel. Separate conduits to ensure proper concrete bond.

(iii) Conduits shall not be embedded in waterproofed or waterbearing walls.

(iv) Conduits penetrating exterior walls of any Structure (other than handholes, manholes, or pullboxes) below grade, at grade floors, or below grade floors shall be sealed to prevent moisture migration.

(v) Grounding-type expansion fittings shall be installed in raceways every 60m or less of linear run or wherever structural joints are crossed to allow for expansion and contraction.

(vi) Project Co shall provide the raceway system and cable pulling for Equipment described and identified by facility/systems and the City. Raceways shall be designed to include at least 25% spare capacity to protect for future growth and expansion. Refer to Paragraph 5.3 (b) (vii) above for direction.

ARTICLE 6 WAYFINDING AND SIGNAGE

6.1 Introduction

(a) This article describes wayfinding and signage performance requirements for all OLRT Stations including performance criteria for wayfinding and signage Design.

(b) The performance specifications will provide brand neutral examples for the application and integration of a comprehensive wayfinding and signage system with the specific architectural and art finishes and features of the OLRT Stations.

6.2 Goals & Objectives

(a) The overall goal of this Article is to provide a standard signage and wayfinding system that makes transit facilities easy to identify and navigate system wide, that utilize language and visual techniques that people understand, comply with accessibility guidelines, integrate with the Design approach of other Design disciplines and assist in delivering a successful journey for Passengers.

(b) The objectives for the wayfinding and signage program are as follows:

(i) To improve the overall function and aesthetics of the LRT by providing accessible, attractive, identifiable and understandable signage;

(ii) To improve wayfinding for Passengers by providing map, text and or pictograph signage for important Station destinations and features;

(iii) To provide plain language signage and not ‘over sign’ Stations;

(iv) To develop project outcomes that inform and meet the timing of the Design requirements for Station pre-engineering and final Designs; and

(v) To achieve the above goals sustainably.

6.3 Scope

(a) This Article includes requirements for the design, manufacture, supply, delivery, storage, assembly, installation, protection, inspection and testing of all components as described herein, necessary to achieve and deliver a successful, comprehensive and integrated wayfinding and signage system for the OLRT.

(b) The wayfinding and signage system shall be consistent with other City transit settings (i.e. Transitway stations, O-Train Platforms, etc.) where new wayfinding and sign systems will be implemented by the City.

(c) The wayfinding and signage system includes but is not limited to providing signage that addresses the following areas and uses:

(i) Station identification signage - Signage that identifies a Station and is visible whether approaching a Station by foot, bicycle, transit vehicle, taxi or private vehicle;

(ii) Community orientated wayfinding signage - Signage that identifies and provides a link to other modes of transport, public services, landmarks, pedestrian and bicycle routes or significant destinations in the general vicinity of each Station;

(iii) Station located wayfinding signage - Signage that assists the movement of Passengers through a Station or to facilities located within the Station. This includes signage that identifies and or directs users to and from Platforms, exits, ticketing and fare payment facilities, information services, elevators, escalators, accessible pathways, bicycle routes through each Station, taxi and connecting bus services;

(iv) Navigation signage - Signage that works in conjunction with (iii) and provides wayfinding through the available multi modal forms of transportation by identifying directions, major destinations, adjacent Stations and confirms the appropriate transport service. At least two transit information panels similar in size and function with map cases currently used in existing Stations shall be provided at all bus and Train Platforms. Transit information panels shall also be placed at the DWA and at locations prior to payment. Signage indicating the locations of transit information panels shall be provided;

(v) Schedule and service status signage - Signage that displays real time information on the status of transport services communicated through the use of static visual displays, panels, electronic updates and audio announcements when a service is operating, due to arrive, delayed or cancelled and provide information and notices for hours of operation, trip schedules and timetables; and

(vi) Regulatory and utility signs - Signage used within a Station that provides users and staff with regulatory notifications such as no smoking, hazards, no littering, emergency exit, emergency phones, fire alarms, elevator buttons, rules of use, disclaimers, etc. Standard traffic signage is also required for private vehicles and for buses circulating through or around a Station.

6.4 General Responsibilities

(a) Project Co shall Design, fabricate, install, and maintain all wayfinding Equipment.

(b) The City will determine content, format, and location of all wayfinding Equipment, including but not limited to signage (directional, orientation, information, regulatory, commemorative), electronic displays, transit information panels, and maps, and will provide such specifications to Project Co at the appropriate stage of Design.

(c) Any proposed wayfinding Equipment shall be coordinated and compatible with existing wayfinding Equipment, and shall be restrictive in terms of future wayfinding decisions and requirements.

(d) Any proposed wayfinding Equipment shall support and contribute to the transit customer experience on the OLRT and overall transit network.

6.5 General Requirements

(a) Reference Documents

(i) The Design and Construction of wayfinding and signage shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

A. City of Ottawa – Official Plan;

B. City of Ottawa – Transportation Master Plan;

C. Ottawa Urban Design, A Reference Guide to Creating Great Places and Great Spaces, Publication #2103;

D. Downtown Ottawa Urban Design Strategy;

E. City of Ottawa – TOD Guidelines;

F. City of Ottawa – Green Space Master Plan;

G. City of Ottawa Cycling Plan;

H. City of Ottawa – Pedestrian Plan;

I. City of Ottawa – Integrated Street Furniture Program;

J. OBC;

K. AODA;

L. Canadian Transportation Agency, Code of Practice, Passenger Terminal Accessibility

M. Canadian Transportation Agency, Code of Practice, Removing Communication Barriers for Travelers with Disabilities

N. City of Ottawa Construction Specifications and Details; and

O. Ontario Traffic Manual.

(b) Signage System Design

(i) Design for the wayfinding and signage system for the OLRT is comprised of identification, directional, information, operational, regulatory, and temporary signage.

(ii) The City shall determine Station names for all LRT Stations.

(iii) The City shall determine all specifications regarding the branding and service identity of the LRT.

(iv) Identification Signage

A. The key functions of the identification signage are to identify:

i. Stations within the built environment;

ii. Station entries;

iii. Station facilities;

iv. Passenger services;

v. Elevator access; and

vi. Accessible entries.

(v) Directional Signage

A. The key functions of the directional signage are to direct:

i. Passengers from the Station entries to ticketing facilities and on to the Platform and to the exits;

ii. Passengers to connecting transport services and Infrastructure;

iii. Passengers to facilities within the Station; and

iv. Disabled Passengers to accessible access points.

(vi) Information Signage

A. The key functions of the information signage are:

i. Provide transport network information;

ii. Notify Passengers of available services; and

iii. Notify Passengers of delays or changes to scheduled services.

(vii) Operational Signage

A. The main purposes of the operational signage are:

i. Identify doors, areas and access points for staff and facilities management; and

ii. Identify ancillary room functions.

(viii) Regulatory Signage

A. The key functions of the regulatory signage are:

i. Identify potential hazards to Passengers and the public; and

ii. Identify potential hazards to OLRT staff and Third Party Contractors.

(ix) Temporary Signage

A. The key function of temporary signage is to:

i. Temporarily identify changes to services, Station facilities, Station closures or hours of operations;

ii. Temporarily identify hazards to Passengers and the public; and

iii. Temporarily identify hazards to OLRT staff and Third Party Contractors.

(x) Sign Types

A. The following list of sign types has been developed specifically for the OLRT Project and represents the sign types required to effectively deliver a signage and wayfinding system that meets the stated goals.

i. The list includes, but is not necessarily limited to, sign types that Project Co. shall Design and supply:

DR01	Pylon – large;
DR02.1	Pylon – Medium (exterior with map);
DR02.2	Pylon – Medium (interior without map);
DR03	Pylon – Small;
DR05	Overhead Beams;
DR05.1	Station ID & Directional Content;
DR05.2	Direction of Train Travel;

DR05.3	LED sign (time to Train);
DR06	Overhead Beams – Freestanding;
DR07	Illuminated – To area of refuge;
DR08	Directional Info;
ID01	Station Name – Megagraphic;
ID02	Station Name – Large;
ID03	Station Name – Small;
ID04	Station Name – Small;
ID05	Station Name – Small;
ID06.1	Room ID – Front of House (Large with Pictogram);
ID06.2	Room ID – Back of House (Large with Pictogram);
ID06.3	Clip on Regulatory;
ID07.1	Room ID – Front of House Medium;
ID07.2	Room ID – Back of House Medium;
ID08.1	Room ID – Front of House Small;
ID08.2	Room ID – Back of House Small;
ID09	Safe Waiting Area;
ID10	Elevator Jamb;
ID12	Interpretive – Small Art Plaque;
ID13	Honorific – Interpretive;
ID14	Illuminated – Area of Refuge High Level;
ID15	Illuminated – Area of Refuge Low Level;
ID16	Attendant Kiosk;
IN01.1	Fare Threshold – Integrated Floor, Wall & Ceiling;
IN01.2	Fare Threshold – Integrated Floor, Wall;
IN01.3	Fare Threshold – Integrated Floor;
IN02.1	Orientation Point (3 Panels);
IN02.2	Orientation Point (1 Panel);
IN02.3	Orientation Point (4 Panels);
IN06	Temporary Notice – Paper Insert;
IN07	Digital Temporary Notice of Accessible Service Disruption;
IN08	Temporary Signage for Elevator;
IN09	Regulatory – No Smoking/Eating/etc; and
IN10	Regulatory – No Smoking at Entry.

(xi) Sign Dimensions

A. Project Co shall provide signage in accordance to the requirements for the OLRT Sign Family in Appendix C of this Schedule 15 Output Specifications.

(xii) Project Co shall use the exemplar sign family in Appendix D of this Schedule 15 to measure the general Design expectations for sign dimensions, sign and information hierarchy, sign types, sign content, visibility, contrast, layout, sign mass and sophistication against those of Project Co Designs for the wayfinding and signage system.

(xiii) Sign Quantities

A. Project Co shall be responsible for Designing the wayfinding program including providing sufficient quantities of signs as deemed necessary to design and supply a clear, concise and consistent wayfinding sign system in order to meet the Project requirements.

(xiv) Sign Information

A. Project Co shall be responsible for updating and maintaining sign information content and messages to ensure that all signage is relevant and reflects relevant changes to the City transit System.

(xv) For Stations subject to FLUA, the following requirements apply:

A. Signage design shall comply with the NCC commercial signage guidelines.

B. All text shall to appear in both official languages.

C. Exterior signage shall not be permitted above the ground floor level.

D. Backlit signage, billboard signage and digital signage are not permitted outside of the station.

(c) Design Elements and Considerations

(i) The Design and implementation of the OLRT wayfinding and signage system requires the Project Co to incorporate the following key considerations and elements into the Designs.

(ii) Line & Letter Spacing

A. Line spacing where a set of messages is displayed shall be at least 75% of the Cap height so messages can be quickly scanned and destinations identified.

(iii) Language

A. All signage for the OLRT Project shall feature messages in both English and French.

B. Where both languages appear on a single sign, Project Co shall follow one of the following two options:

i. English text on the left side and French text on the right; or

ii. English text on the upper portion of the sign with French text below.

C. Where pairs of signs are used the sign displaying English text shall be placed at the beginning of the viewing sequence with the second sign in French located beyond it.

D. Where the two signs are required they shall be far enough apart to ensure the messages are differentiated and not read as a single message and close enough to one another allowing users to recognize that they represent the same message displayed in the two languages. A minimum gap of four character strokes shall be maintained between English and French messages. A minimum of two character strokes shall be permitted where a graphic device such as a vertical line or hyphen is used to visually separate the two messages.

E. Bilingual or unilingual paired signs shall employ the same size, fonts, letter heights, colours and general Design principles for each language.

(iv) Pictograms

A. Pictograms shall be used to reinforce sign messages, aid quick recognition and clearly communicate information to all languages and cultures.

B. Pictograms shall be based on accepted international standards. Any additional pictograms proposed by Project Co that are not based on international standards shall be presented to the City for acceptance.

(v) Legibility & Viewing Distance

A. All signage shall be legible and feature letters and graphic elements of the appropriate size for the identified viewing distances. The chart below provides the viewing distances for text of a particular height. These values are based on the viewer having good vision and reading the signs in daylight whilst stationary.

B. It shall be noted that many factors negatively impact the legibility of sign text. These include angular distortion, speed of travel and low light levels. Factors such as these shall be considered when determining the height of text appearing on signs. Project Co shall increase text heights from those described in the chart as required to maintain sign legibility based on the impact of the above conditions.

(vi) Mock ups of all sign types shall be provided by Project Co to assess the legibility of the proposed Design and text heights. Mock ups shall be reviewed by user groups comprised of a cross section of the community and representing people with diverse abilities.

(vii) Sign Placement

A. Signage shall be placed in visible locations, free from obstructions. Special care shall be taken to ensure that signs are not obstructed by other signs, Design elements or items such as security cameras.

B. Project Co shall place signs within the accepted standard for a viewers' cone of vision, being 15°above and below the viewers' horizontal line of sight. Signs viewed outside a viewers' cone of vision are read peripherally and with much less detail. The Project Co shall consider the viewers' cone of vision when selecting the height of the sign from floor level and the height of the typeface.

C. The average persons' eye level when standing is 1500mm from floor level. When seated it is approximately 1000mm from floor level and when driving eye level is approximately 1200mm from floor level. Signage shall be placed depending on how it shall be viewed and taking into account differences in eye level and a sign's audience.

D. Placement of signage shall be coordinated with the landscaping, architecture, interior Design lighting and other Equipment in order to standardize locations within a Station and across the OLRT System. Signage shall be applied consistently, assist users to know where to expect sign information and aid navigation.

(viii) Contrast and Colour

A. Project Co shall ensure contrast between sign backgrounds and messages are at a level considered acceptable to maintain sign legibility and deliver a successful signage system.

B. For environments with light levels between 10-70 foot candles Project Co shall provide signs with a contrast of 75% or higher between the background and message.

C. For environments with higher light levels (70 foot candles and above) Project Co shall provide signs with a lower contrast level of 65-75%. A dark background shall be used to absorb light and prevent glare.

(ix) Halation

A. When signs are backlit care must be taken to reduce flare or halation. Halation makes backlit or reversed lettering difficult to read especially when travelling at speed or at night. Project Co shall ensure that signs are designed to minimize the effects of halation. Directional signage shall not feature Designs which purposely use the effect of halation as a feature. This includes signage with halo lighting effects.

B. Internally illuminated signage shall have reversed opaque or translucent backgrounds to reduce halation and increase legibility.

C. Internally illuminated signs shall not feature light coloured illuminated backgrounds.

(x) Lighting

A. Design and implementation of internal or external signage illumination shall be coordinated by Project Co with the City to ensure compatibility with the Design intent for the overall lighting scheme.

(xi) Universal Design

A. The principles of universal Design shall be applied to Designs for the wayfinding and signage system by Project Co The signage system shall whenever possible seek to integrate accessible Design features with the Design as a whole. The goal is to deliver a wayfinding signage system that assists in providing an environment accessible to people with all levels of abilities. As a minimum, signage for the OLRT Stations shall be designed in accordance with the relevant accessibility codes referenced in this document. All directional signage shall be located in compliance with the stated codes.

B. The application of tactile indicators shall be coordinated with key sign locations to assist with the recognition of tactile signage locations and aid navigation by the visually impaired.

(xii) CPTED

A. The principles of CPTED shall be applied in order to ensure the Design and placement of the wayfinding and signage system does not compromise the Safety of Passengers or the general public. In general, signage must enhance public Safety by providing uninterrupted site lines in critical areas, reduce areas where people or devices may be concealed and provide sufficient information to users to instil confidence and minimize confusion. All Station, security facilities and supporting transport services shall be easily differentiated and identified whilst being recognisable as part of an organised system.

(xiii) Vandalism

A. All signage elements shall be designed and fabricated to dissuade and provide protection against vandalism and graffiti.

B. Tough, scratch and impact resistant materials shall to be utilized to resist damage, maintain appearance, increase product life spans and reduce operational costs. Sacrificial and non-sacrificial anti-graffiti coatings are to be applied to signs where the risk of graffiti is deemed to be high.

C. All accessible mechanical fixings shall be ‘security fixings’ with nonstandard drives. All accessible fixings shall be tamper proof.

D. Damaged signs shall be repaired or replaced by Project Co. in a timely manner and without negatively impacting Passengers, staff or the general public.

(xiv) The City Branding Integration

A. Project Co shall be responsible for the integration of the City branding with their Design solutions for the wayfinding and signage system for the OLRT project.

(xv) Local Conditions

A. All signage components designed and supplied by Project Co shall be fit for purpose, able to perform in the local climatic conditions presently experienced in Ottawa.

B. The effects of snow, ice and the effects of methods of snow dispersal on signage shall be addressed in the Design.

(d) Fabrication Materials & Finishes

(i) Sign material selections and colours are subject to final brand review by the City.

(ii) Metalwork

A. All work shall be accurately and neatly constructed and securely fitted and fixed.

B. Project Co shall use types and grades of metals suited to their required function, finish and method of fabrication, in sections of adequate strength and stiffness for their purpose.

C. Where appropriate, prefabricate and preassemble items in the workshop before delivering items to site.

D. Care shall be taken to ensure all visible metal surfaces are free from damage, scratching or other surface degradation.

E. Fabrication techniques, surface detailing and application of finishes shall be closely controlled to ensure continuity of appearance between individual items.

F. All visible metal edges shall be cut with machine tools. No visible edges of metal shall be cut with a guillotine or break press. No radius to edges unless specified.

(iii) Stainless Steel

A. All stainless steel used externally; in basement levels and non air conditioned areas shall be marine alloy, AISI grade 316. In internal areas all stainless steel shall be grade AISI grade 304 unless otherwise specified.

B. All stainless steel surface finishes shall be factory or machine finishes. Stainless steel products with a standard mill or 2B finish shall not be hand linished or polished, by the contractor to match factory finishes.

C. All brushed or linished stainless steel shall be No.4 linish unless otherwise specified. Grain of finish is to run with long dimension of each sign unless otherwise specified.

D. All polished or mirror stainless steel shall be No.8 mirror finish, unless otherwise specified.

E. All surfaces shall be ground and polished to produce uniform, directionally textured, polished finishes free of cross scratches.

F. All corners shall be 90° and mitred, with a hairline joint and with surface finishes meeting at mitre. No visible welds.

(iv) Aluminium

A. All aluminium shall be of an alloy suitable for purpose. For signage applications where sheet and plate is required alloy 5005 shall be used.

B. All welding shall be carried out in accordance with international standards, using techniques to avoid buckling and discolouration.

C. All exposed welds shall be ground smooth and where aluminium is to be painted all surfaces shall be suitably sanded, primed, filled and smoothed prior to final paint treatment.

(v) Mild Steel

A. Steel components shall be of quality mild steel of a gauge and alloy appropriate for location and use.

B. Method of welding used shall provide the maximum strength along joints, fill all gaps and run to a clean and regular finish. All welds shall be continuous along joints with no raw or exposed edges.

C. Irregular welds shall be ground smooth with particular attention to visible areas.

D. After fabrication and prior to pre-treatment and finishing processes, all rust, scale, burrs, weld slag and splatter shall be removed from the weld and surrounding areas.

E. Steel work shall be free of grind and machine marks by way of linishing or sandblasting without causing damage to the designed form or creating surface irregularities.

F. All mild steel framing and signage support Structure, located in external areas shall be hot dipped galvanised regardless of the application of paint finishes unless otherwise specified.

(vi) Glass

A. All glass used in the fabrication of signage shall be toughened safety glass.

B. Where glass is used in conjunction with applied graphics for the purposes of visual display, all glass shall be low iron toughened safety glass.

C. All edges are to be ground and polished smooth. All edges shall be square without chamfered or sharp edges.

D. All glass installations located in direct contact with Passengers and staff shall be certified by a Professional Engineer.

(vii) Acrylic & Polycarbonate

A. All acrylic used shall contain 90% or more Polymethyl methacrylate.

B. Where possible cast acrylic shall be used instead of extruded acrylic or polycarbonate products.

C. Cut edges shall be finished smooth and polished. No flame polished edges shall be provided.

(viii) Fastenings

A. Fastenings, including anchors, lugs, screws, rivets, and the like shall be fit for purpose and capable of transmitting the loads and stresses imposed. All fastenings shall be sufficient to ensure the assembly is secure and rigid.

B. All fastenings and associated components such as sleeves shall be finished to match the sign body treatment and colour, unless otherwise approved.

C. All exposed screw heads shall be countersunk. All screw heads shall finish flush with the adjacent exposed surface.

D. Project Co shall ensure that all fixings are protected against corrosion and will not mark or stain existing finishes.

E. Fixings shall be compatible with the types of metal they are used to secure.

(ix) Welding

A. Welded, brazed or soldered joints on exposed surfaces shall be ground, buffed or polished as applicable to the material and specified finishes. There shall be no buckling or visible surface colour variations in exposed metal finishes.

B. Welds and brazes on finished surfaces shall be indistinguishable from the parent metal.

(x) Precision Cutting

A. All cut edges shall be smooth, ground and polished. No visible cut marks, burn marks, splatter or discolouration shall be accepted.

B. All start and end cuts for laser and waterjet cutting and shall be located outside the form to be cut. All cut edges shall be de-burred. All edges shall be square. No sharp edges.

(xi) Metal Separation

A. Incompatible metals shall be separated to prevent galvanic reactions. Separation materials shall not be visible on exposed surfaces or cause discolouration to the surrounding finishes over time.

(xii) Graphic Films

A. All corners and edges of finished letterforms, numerals, arrows, pictograms, logotypes and other graphic elements shall be sharp and true to the selected typeface or artwork, with accurate even curves and serifs where applicable.

(xiii) Screen Printing

A. All screen printed graphics shall be applied according using a screen of 120 threads per inch. Registration shall be accurate.

B. Screen printing ink shall be Sericol Polyscreen 2 pac system or similar.

(xiv) Anti-Graffiti Coatings

A. All applied coatings shall be compliant with the sustainability goals for the Project and be applied to the manufacturers' instructions by qualified personnel trained in the correct use and application and/or removal of these types of products.

(e) Electrical

(i) Internal Lighting

A. Project Co shall ensure that all illumination is fit for purpose and provides even illumination. No shadows, visible wiring or hotspots shall be permitted.

B. Project Co shall fabricate all signs with internal lighting in such a way as to prevent all light leaks

C. All control gear shall be compatible with the lamps used and shall be located within the sign or concealed in a remote location. In all cases Project Co shall ensure that all control gear including transformers, drivers and ballasts are installed in an accessible and safe location which does not interfere with the functioning of the lighting or the sign itself.

D. All wiring shall be encased in non-conductive, insulated, electrical conduit, fit for purpose.

E. All ballasts and control gear shall be electronic. No solid core transformers or ballasts shall be used.

F. All interior lighting fixtures located underneath skylights shall be full cutoff.

(ii) External Lighting

A. Where additional illumination is required for the purposes signage illumination, light fixtures shall match in colour temperature, lumen output and intent.

B. All exterior lighting fixtures shall be full cutoff.

(iii) Activation of Signage Illumination

A. Timers for activating signage related lighting shall be integrated with the lighting for the OLRT Stations.

B. Activation for sign illumination shall be photo sensitive and linked to the level of ambient daylight. Deactivation will also be automatic and photo sensitive but with the option of a timed deactivation and manual override to reduce power consumption if required.

(iv) LED Displays

A. Project Co shall be responsible for the Design and placement for all LED displays. Project Co shall be responsible for the Design and supply of all shrouds and fixing systems required to maintain a consistent Design language and integrate the displays with the Designs for the wayfinding

and signage system. Design of the shrouds and or fixing systems shall not negatively impact the performance of the base LED displays in any way.

B. Placement of LED displays as part of the Passenger information systems shall be the responsibility of Project Co. Placement of Passenger information displays shall not obscure or interfere with the operational performance of the wayfinding and signage system.

C. All LED displays shall be networked and compatible with the OLRT operating system for information displays.

D. LED displays used for information signage shall comply or exceed the following performance requirements:

i. AC Power supply: 120V;

ii. Line frequency: 50Hz;

iii. Size of characters: 100mm, 16 pixels;

iv. View angle of 60° in all direction;

v. High visibility during the periods of strong environmental luminosity;

vi. LED luminance from 300 up to 700 Cd/m2;

vii. Interfaced network card (TFT and character);

viii. Ethernet RJ 45 data connection;

ix. Wireless remote control function for power on/off and remote access for maintenance;

x. Exterior power and network availability indicator light;

xi. Remote brightness control;

xii. Minimum contrast level of 450:1;

xiii. Response time: less than 25ms;

xiv. Automatic temperature compensation for display operation;

xv. Minimum 3 colour display (red, green, amber);

xvi. Compatible with French and English language characters;

xvii. Safety anti-glare screen; and

xviii. HD displays shall be in a format ratio of 16:9 and a minimum resolution of 1280 x 768 pixels and shall support HDMI connectors.

(v) LCD Displays

A. Project Co shall be responsible for the Design and placement for all LCD displays. Project Co shall be responsible for the Design and supply and of all shrouds and fixing systems required to maintain a consistent Design language and integrate the displays with the Designs for the wayfinding and signage system. Design of the shrouds and or fixing systems must not negatively impact the performance of the base LCD displays in any way.

B. Placement of LCD displays as part of the Passenger information systems shall be the responsibility of Project Co. Placement of Passenger information displays shall not obscure or interfere with the operational performance of the wayfinding and signage system.

C. All LCD displays shall be networked and compatible with the OLRT operating system for information displays.

D. LCD displays used for information signage shall comply or exceed the following performance requirements:

i. AC Power supply: 120V;

ii. Line frequency: 50Hz;

iii. Flat and slim Design, low depth (<150mm) and weight (< 50 kg);

iv. Robust metal housing with exterior grade finishes;

v. Safety Anti-glare and anti-reflective screen;

vi. Ratio: 16:9 format;

vii. Resolution: 1280 x 768 or more;

viii. Luminance: more than 450 Cd/m2 ;

ix. Contrast: more than 450:1;

x. Automatic control of the environment light;

xi. Response time: less than 25ms;

xii. Inputs: HDMI;

xiii. Integrated Ethernet network cards with two RJ 45 socket;

xiv. Wireless remote control function for power on/off, visual settings and remote access for maintenance;

xv. Exterior power and network availability indicator light;

xvi. Angle wide viewing: more than 160° in all directions;

xvii. Shall include integrated (built in) controller, and provision for wireless keyboard & keyboards; and

xviii. Screen shall be easily removed from site without heavy lifting Equipment and disruption to users.

6.6 Conditions

(a) Site

(i) Site Conditions

A. No signage is to be fabricated or finished onsite.

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SCHEDULE 15-2
DESIGN AND CONSTRUCTION

PART 6
DESIGN AND CONSTRUCTION REQUIREMENTS - MSF

ARTICLE 1 INTRODUCTION

1.1 Introduction

(a) This article outlines the guidelines and performance criteria that are necessary for Project Co to carry out the final Design and Construction for the various components and elements of the MSF for the OLRT Project. The MSF shall serve as the maintenance and storage facility for the City and Project Co and shall house the OLRT Vehicle fleet. This Work requires coordination and interaction with other work by Project Co, including but not limited to the mainline Track. Project Co shall Design the MSF to meet the LRV peak daily service requirements.

(i) Features of the Work shall include, but not be limited to, final Design, financing, Construction, testing and acceptance, operation and maintenance of the following:

A. Obtain necessary Construction Permits;

B. Complete mobilization and demobilization;

C. Install and maintain storm water pollution prevention features;

D. Construct all Track;

i. Furnish and install new turnouts, crossties, ballast, and necessary appurtenances.

ii. Install new rail within buildings and/or where embedded; second-hand rail, meeting the criteria stipulated in Part 6 Article 6 – Trackwork, may be used elsewhere.

E. Retaining walls and miscellaneous concrete Structures;

F. Buildings as further defined in 1.1(c); and

G. Emergency Planning

i. Project Co shall be responsible for the preparation, submission and maintenance (including revisions as necessary) of fire safety plan(s), for approval by the authority having jurisdiction, pursuant

to Ontario Fire Code, Section 2.8 Emergency Planning, where applicable.

(ii) Project Co shall not be permitted to install fuel storage tanks at the MSF with the exception of fuel tanks servicing stand by power generation equipment only.

(b) This section summarizes the requirements that are otherwise detailed in the remaining Articles of this Part 6.

(i) Site Summary

A. The site is located on a parcel just east of the crossing of Belfast Road to the south and west; to the north is the VIA right of way, which defines the northern property line. The eastern site boundary is a light industrial property (occupied by Pepsi Cola).

B. The site zoning is compatible with the proposed use and activities associated with the MSF.

C. This site currently houses a series of privately owned commercial properties and a maintenance facility for the City.

D. A neighbouring development to the north of the VIA Rail right of way is composed largely of three storey, multifamily residential units. A combination of sound walls, landscaping berms and other noise mitigation measures shall be employed to provide acoustic and visual screening of the MSF.

(c) Facility Summary

(i) The MSF shall be designed to maintain and store all vehicles required by Project Co to meet the requirements outlined in Part 1 Article 2 – Operational Performance Requirements.

(ii) The MSF will serve as the service center and heavy maintenance center for the entire LRT network. Any Design for the initial build out shall take into consideration, be compatible with and protect for any future expansion or build-out requirements.

A. Project Co shall plan, design and construct facilities as required to perform all necessary operations and maintenance activities required by the Project Agreement.

B. Buildings may be designed to take advantage of the pre-engineered delivery method.

C. Space shall be assigned on the site to protect for a future two-bay paint shop building.

(iii) LEED:

A. The administration building and the maintenance building shall be designed for LEED® "Certified" status.

B. Project Co shall register the MSF with the GBC and provide documentation for all credits necessary for "Certified" status.

(iv) Accessibility:

A. Where applicable, Project Co shall ensure the project site and facilities are designed to be universally accessible including satisfying the requirements of Transport Canada, AODA and applicable City Guidelines and CSA Standards. The application of Design guidelines and criteria, standards and practices shall accommodate the needs of persons with physical, sensory, and mental disabilities.

(d) General Maintenance Philosophy: The MSF Design shall allow for flexibility in LRV maintenance procedures.

(i) The MSF site, or alternative location determined by the threat and vulnerability analysis, shall house the BCC for the OLRT System.

(ii) The Design and operation of the MSF, shall be based on the following concepts:

A. To ensure that the required number of Vehicles needed for specified levels of service are available for revenue service, clean, sanded and in good mechanical order; and

B. The goal of the maintenance shop is to return the LRV to "ready for revenue service" status as quickly as possible. Therefore, maintenance procedures shall focus on exchanging good components (from shop stores) for defective components.

(e) General MSF Operations Philosophy

(i) The MSF shall provide for maximum safety and flexibility in Train movements. Direct access from the mainline to the MSF Tracks shall be provided.

(ii) Project Co shall Design and construct a parking facility (minimum 50 spaces) for the City within logical proximity of the vehicle hand-off area from Project Co to the City.

A. Should the City be required to cross Tracks in the maintenance yard to access any areas required to maintain operations, Project Co shall provide all necessary safety appurtenances and training to provide the City with a safe crossing environment.

(iii) At the location within the MSF, where Project Co will handover LRT trains to the Driver, Project Co shall provide the following facilities:

A. A heated and enclosed shelter for waiting Drivers;

B. An enclosed/heated office for the City supervisor who will be responsible for the handover; and

C. Project Co will work with the City to define the specific functional requirements for the spaces outlined above.

(f) MSF Operations Criteria

(i) Maximum MSF speed shall be 15km/hr.

1.2 MSF Functions and Requirements

(a) At a minimum, Project Co shall design and construct the MSF to accommodate the following:

(i) To satisfy all Operational scenarios of the Agreement;

(ii) All necessary functions to support the initial LRT line and several functions for the entire planned network;

(iii) Rooms and spaces within the facility as identified in the room Data sheets for use and occupation by City staff; and

(iv) Roadways and other paved areas, Utilities, signaling, communications, access control and other security features, and other miscellaneous features for a complete and operational facility.

1.3 Administrative, Welfare and Training Functions

(a) The administrative and training functions for the MSF facility shall be at the maintenance of equipment building, providing easy and direct access from Belfast Road to the public, employees, and visitors. It shall include the following areas and features:

(i) Access: entrance to/exit from the site shall be easily recognizable and shall not require passing through "industrial" areas of the site;

(ii) These areas of the MSF shall be conceived and designed to permit ready expansion to accommodate the staffing and functional requirements of full system build-out;

(iii) A ground floor lobby shall be provided to educate the public on the sustainable principals employed by the facility Design and the features of the rest of the OLRT System;

(iv) Public access shall be through a secure reception area on the first floor. Direct public access to the shop, warehouse, and any other industrial areas shall not be permitted;

(v) Administrative, training and welfare areas shall be isolated from the transmission of sound and vibration;

(vi) Administrative and management shall be provided with offices or open office cubicles in accordance with the standards established by Interior Planning Standards, City of Ottawa, Real Property and Assets Management. Finishes shall also be consistent with these standards;

(vii) Management shall, to the fullest extent possible, be positioned with a view of maintenance and Equipment operations; and

(viii) Training areas shall be provided for all staff and protect for the future installation of driver training equipment.

1.4 LRV Storage

(a) The LRV Storage Tracks shall be provided with storage capacity of sufficient size to accommodate the operational performance requirements.

1.5 BCC Functions

(a) Facility shall provide for the day to day operations of the yard and:

(i) BCC shall provide for a back-up operations and dispatch area capable of performing all of the operations of the primary TSCC located at. Not less than two dispatcher stations shall be provided and each shall be outfitted to provide for normal operations of the LRT System by the City; and

(ii) Shall be designed to be post disaster survivable following the Essential Services Code requirements for structural, mechanical, and electrical systems. Additionally provide for:

A. Triple redundant HVAC systems on mission critical Equipment including the control center and related data systems rooms; and

B. All mission critical systems shall be on full emergency back-up electrical power, to be provided by a fixed emergency generator system. The back-up power system shall be supported by UPS systems capable of maintaining mission critical systems for not less than two hours.

1.6 Crew Dispatch

(a) Crew dispatch areas shall be under control of the LRT Driver and shall be independently controllable from Project Co areas.

(b) Areas shall be maintained by Project Co and shall be operational and available to operations personnel and LRT drivers at all times as required to support system operations.

(c) Crew dispatch areas shall be located proximate to and provide convenient access to LRT hand-off area.

(d) The design and operation of the MSF shall facilitate pedestrian movement to and from Belfast Road.

(e) Functional areas include:

(i) Dispatcher's area;

(ii) Day room for LRT Driver;

(iii) Welfare facilities for the LRT Driver;

(iv) Management offices for the LRT Driver; and

(v) Storage areas for the LRT Driver.

1.7 Room Data Sheets

(a) Project Co shall include within the MSF, the rooms identified in the room data sheets provided in Appendix F. These sheets contain additional requirements for the design and construction of required rooms within the MSF.

ARTICLE 2 ARCHITECTURAL DESIGN CRITERIA

2.1 Introduction

(a) General Requirements

(i) Reference Documents

A. The Design and Construction of the architectural requirements of the MSF shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

i. OBC;

ii. NBC;

iii. CGSB;

iv. ASTM;

v. ODA;

vi. AODA;

vii. The Ontario Heritage Act;

viii. OHSA;

ix. CSA Standards;

x. ULC;

xi. MNECB;

xii. ASHRAE;

xiii. NFPA, including but not limited to NFPA 130;

xiv. NCC Regulations when applicable;

xv. Others:

1. the City standards;

2. City of Ottawa Bylaws;

3. City of Ottawa Standards;

4. City of Ottawa Guidelines;

5. APTA Transit Standards; and

xvi. Ontario Fire Code

xvii. Canada GBC – LEED® Program.

(ii) Scope of Construction Work

A. Materials employed in the construction of exterior façades shall be consistent with City standards.

B. The MSF shall be designed and constructed as a campus with a common aesthetic throughout all Structures.

(b) Materials

(i) All materials used in the construction of the interior and exterior of facility shall be of any code compliant material suitable for the appropriate type and durability of facility or otherwise indicated in the Project Agreement.

2.2 Signage

(a) General Requirements:

(i) Shall comply with Part 5 Article 6 – Wayfinding and Signage of this Schedule 15-2 and the City of Ottawa Visual Identity Standards Manual.

(ii) Site signage including illuminated entry monument, roadway and rail signage and wayfinding signage for visitors and delivery vehicles.

(iii) Building signage identifying address and facility for each building and as required to identify Track numbers at each rail door. Provide emergency contact information and hours of operation (as relates to public access) at main entry doors.

(iv) Interior signage identifying all departments and rooms: offices, workstations, breakrooms, washrooms, shop functions, etc. Provide meeting room agenda, staff directory, and daily events holders.

(v) Regulatory signage for accessibility, Safety, and hazardous materials.

(vi) Provide a fire safety plan(s) for the facility as approved by the AHJ.

2.3 Building Code Analysis

(a) Project Co shall perform a code analysis with respect to the OBC.

(b) Provide a complete code analysis for the MSF, in accordance with Schedule 10 – Review Procedure, addressing the following minimum requirements:

(i) Building Size, Use and Occupancy:

A. Building area and number of storeys; and

B. Mezzanines.

(ii) Structural Design:

A. Approach to compliance for structural Design.

(iii) Occupant Load:

A. Occupant load factors and Design occupant loads; and

B. Occupant load calculation;

(iv) Construction Requirements:

A. Construction classification and Construction requirements; and

B. Interior finishes.

(v) Interconnected Floor Spaces:

A. Description of interconnected floor spaces; and

B. Special protection for interconnected floor spaces.

(vi) Spatial Separation:

A. Spatial separation and exposure protection.

(vii) Fire Department Access:

A. Fire Department access route;

B. Fire Department access openings;

C. Water supply for firefighting; and

D. Hydrants and Fire Department connections.

(viii) Fire Separations and Compartmentalization:

A. Required fire separations;

B. Voluntary fire separations; and

C. Fire resistance rating of assemblies and fire protection ratings of closures.

(ix) Egress and Exiting:

A. Exiting concept including number and location of exits;

B. Travel distance;

C. Exit capacity;

D. Egress widths including, vertical egress widths and horizontal egress widths;

E. Egress time to protected route or exterior; and

F. Door hardware.

(x) Fire Protection Systems, Emergency Power and Communication Systems:

A. Fire alarm system and devices;

B. Standpipe system;

C. Sprinkler system: All buildings shall be sprinklered, including any LRV storage building, except where special extinguishing agents are required in sensitive areas\rooms;

D. Voluntary systems;

E. Emergency lighting and exit signage;

F. Emergency power; and

G. Communication Systems.

(xi) Ventilation:

A. Emergency ventilation.

(xii) Washrooms:

A. Number of washroom fixtures; and

B. Location of gender specific toilet rooms.

(xiii) Barrier Free Design:

A. Provide analysis consisting of description of Barrier Free Design requirements to meet the following to provide the most accommodating environment:

i. Barrier Free Access in accordance with the AODA Accessible Built Environment Standard.

B. Protection of a barrier-free path of travel.

ARTICLE 3 STRUCTURAL DESIGN CRITERIA

3.1 General Structural Design Criteria

(a) General Requirements

(i) This Structural Design Criteria presents the basic structural Design guidelines, codes, and standards references that must be followed throughout the structural Design process of the entire MSF.

(ii) Design and Construction shall conform with the below mentioned codes with any amendments from City of Ottawa codes.

(iii) Wood and wood products shall not be used for structural members.

(b) Reference Documents

(i) The Design and Construction of structural Work shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

A. OBC;

B. NBC;

C. User's Guide – NBC: Structural Commentaries (Part 4);

D. CSA;

E. CAN/CSA S6-06 including Supplement No. 1;

F. CAN/CSA S6 Package – Canadian Highway Design Code and CHBDC;

G. AREMA Manual for Railway Engineering;

H. CAN/CSA A23.1/A23.2;

I. CAN/CSA A23.3;

J. CAN/CSA G40.20-04/G40.21-04;

K. CAN/CSA O86;

L. CAN/CSA S16;

M. CAN/CSA S304.1; and

N. ASTM International.

(c) Structural Loads

(i) Dead Loads

A. Dead Load shall include all actual weight of materials used and shall not be less than minimum requirements by OBC and NBC and any amendments by the City.

(ii) Live Loads

A. Vertical and horizontal live loads shall be as described in the above Reference Documents based on occupancy and use of area. Any Equipment loads such as Bridge crane, jib crane, fork lift etc. shall be considered as live load.

(iii) Environmental Loads:

A. Snow, wind, ice and seismic loads shall be as described in the relevant Reference Documents, using the Importance Category of "Normal" with the building code and "Other" within CHBDC.

(iv) Lateral Earth Pressure Loads

A. All underground Structures including retaining walls and pits shall be designed for lateral earth pressure including surcharge. Lateral earth pressure and surcharge shall be as described in relevant Reference Documents and as may be prescribed in Part 1 Article 12 – Geotechnical/Foundation Design Criteria.

(d) Load Combinations

(i) Load Combinations shall be in accordance with the applicable building codes for the Facility Buildings and foundations and shall include any possible load combinations (dead load, live load, cranes load, impact load, snow load, wind load, seismic load and lateral earth pressure).

(e) Design Considerations for Structures above Ground

(i) Seismic requirements shall be as per OBC and NBCC.

(f) Design Considerations for Foundations

(i) Foundations for Structures shall be designed such that their displacements (SLS), as defined in the Reference Documents identified in this article and as may be prescribed in Part 1 Article 12 – Geotechnical/Foundation Design Criteria, are

compatible with the structural Design, function, and structure performance requirements, and clearance envelope requirements over their Design Life.

(ii) Where there is a potential for new Construction to adversely impact any Adjacent Structures, Project Co shall prepare and implement an appropriate instrumentation and monitoring plan for the existing Structure to confirm that the new Construction will not adversely impact the Existing Adjacent Structures, as prescribed in Part 1 Article 20 – Protection of Existing Adjacent Structures.

3.2 Materials

(a) Concrete

(i) Design of concrete Structures shall be in accordance with CAN/CSA A23.3 and CAN/CSA S6.

(ii) Design of prestressesd and precast concrete Structures shall be in accordance with CAN/CSA A23 and CAN/CSA A251-00.

(iii) Structures supporting Train loads, including ground-supported slabs, shall meet CHBDC standards for fatigue.

(iv) For durability Design within CAN/CSA A23.1, concrete shall be considered class C-1. Concrete supporting Train loads shall be class C-XL. Exterior slabs-on-grade may be class C-2.

(v) All concrete exposed to freezing and thawing cycles shall be air entrained.

(vi) All non-prestressed reinforcement and testing methods shall conform to the following standards:

A. CSA; and

i. CAN/CSA G30.18-M92

ii. CAN/CSA W186-M1990

B. ASTM International.

i. ASTM A82/A82M

ii. ASTM A182/A185M

iii. ASTM A496/A496M

iv. ASTM A497/A497M

v. ASTM A775/A775M

(vii) All concrete materials, testing methods, and Construction practices for plain and reinforced concrete shall conform to the following standards:

A. CSA; and

i. CAN/CSA A23.1/A23.2

ii. CAN/CSA A3000 (Consists of A3001, A3002, A3003, A3004, A3005)

B. ASTM International.

i. ASTM C260

ii. ASTM C494/C494M

iii. ASTM C1017/C1017M

(viii) Concrete reinforcement shall conform to CAN/CSA G30.18 M, and welded wire mesh shall conform to CAN/CSA G30.5.

(ix) Weldable reinforcing steel: CAN/CSA G30.18-M.

(x) All bent reinforcing bars shall meet the bend test requirements of CAN/CSA G30.18.

(xi) Joints

A. Construction joints

i. Waterstop shall be provided for the entire joint between units including invert slab, external walls and roof slab for Structures partially or completely underground. Wall construction joints above invert slab and below roof level shall have a horizontal water seal only.

(b) Masonry

(i) Design of masonry Structures shall be in accordance with CAN/CSA S304.1 and CAN/CSA S6, where they are applicable.

(ii) Masonry Structures shall be designed to resist all applied vertical and lateral loads as required by the OBC (and the NBC where applicable). This requirement applies to load-bearing and no- load-bearing masonry.

(iii) All concrete materials, testing methods, and Construction practices for reinforced and unreinforced masonry shall conform to the following standards:

A. CSA

i. CAN/CSA A23.1/A23.2

ii. CAN/CSA A179

iii. CAN/CSA A370

iv. CAN/CSA A371

(iv) All masonry walls shall have galvanized horizontal reinforcing.

(c) Steel

(i) Design of cold formed steel Structures shall be in accordance with CAN/CSA S136.

(ii) All steel materials shall confirm to the following standards:

A. CSA; and

i. CAN/CSA G40.20/G40.21.

ii. Beam connections, columns, base plates, beams, purlins, girts and sag rods: CAN/CSA G40.20/G40.21-M.

iii. Welding materials: CAN/CSA W59-M, and certified by the Canadian Welding Bureau.

B. High strength bolts: ASTM A325M, Type 1. Nuts: ASTM A563. Washers: ASTM F436.

(iii) Protection of Steelwork

A. The minimum thickness of concrete when used as an encasement for steelwork shall be 60mm.

(iv) Protective Coatings

A. Structural steel members and connections shall be protected against corrosion.

B. Acceptable methods of protection are painting and hot dip galvanizing as follows:

i. Bolts, nuts and washers used with galvanized Structures shall also be galvanized in accordance with CAN/CSA G164-M92 (R2003).

ii. Protection shall be restored when severe damage to the galvanized coating has occurred during welding or as a result of rough handling or abrasion.

iii. Methods of painting shall be in accordance with CISC/CPMA.

(d) Metal Deck

(i) Design and Performance Requirements

A. Design steel deck to CAN/CSA S16, Update No. 1.

B. Formed steel sheet: CSSBI 101 M, Grade A and ASTM A653/A653M.

(e) Metal Studs

(i) This section applies to all light gauge metal work

A. Include Design, manufacture, supply, installation, inspection and testing of load bearing metal studs as described in these performance specifications and summarized in the following elements of the work:

i. Load bearing metal studs shall be capable of carrying live, dead, and imposed loads.

(ii) Design and Performance Requirements

A. Design load-bearing metal studs based on Limit States Design principles using factored loads and resistances. Loads and load factors to be in accordance with the OBC. Resistances and resistance factors to be determined in accordance with the OBC and CAN/CSA S136-M.

ARTICLE 4 MECHANICAL DESIGN CRITERIA

4.1 HVAC

(a) General HVAC Requirements

(i) Project Co shall provide complete design and construction of HVAC systems for all facilities as required by and in accordance with all referenced codes and standards and where required in the Project Agreement.

(ii) Reference Documents

A. Project Co shall comply with all applicable municipal, provincial, federal and foreign, codes, standards, regulations and best practices, and with manufacturers' requirements and recommendations.

B. The Design and Construction of the mechanical systems shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

i. Ontario Regulation 350/06 OBC;

ii. NBCC;

iii. ODA;

iv. AODA;

v. CSA Codes and Standard;

vi. Model National Energy Code of Canada for Buildings;

vii. ULC;

viii. NFC;

1. NFPA 70

2. NFPA 90

3. NFPA 91

4. NFPA 130

ix. ASHRAE Handbooks and Standards; and

x. SMACNA.

(iii) Design Criteria and Parameters

A. The Design of HVAC systems shall conform to the requirements of this Article, and all the applicable codes and standards.

B. Noise Criteria

i. Mechanical Equipment and systems shall be designed so that the maximum transmitted by the systems do not exceed Ontario health and safety codes, ASHRAE Standards, or the following noise criteria.

Table 6-4.1

Noise Level Criteria		
Area	**Noise Criterion**	**Equivalent Air-Weighted Sound Level dB(A)**
Office and Staff Break Room	NC-40	49
Conference Room	NC-35	44
Toilet Room and Janitor's Closet	NC-45	53
Communication Room	NC-50	58
Equipment Room	NC-60	67
Shop Areas	NC-60	67

C. Vibration Requirements

i. All HVAC Equipment shall be designed and installed to eliminate or to reduce the transmission of vibration and noise to any part of the building as follows:

1. Provide vibration isolators to mechanical Equipment and components; and

2. Provide seismic restraints for mechanical Equipment or components including ductwork and piping.

D. Design Conditions

i. The Design conditions shall be based on ASHRAE Handbook Fundamentals.

E. Design Parameters

i. The Design parameter shall be based on ASHRAE standards 55, 62.1, 90.1 and 189.1

F. Duct Sizing Criteria

i. Use equal pressure method to size ducts serving air conditioning system, heating and ventilation system, and normal building exhaust system. Use velocity method for any other system that may require it due to system requirement or noise control or as indicated in the individual system.

(b) HVAC Equipment and Systems

(i) General Requirement

(ii) Design and Performance Requirements

A. Equipment

i. Select HVAC Equipment containing no CFC refrigerant

ii. Select HVAC Equipment utilizing refrigerant that will not contribute to ozone depletion and global climate change, such as Refrigerant 410A.

iii. All HVAC Equipment shall be isolated from the building and anchored for seismic restraint.

B. System:

i. Design high efficiency HVAC system to meet or exceed ASHRAE 90.1-2007.

ii. System ventilation Design shall meet ASHRAE 62.1-2007 for indoor air quality.

(iii) Material and Product

A. All Equipment shall be certified to be installed in Canada and meet the requirements of MNECB.

(c) HVAC Controls

(i) Design and Performance Requirements

A. All building controllers, application controllers and all input/output devises shall use industry standard protocols.

(d) Testing and Balancing

(i) Performance Requirements

A. Provide testing, adjusting and balancing by an agency certified by an agency certified by the AABC or NEBB.

4.2 Plumbing and Fire Protection

(a) Project Co shall provide complete design and construction of plumbing and fire protection systems for all facilities as required by and in accordance with all referenced codes and standards and where required in the Project Agreement.

(b) Reference Documents

(i) Project Co shall comply with all, applicable, municipal, provincial, and federal codes, standards, regulations and best practices.

A. Ontario Regulation 350/06

B. Ontario Mechanical Code

C. CSA Codes and Standard

D. NFPA 70

E. Ontario Regulation 213/07

(c) Plumbing Fixture

(i) General Requirement

A. Provide Design, approvals, supply of materials, installation, inspection and testing of works associated with the plumbing fixtures as described in these performance specifications and summarized in the following elements of the Work.

i. Urinal: Waterless type urinals are prohibited.

(ii) Design and Performance Requirements

A. Fixtures and fittings, where applicable, shall be in accordance with requirements of CSA B45 Series.

(d) Fire Protection System

(i) Design of the fire protection systems shall conform to the latest edition of the following applicable codes and standards:

A. Ontario Regulation 350/06 OBC;

B. Ontario Fire Code (latest issue);

C. Ontario Mechanical Code;

D. CSA Codes and Standard;

E. NFC: NFPA 13;

F. NFPA 14.

i. Provide dry standpipe systems in areas subject to freezing temperature. Provide pressure gauge at top of each standpipe riser. Siamese fire department connection for standpipe shall match connection for sprinkler systems;

G. NFPA 20 and

H. NFPA 2001.

(ii) Design and Performance Requirements

A. BCC:

i. Provide clean agent for the BCC area to protect the electronic Equipment. Also provide Class III wet standpipe system to comply with the requirements of NFPA 14 as a back-up system.

(iii) Fire Protection Specialties

A. Design and performance requirements: All fire extinguishers shall be pressurized (stored pressure) rechargeable type, in accordance with NFPA 10, and ULC listed and labeled for the class of fires for which they are specified.

i. The clean agent fire suppression system is to utilize Inergen gas and be in accordance with requirements of NFPA 2001.

ii. The clean agent fire suppression system supplier shall, as a minimum, provide 24-hour Emergency service, 7 days per week and be able to respond to an Emergency situation with 2 hours of receiving the call.

ARTICLE 5 ELECTRICAL DESIGN CRITERIA

5.1 Introduction

(a) This article presents the basic electrical Design guidelines, codes, and standards references that shall be followed throughout the electrical Design process of the MSF.

(b) Project Co shall provide complete design and construction of electrical and communication systems for all facilities as required by and in accordance with all referenced codes and standards and where required in the Project Agreement.

5.2 Reference Documents

(a) The Design and Construction of electrical Work shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

(i) OBC;

(ii) NBCC;

(iii) Ontario Regulation 164/99, Current Edition;

(iv) CEC, Part I, 21st Ed: Safety Standard for Electrical Installations;

(v) ANSI;

(vi) ULC;

(vii) NEMA;

(viii) CSA;

(ix) IESNA, Lighting Handbook;

(x) ASHRAE 90.1;

(xi) City of Ottawa Standards;

(xii) NFPA 130;

(xiii) ASME A17.1;

(xiv) IEEE; and

(xv) Hydro Ottawa Standards.

5.3 Basis for Design

(a) Calculations:

(i) Lighting-level calculations shall be completed for all interior and exterior spaces occupied by staff.

5.4 Functional Requirements

(a) Electrical Service

(i) The MSF will receive its service feeder from Hydro Ottawa. Project Co shall determine whether to receive medium voltage power from the Utility and distribute around the site at this level to pad mounted transformers at the various load points.

(ii) Primary switching rooms for incoming service shall be:

A. designed in partnership with HOL and in accordance to HOL Specification GCS0002: Primary Voltage Service Specification;

B. at grade or within five (5) meters below grade with two walls on the outside to allow ease of access for HOL incoming feeders and designed for a three (3) hour fire envelope;

C. a minimum of 5.5m wide, 9.5m long and a ceiling height of 3.2m; and

D. coordinated with HOL in terms of switchgear location and placement within the rooms.

(iii) Emergency ventilation or fire suppression Equipment shall be provided a reliable power source or combination of sources. On-site power generation shall be provided as the backup source for these loads. All power sources shall be as approved by the Authority Having Jurisdiction and in conformance with the applicable code.

(b) Metering

(i) Customer-owned metering shall be provided.

(ii) Utility revenue metering shall be provided as required by Hydro Ottawa.

(c) Duct banks, Maintenance Holes and Handholes

(i) Duct banks and maintenance holes shall be designed in accordance with the seismic criteria defined for this Project. Duct banks shall be designed to include spare capacity after completion of installation to protect for future growth and expansion. Ducts shall be sloped to maintenance holes to provide adequate

drainage. Concrete encasement shall be provided where required by applicable code. In addition, space is to be provisioned for a 24 way fibre to be installed for a separate highways IT network in coordination with the City Highways Department. All ducts to be roped.

(ii) Maintenance holes and/or handholes shall be sufficiently sized and provided where access to or installation of cable is necessary.

(d) Electrical Rooms

(i) Electrical rooms shall have sufficient space to house all Equipment. Adequate space shall consider minimum working clearances, conduit entry points and routing, Equipment removal / replacement and ventilation requirements.

(e) Grounding and Bonding

(i) The electrical distribution system shall be solidly grounded.

(ii) An applicable code compliant grounding electrode system shall be provided.

(iii) All non-current-carrying metal enclosures and all alternating current Equipment shall be securely connected to the grounding system.

(iv) Avoid natural gas piping and pipe connected to an active cathodic protection system.

(f) Lighting

(i) Emergency fixtures, exit lights and essential signs shall be independently wired from the emergency lighting panel. Emergency lighting shall be automatically energized upon failure of commercial power. Emergency lighting for stairs and passageways shall be designed to accommodate egress.

(g) Fire Alarm

(i) The fire alarm system shall be analog addressable, non-coded with a general alarm sounding and strobe lights activated in the building when alarm conditions are initiated. Visual and audible alarms shall be initiated at the fire alarm control panel in each building. The central fire alarm control panel shall have the capability to receive alarm, supervisory and trouble signals from all buildings. Sprinkler systems and PIV valves will be monitored by the fire alarm system, with water flow initiating a general alarm. The panel shall be provided with a dialer for calls of alarm and trouble conditions. A remote annunciator shall be placed in the lobby at the fire department's designated show-up location to aid in their locating the fire.

ARTICLE 6 TRACKWORK

6.1 Order of Precedence

(a) General

(i) The Design and Construction of trackwork shall comply with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. In the event of a conflict between the criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

A. AREMA Track Standards, unless otherwise approved, or approved equivalent; and

B. The criteria in TCRP Report 57 may be used as a source for proposed alternative requirements.

6.2 General Requirements

(a) The scope of the trackwork includes all Works related to the Design and Construction of a complete light rail yard for the maintenance and storage facility as specified herein. This includes, but is not limited to, the Design, supply, installation, and testing of yard Tracks and any and all related incidentals.

(b) The scope of the special trackwork consists of all Works related to the complete Construction of special trackwork as described in these Output Specifications. This includes, but is not limited to, the Design, supply, and installation of special trackwork, including all turnouts, adjoining trackwork, fastening components, and all other Track materials.

(c) The limits of the yard begin at the points of switches for the yard special trackwork that designate the end of the MSF connection Tracks and the beginning of the yard Tracks.

(d) Grade

(i) The maximum grade on yard storage tracks shall be 0.3%.

6.3 Operational Requirements

(a) Yard Tracks designed to hold or store full-length Trains clear of other Tracks and Structures shall accommodate the maximum Train consist between clear points, defined as the location where Track centres between two diverging Tracks from a given turnout are exactly 4m.

(b) Unless site constraints provide insufficient space, storage Tracks shall be double-ended.

6.4 Track Types

(a) General

(i) The Track Structure shall be built to 1435mm Track gauge.

(ii) The running rails of all Track, including special trackwork, shall be electrically isolated from the ground.

(b) Ballasted Track

(i) Yard ballasted Track shall utilize timber or precast concrete crossties with a resilient rail fastening system.

(ii) Crushed stone or other material shall conform to AREMA ballast specifications.

(iii) The particle size requirements shall conform to AREMA requirements in relation to the crushed stone ballast, class number 4A.

(iv) Minimum depth of ballast below the bottom of ties under the running rail shall be 225mm. Shoulder ballast shall extend a minimum of 300 mm beyond the ends of ties before sloping at 2:1 to the sub-ballast.

(v) Ballast shall be well drained and shall not contact the running rails for mitigation of stray current and loss of shunting or calibration with signal systems.

(c) Asphalt Concrete Paved Track

(i) Paved yard Track shall be utilized for grade crossings with site roadways, service aisles, cart paths.

(ii) Compacted asphalt shall be placed to embed the rails to top-of-rail elevation. Gaps shall be left on the inside of the rails for wheel flange ways.

(d) Embedded Track

(i) Embedded yard Track shall, except for gaps formed for wheel flange ways, consist of the rails fully embedded in concrete to top-of-rail elevation.

(ii) The embedment concrete and base slab concrete shall be designed to support and hold the rails in place to the correct Alignment, profile, and Track gauge.

(iii) Embedded Track shall be utilized in the shop buildings and aprons immediately outside of buildings.

(iv) Embedded Track Design shall include provisions for providing resiliency and electrical isolation between the rail and concrete slab.

(v) Embedded Track shall be drained.

(e) Pedestal Track

(i) Pedestal Track shall be utilized in pit areas of the shop building.

(ii) Rails shall be supported on short steel columns and fastened with crane rail clamps.

6.5 Track Materials

(a) General

(i) Materials identified in the following sections shall be used for all Track Construction.

(b) Rail/115 lb RE

(i) Supply rail that meets:

A. AREMA Volume 1, Chapter 4, Part 2; and

B. ASTM A1.

(ii) Second-hand Rail

A. Second-hand, or relay, rail may be used in the yard except for rail switches and inside the buildings.

B. Project Co shall perform ultrasonic or other appropriate inspections to ensure second-hand rail is free from mechanical and internal defects.

(iii) Rail Lengths

A. All rail shall be CWR.

(c) Restraining Rails

(i) Project Co shall install restraining rails against the gauge side of the low rail for all mainline horizontal curves with a radius of 145m or less.

(ii) Restraining rail must be electrically isolated from running rail in order to maintain broken rail protection.

(d) Rail Joints

(i) Project Co shall supply insulated glued joints for 115lb RE rail manufactured to AREMA standards.

(ii) Rail joints must be electrically tested prior to and after placement in Track.

(e) Rail Bonding

(i) Project Co shall supply and install rail bonds that meet AREMA specifications in Volume 3, Chapter 33, Parts 7 and 12.

(ii) Rails shall be welded in continuous lengths and bolted joints must be electrically bonded.

(iii) At locations requiring insulated joints, the traction power direct current continuity of negative rails must be maintained by use of impedance bonds.

(f) Switch Clearing Device

(i) Switch clearing devices shall be supplied and installed by Project Co at special trackwork locations. Project Co shall provide conduits and junction boxes and other supporting Infrastructure for these devices.

(ii) Project Co shall provide switch clearing devices that are proven in railway industry and meet accepted industry standards and do not compromise safety.

(g) Switch Machines and other Turnout Appliances

(i) Switch machines and other associated Equipment shall be provided and installed by Project Co.

(ii) Project Co shall allow for the location of trackside terminal boxes, which shall be located near the switch machine. Terminal boxes shall not be located within a position that would restrict the ability of maintenance personnel to maintain or manually throw the switch.

(iii) Additional separate controlled heating that can melt snow in the critical switch areas shall be provided.

(h) End-of-Track Devices (Bumping Posts)

(i) These devices shall be mounted near the end of Track on stub-end storage Tracks. The end-of-Track device shall meet the following requirements:

A. It shall be capable of stopping an unoccupied Train travelling at 10km/h;

B. It shall be suitable for permanent exterior exposure;

C. It shall engage the vehicle symmetrically about the coupler at bumper height;

D. It shall have a cushioned face and not produce any damage to a vehicle at vehicle speeds less than 5 km/h. Project Co shall coordinate the Design of the stopping device to ensure engagement to the car is adequate to prevent damage; and

E. Upon approval(s), Project Co shall procure and install the approved end-of-Track devices as part of the Works.

(ii) Rail-mounted wheels stops shall be used at the ends of shop Tracks to impede the travel of any car beyond the end of the Track(s).

6.6 Special Trackwork

(a) General

(i) All special trackwork shall be supplied and installed by Project Co. Special trackwork assemblages include all materials necessary for Construction.

(ii) All special trackwork joints shall be butt welded in-field except where Project Co can demonstrate that space does not permit. At these locations thermite welds performed in accordance with manufacturer's weld procedures are acceptable. Compromise welds shall be considered part of the mainline Track conditions and installation. No holes, for temporary joint installation, or otherwise, shall be permitted within 150mm of the weld location.

(iii) All turnouts shall utilize curved switch points.

(iv) Special trackwork components shall be based on AREMA specifications for turnout Construction.

(v) All components shall be designed so that the specified tolerances can be maintained throughout the operating life of the special trackwork with minimal maintenance.

(b) Types of Special Trackwork

(i) Turnouts

A. Provide minimum #6 turnouts within the yard.

B. All yard turnouts shall be power operated.

6.7 Track Construction Tolerances

(a) Verification of the Track installation shall include a Trackstar Geometry Test (or equivalent).

(b) Clearances shall be verified by laser measurement using an L-Kopia vehicle (or equivalent).

ARTICLE 7 COMMUNICATION AND PUBLIC ADDRESS SYSTEM

7.1 General Requirements

(a) The communication systems and PA system for the MSF shall provide support to Project Co operations. The communications systems for the MSF shall include the following:

(i) CTS interface;

(ii) BCC;

(iii) YCC;

(iv) Yard/shop PA system;

(v) CCTV;

(vi) Telephone system;

(vii) IT Infrastructure System;

(viii) SCADA which includes;

A. Traction Power SCADA;

B. Train Control SCADA; and

C. MSF BMS.

(ix) Intrusion Access Control; and

(x) Train-to-wayside wireless communications.

7.2 Operational Description

(a) CTS Interface – Project Co shall provide an interface to the CTS, which provides hi-speed fiber optic communications transmission for the various communications subsystems at the MSF, including CCTV, PA, telephone, IAC, train-to-wayside communications, BMS, and SCADA systems.

(i) Project Co shall provide dual redundant hi-speed network nodes located at the main control room in the MSF for sending and receiving voice and data information to the TSCC.

(ii) All backup for the system servers shall be located at. Project Co shall provide data connectivity to the City's IT service for connectivity to. Data connectivity between the TSCC at already exists.

(b) [REDACTED]

(c) MSF PA System – The MSF shall be equipped with a PA loudspeaker system that shall allow personnel at the YCC to make announcements throughout the facility concerning Train parking, maintenance, and repair operations in the yard shop. The system shall operate within local regulations and applicable laws with respect to ambient noise.

(d) CCTV – CCTV cameras shall be deployed strategically throughout the MSF to provide visual images of the MSF to be viewed at TSCC, BCC and YCC. The CCTV system shall use video analytics and/or intrusion detection systems to detect if people or objects have made unauthorized entry into the MSF Tracks including the yard wye and road crossings into the facility. The CCTV system shall be capable of monitoring Train movements throughout the yard.

(e) Telephone System – Project Co shall provide maintenance telephones and administration telephones for all the offices and equipment rooms, including the BCC, YCC, TPS, CIHs, and electrical equipment rooms. Project Co shall provide an interface to the existing City PBX for the management and routing of the telephone extensions.

(f) IT Infrastructure – An IT infrastructure shall be provided to support the daily office operations of Project Co including desktop workstations, printing equipment, and teleconferencing equipment.

(g) SCADA – The SCADA systems required for the MSF includes the following subsystems:

(i) Traction Power – The Traction Power SCADA shall be an on-line, real-time, interactive system operated by TSCC and YCC personnel at the maintenance console to monitor and control power distribution and equipment. The shop traction power system shall include the shop TPSS, traction interlock systems, traction emergency trip systems, shop traction power switch status and shop stinger system monitoring and control.

(ii) Train Control – The Train Control system shall have a separate monitoring system.

(h) MSF BMS – The BMS system within the MSF shall provide supervisory control of the shop Traction Power System, MSF electrical and mechanical systems, and communications subsystems. It shall be compatible with the OLRT SCADA system and supervision from the YCC.

(i) Radio Communications – The City and Project Co shall utilize the existing and planned Public Safety Service Radio System for its operations. Project Co shall obtain from the Radio Supplier, dispatch workstations which shall be installed in the YCC and BCC. Project Co shall work with the Radio System Supplier to determine quantity and functionality required to efficiently operate and maintain the LRT System.

(j) IAC – The IAC system shall control access and provide for detection of intrusion into entrance points of the MSF. Intrusion sensor activation shall sound an audible alarm

locally and trigger an alarm notification for unauthorized entry or tampering to the YCC and TSCC.

(k) Train-to-wayside wireless System – A Train-to-wayside wireless system enabling wireless transmission of data from one device to a receptor within a limited range shall be provided in the MSF. This system shall support the transfer of Train diagnostics, passenger counts, and the transfer of recorded video between the Trains and the data servers located within a secure data room.

7.3 Performance Requirements

(a) CTS

(i) The MSF CTS shall utilize the same network topology as the main OLRT CTS.

(ii) The CTS shall provide hi-speed dual redundant fiber optic data connectivity to the CIHs and TPSSs within the MSF, YCC, TSCC, and main MSF communications room.

(b) [REDACTED]

(c) YCC

(i) The functions within the YCC for operation and control of the MSF shall include CCTV, IAC, PA, and BMS monitoring of the electrical substation, sump pumps, pump systems, ventilation systems, car wash, cranes, lifts, wheel trueing, shop traction power substation, emergency trip system, traction power interlock system, shop traction power switch position, yard Train Control system controlling all yard track switch movements, monitoring of all yard Track switch movements, monitoring of vehicles in yard, monitoring of vehicles within the yard and up to the yard lead demark for turn over to mainline operations. In addition, the YCC shall have access to maintenance monitoring, reporting and scheduling, defect reporting, vehicle scheduling, rostering of drivers, and status of in service fleet.

(ii) The YCC shall contain at least one workstation capable of administration of all MSF communications systems. Functions shall vary based upon the responsibility and access rights of the person who is logged on at that workstation at any given time.

A. At a minimum, workstations shall include visual displays, keyboards, telephones, headset connection and headset, microphone, printer, and portable radio station.

B. The workstations shall have a yard GUI installed which shall provide a graphic representation of the track layouts and switch positions, power status, vehicle location and identification, CCTV images of the yard, logs of maintenance, SCADA status, report generation daily logs, and security status.

(d) Yard/Shop PA System

(i) Announcements shall be addressed to single and multiple zones within the MSF. Separate zones with separate amplifying channels and speaker systems shall be accessible individually or in combination. Zones shall be defined by operational needs and announcement sound levels shall be within applicable codes and standards.

(ii) The MSF PA system shall maintain a uniformly distributed sound level not less than 60dB plus or minus 30 degrees off axis, 1 meter above the floor, at Vehicle ambient noise level.

(iii) Automatic gain adjustment of the PA system shall be provided based upon ambient noise levels captured by ambient noise sensors. The system shall adjust volume and clarity in proportion to the increase in noise level from a preset quiet level.

(iv) The PA system shall be fully supervised with failure annunciation at the YCC of all major system components such as preamplifiers, power amplifiers, supervision detectors, and power supplies.

(e) CCTV

(i) The CCTV system camera views shall comply with any Applicable Law.

(ii) The CCTV system cameras within the MSF shall be capable of being controlled from the YCC, TSCC, or BCC (when active).

(iii) The system shall include both fixed and PTZ cameras. Cameras shall be rated for the environment installed, including day/night capabilities, heater/blower, appropriate housing, etc.

(iv) Camera locations shall be strategically selected to view the following, ensuring the views are clear, unobstructed, and not impaired by Structures, signage, foliage, intense lights, or any other obstacles:

A. All areas of the MSF exterior and perimeter;

B. Entrances and exits to MSF buildings and access controlled locations;

C. Entrances to yard wye, access roads and pedestrian access through perimeter fence; and

D. All maintenance activities that require safety and security.

(v) The CCTV system shall have video analytics and/or intrusion detection systems to detect if there has been unauthorized entry into the MSF Track areas within the perimeter fence.

(vi) The CCTV system shall interface to the IAC system. The CCTV system shall be capable of automatically displaying the best view of an access control device at YCC, TSCC, or BCC (when active) automatically either via fixed camera or PTZ preset, upon activation of an IAC system. The system shall be capable of overriding the automatic panning if necessary.

(vii) All CCTV video shall be recorded and stored digitally for a minimum of 30 days. The system shall automatically archive all alarm events automatically detected to the TSCC head-end storage system.

(viii) The system shall capture, record, store, download, view (playback), and allow monitoring of all CCTV cameras. The system shall be capable of providing simultaneous viewing, recording, and playback.

(ix) The resolution and clarity of captured images shall be maintained under a range of lighting conditions from darkness (>10 lux) through bright sunlight while ensuring optimal picture quality.

(x) The system shall safeguard and maintain authenticity of the video images using security techniques such as digital image watermarking or encryption and shall be able to demonstrate a chain of custody for data that will be used as evidence in a court of law.

(xi) All cameras shall have a camera identity displayed so that image loss can be detected.

(xii) The system shall be capable of configuring recording rate and resolution individually for each camera locally or remotely.

(xiii) The system shall store all recorded images in an industry accepted standard authenticated format. At a minimum, the system shall be capable to support MPEG4 and H.264 video formats.

(f) Telephone System

(i) The telephone system, at a minimum, shall provide maintenance telephones located in communications rooms, electrical equipment TPSSs, CIHs, the BCC, and YCC.

(ii) The system shall provide clear and intelligible communication suitable for the environment the telephones are installed in.

(iii) The telephone system shall be fully compatible with the main OLRT telephone system. The PBX at the TSCC shall provide call routing and processing for all telephones in the MSF.

(g) SCADA System

(i) The SCADA systems within the MSF shall be capable of being controlled from the YCC, TSCC or BCC (when active).

(ii) The SCADA system shall facilitate the transmission of indications and alarms from the RTUs to the TSCC or YCC as described previously via the CTS. Transmissions shall include:

A. Traction Power alarms, indications, and control signals.

B. Train Control alarms, indications, and control signals.

C. Facility power alarms, indications, and control signals.

D. Communications Systems alarms, indications, and control signals.

E. Lighting controls, auxiliary equipment monitoring such as HVAC and electrical equipment.

(iii) Indications transmitted from the RTUs to the processors shall be processed to provide monitoring information to all required subsystems, generate commands to be transmitted back to the RTUs, provide information for displays and alarm processing at the control consoles, and store information and historical data for future processing.

(iv) For each remote location, the SCADA system shall display the following items on the SCADA monitoring workstations:

A. Current system and subsystem status

B. Control panel status

C. Remote control RTU functions

D. Alarm handling and fault resets

E. Historical event logging

(v) RTUs shall operate in a full-duplex mode in which each continuously scans and reports the status of indicators and commands.

(vi) Each RTU shall be designed to interface to the CTS. The RTU shall have electrical isolation between the system inputs/outputs and the CTS units.

(vii) Each remote, monitored location shall contain a local human-machine interface for local alarm annunciation and system local control.

(viii) Emergency conditions shall immediately be displayed within 3 seconds on the operating displays in TSCC to permit the monitoring of device actions.

(h) Radio Communications

(i) The radio communications in MSF shall support operations, maintenance, security and management personnel. A dispatch console with connectivity to the City's switching site shall be installed in the BCC and YCC.

(i) Intrusion Access Control System

(i) The IAC systems within the MSF shall be capable of being monitored from the YCC, TSCC and BCC (when active).

(ii) The system shall provide controlled access and detect intrusion of the following:

A. TPSS;

B. CIH;

C. YCC;

D. BCC;

E. MCR;

F. External doors, entrances and exits of the MSF; and

G. Yard perimeter and access gates including the yard wye.

(iii) All cardholders shall have access based on facility, card reader, time, and day. The system shall allow Project Co or the City to define access levels and apply them to any or all cardholders. Access authorization shall be denied by credential holder, time of day, group of staff, shift, and any additional characteristics that are identified by the system controller database.

A. Access cards shall be provided by Project Co to approved City staff for entry into the MSF, CIHs, TPSS, and vent plants.

B. Access cards shall be provided by the City to Project Co staff for entry into private station areas and the TSCC.

(iv) The IAC system which is interfaced with the CCTV system shall provide staff within the TSCC, BCC and YCC with the display of video of the nearest CCTV camera providing coverage of that area, upon activation of an IAC alarm.

(j) Train-to-Wayside Wireless System

(i) The Train-to-wayside wireless system shall provide all LRVs with a wireless data connection at the MSF for the data transfer of Train diagnostics, passenger counts and recorded video from the NVR.

(ii) The Train-to-wayside wireless system shall be an extension of the CTS. A LAN connection shall be provided between the wireless access points and the nearest communications room in order to connect to the CTS WAN.

(iii) The system shall provide the latest wireless technology standards with backwards compatibility of established standards as needed. The system shall be fully compatible with the LRV systems.

(k) Systems Infrastructure Interface

(i) Each communications system element has a requirement for both power supply and data transmission. Project Co shall supply and connect the power requirements necessary for each communications device to operate properly in accordance with appropriate codes to each device location in a raceway system. Project Co shall supply and connect the data transmission requirements necessary for each communications device to operate properly to each device in a raceway system.

ARTICLE 8 VEHICLE SERVICE EQUIPMENT

8.1 Overview

(a) Project Co shall provide all equipment, accessories, materials, etc, and building systems to meet the maintenance requirements of the Project Agreement.

(i) Project Co's maintenance responsibilities related to the Vehicles and the right of way are detailed in Schedule 15-3 – Maintenance and Rehabilitation Requirements. Project Co shall provide the required major equipment and appurtenances to comply with these requirements

(b) Minor Equipment and Appurtenances

(i) Project Co's maintenance responsibilities related to the Vehicles and the right of way are detailed in Schedule 15-3 – Maintenance and Rehabilitation Requirements. Project Co shall provide the required minor Equipment and appurtenances to comply with these requirements.

8.2 Baseline Requirements for Industrial Equipment

(a) This section sets forth baseline requirements that apply to all Vehicle service Equipment defined herein.

(b) General Requirements

(i) Equipment shall be manufactured, installed and operated in accordance with all industrial and safety standards (or portions thereof) that apply to the Work, including but not limited to:

A. CCOHS;

i. OHSA

B. CSA;

i. CSA Standard C22.2 No 94

ii. CSA Standard C390-10

iii. CSA W47.1

iv. CSA W59

C. CEAA;

D. CGSB;

E. CISC;

F. CWB;

G. NBCC;

H. NFCC;

I. NPCC;

J. OBC; and

K. OESC (Ontario Regulation 164/99).

(ii) Labeling

A. Manufacturer shall securely attach in a prominent location on each major item of Equipment a noncorrosive, indelible nameplate showing manufacturer's name, address, model number, serial number, and pertinent utility or operating data.

B. All electrical Equipment and materials shall be new and shall have attached labels attesting to CSA or Electrical Safety Authority approval, in categories for which standards have been set by that agency and labeled as such in the manufacturer's plant.

Parameters set by City / OC Transpo		
	Peak Passenger Comfort Load Standard - Standees/m^2	3.33
	Off-peak Passenger Comfort Load Standard - Standees/m^2	0.80
	Minimum seated share of required service capacity	40%
	Minimum Terminal Time at each terminal	3.00 or headway, whichever is less
	Terminal time below which step-back operation required	3.00
	Length of Alignment (km) Baseline-Trim	33.31
	Moodie-Trim	36.47
	Moodie-Blair	24.73
	Moodie-Lincoln Fields	6.05

					Calendar Year	2018-2019	2020-21	2022	2023	2024-25	2026-30	2031-35	2036-40	2041-46	2047-48	
					Service Level	1	2	3	3a	4	5	6	7	8	9	
					Contract Year	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Days per year	Time periods	Start	End	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)	Minimum Service Capacity (pphpd)	Minimum Service Capacity (pphpd)	Minimum Service Capacity (pphpd)	Minimum Service Capacity (pphpd)	Minimum Service Capacity (pphpd)	Minimum Service Capacity (pphpd)	Minimum Service Capacity (pphpd)	Minimum Service Capacity (pphpd)	Minimum Service Capacity (pphpd)	Stage 1 Percentages
Monday-Thursday																
201	Early morning	5:00	6:30	1.5	8.0	1,351	1,435	1,518	1,331	1,331	1,515	1,653	1,819	1,819	1,819	13%
201	Morning peak	6:30	9:00	2.5	5.0	10,700	11,360	12,020	10,537	10,537	12,000	13,091	14,400	14,400	14,400	
201	Midday	9:00	14:45	5.75	5.0	4,168	4,425	4,682	4,105	4,105	4,675	5,100	5,609	5,609	5,609	39%
201	Afternoon peak	14:45	18:00	3.25	5.0	8,833	9,377	9,922	8,698	8,698	9,906	10,806	11,887	11,887	11,887	83%
201	Early evening	18:00	21:30	3.5	5.0	2,156	2,288	2,421	2,123	2,123	2,417	2,637	2,901	2,901	2,901	20%
201	Late evening	21:30	23:00	1.5	8.0	1,377	1,462	1,547	1,356	1,356	1,545	1,685	1,854	1,854	1,854	13%
201	Night	23:00	1:00	2	15.0	300	319	337	296	296	337	367	404	404	404	3%
Friday																
51	Early morning	5:00	6:30	1.5	8.0	1,351	1,435	1,518	1,331	1,331	1,515	1,653	1,819	1,819	1,819	13%
51	Morning peak	6:30	9:00	2.5	5.0	10,700	11,360	12,020	10,537	10,537	12,000	13,091	14,400	14,400	14,400	100%
51	Midday	9:00	14:45	5.75	5.0	4,168	4,425	4,682	4,105	4,105	4,675	5,100	5,609	5,609	5,609	39%
51	Afternoon peak	14:45	18:00	3.25	5.0	8,833	9,377	9,922	8,698	8,698	9,906	10,806	11,887	11,887	11,887	83%
51	Early evening	18:00	21:30	3.5	5.0	2,156	2,288	2,421	2,123	2,123	2,417	2,637	2,901	2,901	2,901	20%
51	Late evening	21:30	23:00	1.5	8.0	1,377	1,462	1,547	1,356	1,356	1,545	1,685	1,854	1,854	1,854	13%
51	Night	23:00	2:00	3	8.0	713	757	802	703	703	800	873	960	960	960	7%
Saturday																
53	Daytime	6:00	19:00	13	5.0	1,593	1,691	1,789	1,568	1,568	1,786	1,948	2,143	2,143	2,143	15%
53	Evening	19:00	23:00	4	8.0	1,171	1,243	1,315	1,153	1,153	1,313	1,432	1,575	1,575	1,575	11%
53	Night	23:00	2:00	3	8.0	713	757	802	703	703	800	873	960	960	960	7%
Sunday																
60	Daytime	8:00	19:00	11	5.0	1,254	1,331	1,408	1,235	1,235	1,406	1,534	1,687	1,687	1,687	12%
60	Evening	19:00	23:00	4	10.0	701	744	787	690	690	786	857	943	943	943	7%

Notes:

- Does not include Monday-Friday summer and other seasonal service reductions
- Saturday level of service also operated on Boxing Day
- Sunday level of service also operated on New Year's, Good Friday, Victoria Day, Civic Holiday, Labour Day, Thanksgiving Day, and Christmas Day
- Does not include extra service scheduled on Canada Day
- Morning Peak Minimum Service Capacity for SL 1, 2, and 3 based on Stage 1 ridership forecasts.
- Morning Peak Minimum Service Capacity for SL 3a, 4, 5, 6, 7, 8, 9 based on Stage 2 ridership forecasts.

			Stage 2 Service Planning Summary																			
Calendar Year			***2018-2019***				***2020-2021***				***2022***				**2023**				**2024-25**			
Service Level			***1 (Stage 1)***				***2 (Stage 1)***				***3 (Stage 1)***				**3a**				**4**			
System			***Stage 1***				***Stage 1***				***Stage 1***				**Stage 1 + Confed East**				**Stage 2**			
Summary Totals																						
Minimum Service Capacity - AM Peak (pphpd)			***10,700***				***11,360***				***12,020***				**10,537**				**10,537**			
Peak Vehicles in Service			***30***				***32***				***34***				**46**				**64**			
Total Fleet Size			***32***				***34***				***38***				**50**				**72**			
Annual Revenue Train Hours			***73,809***				***76,707***				***78,786***				**120,238**				**162,542**			
Aggregate Annual Driver Hours Target			***73,809***				***76,707***				***78,786***				**120,238**				**162,542**			
Annual Revenue Vehicle Kilometres			***3,646,807***				***3,777,995***				***3,910,890***				**6,910,000**				**9,960,000**			
Time periods	**Start**	**End**	***Head-way***	***Rev Train Hours***	***Driver Hours***	***Rev Veh Km***	***Head-way***	***Rev Train Hours***	***Driver Hours***	***Rev Veh Km***	***Head-way***	***Rev Train Hours***	***Driver Hours***	***Rev Veh Km***	***Head-way***	***Rev Train Hours***	***Driver Hours***	***Rev Veh Km***	***Head-way***	***Rev Train Hours***	***Driver Hours***	***Rev Veh Km***
Monday-Thursday																						
Early morning	5:00	6:30	*8:00*	*13.3*	*13.3*	*721*	*8:00*	*13.3*	*13.3*	*721*	*8:00*	*13.3*	*13.3*	*721*	*8:00*	*27.6*	*27.6*	*1,711*	*8:00*	*38.5*	*38.5*	*2,687*
Morning peak	6:30	9:00	***3:22***	***37.5***	***37.5***	***2,256***	***3:10***	***40.0***	***40.0***	***2,395***	***3:00***	***42.5***	***42.5***	***2,534***	***3:25***	***57.5***	***57.5***	***3,841***	***3:25***	***80.0***	***80.0***	***5,612***
Midday	9:00	14:45	*4:42*	*63.3*	*63.3*	*3,720*	*4:25*	*69.0*	*69.0*	*3,949*	*4:11*	*74.8*	*74.8*	*4,179*	*4:46*	*103.5*	*103.5*	*7,183*	*4:46*	*143.8*	*143.8*	*10,104*
Afternoon peak	14:45	18:00	*4:05*	*42.3*	*42.3*	*2,421*	*3:50*	*45.5*	*45.5*	*2,570*	*3:38*	*45.5*	*45.5*	*2,720*	*4:08*	*61.8*	*61.8*	*4,122*	*4:08*	*87.8*	*87.8*	*6,022*
Early evening	18:00	21:30	*5:00*	*38.5*	*38.5*	*2,125*	*5:00*	*38.5*	*38.5*	*2,125*	*5:00*	*38.5*	*38.5*	*2,125*	*5:00*	*63.0*	*63.0*	*4,167*	*5:00*	*80.5*	*80.5*	*5,862*
Late evening	21:30	23:00	*8:00*	*10.5*	*10.5*	*569*	*8:00*	*10.5*	*10.5*	*569*	*8:00*	*10.5*	*10.5*	*569*	*8:00*	*18.0*	*18.0*	*1,116*	*8:00*	*22.5*	*22.5*	*1,570*
Night	23:00	1:00	*15:00*	*8.0*	*8.0*	*405*	*15:00*	*8.0*	*8.0*	*405*	*15:00*	*8.0*	*8.0*	*405*	*15:00*	*12.0*	*12.0*	*794*	*15:00*	*20.0*	*20.0*	*1,260*
Friday																						
Early morning	5:00	6:30	*8:00*	*13.3*	*13.3*	*721*	*8:00*	*13.3*	*13.3*	*721*	*8:00*	*13.3*	*13.3*	*721*	*8:00*	*27.6*	*27.6*	*1,711*	*8:00*	*38.5*	*38.5*	*2,687*
Morning peak	6:30	9:00	*3:22*	*37.5*	*37.5*	*2,256*	*3:10*	*40.0*	*40.0*	*2,395*	*3:00*	*42.5*	*42.5*	*2,534*	*3:25*	*57.5*	*57.5*	*3,841*	*3:25*	*80.0*	*80.0*	*5,612*
Midday	9:00	14:45	*4:42*	*63.3*	*63.3*	*3,720*	*4:25*	*69.0*	*69.0*	*3,949*	*4:11*	*74.8*	*74.8*	*4,179*	*4:46*	*103.5*	*103.5*	*7,183*	*4:46*	*143.8*	*143.8*	*10,104*
Afternoon peak	14:45	18:00	*4:05*	*42.3*	*42.3*	*2,421*	*3:50*	*45.5*	*45.5*	*2,570*	*3:38*	*45.5*	*45.5*	*2,720*	*4:08*	*61.8*	*61.8*	*4,122*	*4:08*	*87.8*	*87.8*	*6,022*
Early evening	18:00	21:30	*5:00*	*38.5*	*38.5*	*2,125*	*5:00*	*38.5*	*38.5*	*2,125*	*5:00*	*38.5*	*38.5*	*2,125*	*5:00*	*63.0*	*63.0*	*4,167*	*5:00*	*80.5*	*80.5*	*5,862*
Late evening	21:30	23:00	*8:00*	*10.5*	*10.5*	*569*	*8:00*	*10.5*	*10.5*	*569*	*8:00*	*10.5*	*10.5*	*569*	*8:00*	*18.0*	*18.0*	*1,116*	*8:00*	*22.5*	*22.5*	*1,570*
Night	23:00	2:00	*8:00*	*21.0*	*21.0*	*1,139*	*8:00*	*21.0*	*21.0*	*1,139*	*8:00*	*21.0*	*21.0*	*1,139*	*8:00*	*36.0*	*36.0*	*2,232*	*8:00*	*45.0*	*45.0*	*3,140*
Saturday																						
Daytime	6:00	19:00	*5:00*	*147.6*	*147.6*	*4,073*	*5:00*	*147.6*	*147.6*	*4,073*	*5:00*	*147.6*	*147.6*	*4,073*	*5:00*	*246.0*	*246.0*	*8,136*	*5:00*	*322.0*	*322.0*	*11,723*
Evening	19:00	23:00	*8:00*	*28.0*	*28.0*	*759*	*7:52*	*28.0*	*28.0*	*772*	*7:26*	*28.0*	*28.0*	*816*	*8:00*	*48.0*	*48.0*	*1,488*	*8:00*	*60.0*	*60.0*	*2,093*
Night	23:00	2:00	*8:00*	*21.0*	*21.0*	*569*	*8:00*	*21.0*	*21.0*	*569*	*8:00*	*21.0*	*21.0*	*569*	*8:00*	*36.0*	*36.0*	*1,116*	*8:00*	*45.0*	*45.0*	*1,570*
Sunday																						
Daytime	8:00	19:00	*5:00*	*125.6*	*125.6*	*3,466*	*5:00*	*125.6*	*125.6*	*3,466*	*5:00*	*125.6*	*125.6*	*3,466*	*5:00*	*210.0*	*210.0*	*6,945*	*5:00*	*276.0*	*276.0*	*10,048*
Evening	19:00	23:00	*10:00*	*24.0*	*24.0*	*607*	*10:00*	*24.0*	*24.0*	*607*	*10:00*	*24.0*	*24.0*	*607*	*10:00*	*40.0*	*40.0*	*1,191*	*10:00*	*48.0*	*48.0*	*1,675*

Notes:

- Initial Service Level 3a reflects early opening of Confederation Line East; Service Levels 4-9 reflect full Stage 2 build out
- Service Plan 3a-9 reflects OC Transpo service configuration for Stage 2 (Peak periods 3 of 4 trains to Trim, 1 of 4 to Blair; Off-peak all to Trim)
- Service Plan 1-9 reflects OC Transpo policy headways used as basis for Stage 1 Service Plan
- Service Plan 1-9 reflects RTG's proposal of single-car service on weekends from Stage 1

							Stage 2 Service Planning Summary															
Calendar Year			2026-30				2031-35				2036-40				2041-46				2047-48			
Service Level			5				6				7				8				9			
System			Stage 2				Stage 2				Stage 2				Stage 2				Stage 2			
Summary Totals																						
Minimum Service Capacity - AM Peak (pphpd)			12,000				13,091				14,400				14,400				14,400			
Peak Vehicles in Service			74				80				88				88				88			
Total Fleet Size			84				90				100				100				100			
Annual Revenue Train Hours			171,259				181,614				191,386				191,386				191,386			
Aggregate Annual Driver Hours Target			171,259				181,614				191,386				191,386				191,386			
Annual Revenue Vehicle Kilometres			10,730,000				11,310,000				12,060,000				12,060,000				12,060,000			
Time periods	**Start**	**End**	***Head-way***	***Rev Train Hours***	***Driver Hours***	***Rev Veh Km***	***Head-way***	***Rev Train Hours***	***Driver Hours***	***Rev Veh Km***	***Head-way***	***Rev Train Hours***	***Driver Hours***	***Rev Veh Km***	***Head-way***	***Rev Train Hours***	***Driver Hours***	***Rev Veh Km***	***Head-way***	***Rev Train Hours***	***Driver Hours***	***Rev Veh Km***
Monday-Thursday																						
Early morning	5:00	6:30	*8:00*	*38.5*	*38.5*	*2,687*	*8:00*	*38.5*	*38.5*	*2,687*	*8:00*	*38.5*	*38.5*	*2,687*	*8:00*	*38.5*	*38.5*	*2,687*	*8:00*	*38.5*	*38.5*	*2,687*
Morning peak	6:30	9:00	***3:00***	***92.5***	***92.5***	***6,391***	***2:45***	***100.0***	***100.0***	***6,972***	***2:30***	***110.0***	***110.0***	***7,669***	***2:30***	***110.0***	***110.0***	***7,669***	***2:30***	***110.0***	***110.0***	***7,669***
Midday	9:00	14:45	*4:11*	*155.3*	*155.3*	*11,507*	*3:50*	*178.3*	*178.3*	*12,553*	*3:29*	*189.8*	*189.8*	*13,808*	*3:29*	*189.8*	*189.8*	*13,808*	*3:29*	*189.8*	*189.8*	*13,808*
Afternoon peak	14:45	18:00	*3:38*	*97.5*	*97.5*	*6,858*	*3:20*	*107.3*	*107.3*	*7,482*	*3:02*	*117.0*	*117.0*	*8,230*	*3:02*	*117.0*	*117.0*	*8,230*	*3:02*	*117.0*	*117.0*	*8,230*
Early evening	18:00	21:30	*5:00*	*80.5*	*80.5*	*5,862*	*5:00*	*80.5*	*80.5*	*5,862*	*5:00*	*80.5*	*80.5*	*5,862*	*5:00*	*80.5*	*80.5*	*5,862*	*5:00*	*80.5*	*80.5*	*5,862*
Late evening	21:30	23:00	*8:00*	*22.5*	*22.5*	*1,570*	*8:00*	*22.5*	*22.5*	*1,570*	*8:00*	*22.5*	*22.5*	*1,570*	*8:00*	*22.5*	*22.5*	*1,570*	*8:00*	*22.5*	*22.5*	*1,570*
Night	23:00	1:00	*15:00*	*20.0*	*20.0*	*1,260*	*15:00*	*20.0*	*20.0*	*1,260*	*15:00*	*20.0*	*20.0*	*1,260*	*15:00*	*20.0*	*20.0*	*1,260*	*15:00*	*20.0*	*20.0*	*1,260*
Friday																						
Early morning	5:00	6:30	*8:00*	*38.5*	*38.5*	*2,687*	*8:00*	*38.5*	*38.5*	*2,687*	*8:00*	*38.5*	*38.5*	*2,687*	*8:00*	*38.5*	*38.5*	*2,687*	*8:00*	*38.5*	*38.5*	*2,687*
Morning peak	6:30	9:00	*3:00*	*92.5*	*92.5*	*6,391*	*2:45*	*100.0*	*100.0*	*6,972*	*2:30*	*110.0*	*110.0*	*7,669*	*2:30*	*110.0*	*110.0*	*7,669*	*2:30*	*110.0*	*110.0*	*7,669*
Midday	9:00	14:45	*4:11*	*155.3*	*155.3*	*11,507*	*3:50*	*178.3*	*178.3*	*12,553*	*3:29*	*189.8*	*189.8*	*13,808*	*3:29*	*189.8*	*189.8*	*13,808*	*3:29*	*189.8*	*189.8*	*13,808*
Afternoon peak	14:45	18:00	*3:38*	*97.5*	*97.5*	*6,858*	*3:20*	*107.3*	*107.3*	*7,482*	*3:02*	*117.0*	*117.0*	*8,230*	*3:02*	*117.0*	*117.0*	*8,230*	*3:02*	*117.0*	*117.0*	*8,230*
Early evening	18:00	21:30	*5:00*	*80.5*	*80.5*	*5,862*	*5:00*	*80.5*	*80.5*	*5,862*	*5:00*	*80.5*	*80.5*	*5,862*	*5:00*	*80.5*	*80.5*	*5,862*	*5:00*	*80.5*	*80.5*	*5,862*
Late evening	21:30	23:00	*8:00*	*22.5*	*22.5*	*1,570*	*8:00*	*22.5*	*22.5*	*1,570*	*8:00*	*22.5*	*22.5*	*1,570*	*8:00*	*22.5*	*22.5*	*1,570*	*8:00*	*22.5*	*22.5*	*1,570*
Night	23:00	2:00	*8:00*	*45.0*	*45.0*	*3,140*	*8:00*	*45.0*	*45.0*	*3,140*	*8:00*	*45.0*	*45.0*	*3,140*	*8:00*	*45.0*	*45.0*	*3,140*	*8:00*	*45.0*	*45.0*	*3,140*
Saturday																						
Daytime	6:00	19:00	*5:00*	*322.0*	*322.0*	*11,723*	*5:00*	*322.0*	*322.0*	*11,723*	*4:34*	*349.8*	*349.8*	*12,838*	*4:34*	*349.8*	*349.8*	*12,838*	*4:34*	*349.8*	*349.8*	*12,838*
Evening	19:00	23:00	*7:27*	*64.0*	*64.0*	*2,248*	*6:50*	*68.0*	*68.0*	*2,452*	*6:12*	*76.0*	*76.0*	*2,698*	*6:12*	*76.0*	*76.0*	*2,698*	*6:12*	*76.0*	*76.0*	*2,698*
Night	23:00	2:00	*8:00*	*45.0*	*45.0*	*1,570*	*8:00*	*45.0*	*45.0*	*1,570*	*8:00*	*45.0*	*45.0*	*1,570*	*8:00*	*45.0*	*45.0*	*1,570*	*8:00*	*45.0*	*45.0*	*1,570*
Sunday																						
Daytime	8:00	19:00	*5:00*	*276.0*	*276.0*	*10,048*	*5:00*	*276.0*	*276.0*	*10,048*	*5:00*	*276.0*	*276.0*	*10,048*	*5:00*	*276.0*	*276.0*	*10,048*	*5:00*	*276.0*	*276.0*	*10,048*
Evening	19:00	23:00	*10:00*	*48.0*	*48.0*	*1,675*	*10:00*	*48.0*	*48.0*	*1,675*	*10:00*	*48.0*	*48.0*	*1,675*	*10:00*	*48.0*	*48.0*	*1,675*	*10:00*	*48.0*	*48.0*	*1,675*

Notes:

- Initial Service Level 3a reflects early opening of Confederation Line East; Service Levels 4-9 reflect full Stage 2 build out
- Service Plan 3a-9 reflects OC Transpo service configuration for Stage 2 (Peak periods 3 of 4 trains to Trim, 1 of 4 to Blair; Off-peak all to Trim)
- Service Plan 1-9 reflects OC Transpo policy headways used as basis for Stage 1 Service Plan
- Service Plan 1-9 reflects RTG's proposal of single-car service on weekends from Stage 1

Preliminary Service Plan / Operations Matters
Worksheet - Service Level 1 - 2018

Parameters provided by RTG for Stage 1	
(Also see cars per train by period, below) Seats per car	120
Standing room per car (square metres)	54.1
EB Peak terminal to terminal run time - start to stop (minutes)	22.17
WB Peak terminal to terminal run time - start to stop (minutes)	22.2833

Calculated	
Peak service capacity per car (limited to min. seated requirement)	300
Off-peak service capacity per car	163
Two-way run time without terminal time (minutes)	44.4533

This tab was brought over from the final Stage 1 Interactive Spreadsheet.
Links to other tabs have been replaced with hard inputs or links to R7-R10.

Length of Alignment (km)	12.65	
Minimum Terminal Time at each terminal	3.00	or headway, whichever is less
Terminal time below which step-back operation required	3.00	
Drivers per train - "0" for driverless, "1" otherwise	*1*	

Service design by time period / **Capacity and service level calculations**

Day type	Days per year	Time periods	Start	End	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)	Cars per train	Capacity per train	Trips per hour required for capacity	Headway (decimal) required (capacity or policy)	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Head-way (m:ss)
Monday-Thursday	201	Early morning	5:00	6:30	1.5	8.00	1,351	2	326	4.1	8.00	44.453	3.00	50.45	7	14	56.00	5.77	56.00	8.00	8:00
	201	Morning peak	6:30	9:00	2.5	5.00	10,700	2	600	17.8	3.36	44.453	3.00	50.45	15	30	50.47	3.01	50.47	3.36	3:22
	201	Midday	9:00	14:45	5.75	5.00	4,168	2	326	12.8	4.69	44.453	3.00	50.45	11	22	51.62	3.58	51.62	4.69	4:42
	201	Afternoon peak	14:45	18:00	3.25	5.00	8,833	2	600	14.7	4.08	44.453	3.00	50.45	13	26	52.99	4.27	52.99	4.08	4:05
	201	Early evening	18:00	21:30	3.5	5.00	2,156	2	326	6.6	5.00	44.453	3.00	50.45	11	22	55.00	5.27	55.00	5.00	5:00
	201	Late evening	21:30	23:00	1.5	8.00	1,377	2	326	4.2	8.00	44.453	3.00	50.45	7	14	56.00	5.77	56.00	8.00	8:00
	201	Night	23:00	1:00	2	15.00	300	2	326	0.9	15.00	44.453	3.00	50.45	4	8	60.00	7.77	60.00	15.00	15:00
Friday	51	Early morning	5:00	6:30	1.5	8.00	1,351	2	326	4.1	8.00	44.453	3.00	50.45	7	14	56.00	5.77	56.00	8.00	8:00
	51	Morning peak	6:30	9:00	2.5	5.00	10,700	2	600	17.8	3.36	44.453	3.00	50.45	15	30	50.47	3.01	50.47	3.36	3:22
	51	Midday	9:00	14:45	5.75	5.00	4,168	2	326	12.8	4.69	44.453	3.00	50.45	11	22	51.62	3.58	51.62	4.69	4:42
	51	Afternoon peak	14:45	18:00	3.25	5.00	8,833	2	600	14.7	4.08	44.453	3.00	50.45	13	26	52.99	4.27	52.99	4.08	4:05
	51	Early evening	18:00	21:30	3.5	5.00	2,156	2	326	6.6	5.00	44.453	3.00	50.45	11	22	55.00	5.27	55.00	5.00	5:00
	51	Late evening	21:30	23:00	1.5	8.00	1,377	2	326	4.2	8.00	44.453	3.00	50.45	7	14	56.00	5.77	56.00	8.00	8:00
	51	Night	23:00	2:00	3	8.00	713	2	326	2.2	8.00	44.453	3.00	50.45	7	14	56.00	5.77	56.00	8.00	8:00
Saturday (see note)	53	Daytime	6:00	19:00	13	5.00	1,593	1	163	9.8	5.00	44.453	3.00	50.45	11	11	55.00	5.27	55.00	5.00	5:00
	53	Evening	19:00	23:00	4	8.00	1,171	1	163	7.2	8.00	44.453	3.00	50.45	7	7	56.00	5.77	56.00	8.00	8:00
	53	Night	23:00	2:00	3	8.00	713	1	163	4.4	8.00	44.453	3.00	50.45	7	7	56.00	5.77	56.00	8.00	8:00
Sunday (see note)	60	Daytime	8:00	19:00	11	5.00	1,254	1	163	7.7	5.00	44.453	3.00	50.45	11	11	55.00	5.27	55.00	5.00	5:00
	60	Evening	19:00	23:00	4	10.00	701	1	163	4.3	10.00	44.453	3.00	50.45	6	6	60.00	7.77	60.00	10.00	10:00

Notes:
*** One-way trip counts for first period of day adjusted to include revenue service trips beginning prior to start of period to comply with requirements in PA Schedule 15-2, Part 1, 2.4 - Hours of Operation**
- Does not include Monday-Friday summer and other seasonal service reductions
- Saturday level of service also operated on Boxing Day
- Sunday level of service also operated on New Year's, Good Friday, Victoria Day, Civic Holiday, Labour Day, Thanksgiving Day, and Christmas Day
- Does not include extra service scheduled on Canada Day
- Friday Early Morning through Early Evening train length and round trip time same as Monday-Thursday

Operations Matters and Service Quantities

Step-back needed at terminals?	Drivers on duty	Hours of drivers' work per day	Hours of drivers' work per year	Number of One-Way Trips *	Rev Train Hours per day	Annual Rev Train Hours	Rev Train Km per day	Annual Rev Train Km	Rev Veh Km per day	Annual Rev Veh Km
-	7	13.3	2,673	28.5 *	13.3	2,673	361	72,466	721	144,931
-	15	37.5	7,538	89.2	37.5	7,538	1,128	226,720	2,256	453,439
-	11	63.3	12,713	147.0	63.3	12,713	1,860	373,861	3,720	747,721
-	13	42.3	8,492	95.7	42.3	8,492	1,210	243,298	2,421	486,596
-	11	38.5	7,739	84.0	38.5	7,739	1,063	213,583	2,125	427,165
-	7	10.5	2,111	22.5	10.5	2,111	285	57,210	569	114,419
-	4	8.0	1,608	16.0	8.0	1,608	202	40,682	405	81,365
-	7	13.3	678	28.5 *	13.3	678	361	18,387	721	36,774
-	15	37.5	1,913	89.2	37.5	1,913	1,128	57,526	2,256	115,052
-	11	63.3	3,226	147.0	63.3	3,226	1,860	94,860	3,720	189,720
-	13	42.3	2,155	95.7	42.3	2,155	1,210	61,732	2,421	123,465
-	11	38.5	1,964	84.0	38.5	1,964	1,063	54,193	2,125	108,385
-	7	10.5	536	22.5	10.5	536	285	14,516	569	29,032
-	7	21.0	1,071	45.0	21.0	1,071	569	29,032	1,139	58,063
-	11	147.6	7,822	322.0 *	147.6	7,822	4,073	215,885	4,073	215,885
-	7	28.0	1,484	60.0	28.0	1,484	759	40,227	759	40,227
-	7	21.0	1,113	45.0	21.0	1,113	569	30,170	569	30,170
-	11	125.6	7,535	274.0 *	125.6	7,535	3,466	207,966	3,466	207,966
-	6	24.0	1,440	48.0	24.0	1,440	607	36,432	607	36,432
Annual Total			73,809	165,118		73,809		2,088,744		3,646,807

Preliminary Service Plan / Operations Matters
Worksheet - Service Level 2 - 2020

Parameters provided by RTG for Stage 1	
(Also see cars per train by period, below) Seats per car	120
Standing room per car (square metres)	54.1
EB Peak terminal to terminal run time - start to stop (minutes)	22.28
WB Peak terminal to terminal run time - start to stop (minutes)	22.35

Calculated	
Peak service capacity per car (limited to min. seated requirement)	300
Off-peak service capacity per car	163
Two-way run time without terminal time (minutes)	44.63

This tab was brought over from the final Stage 1 Interactive Spreadsheet.
Links to other tabs have been replaced with hard inputs or links to R7-R10.

Length of Alignment (km)	12.65	
Minimum Terminal Time at each terminal	3.00	or headway, whichever is less
Terminal time below which step-back operation required	3.00	
Drivers per train - "0" for driverless, "1" otherwise	*1*	

Service design by time period / **Capacity and service level calculations**

Day type	Days per year	Time periods	Start	End	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)	Cars per train	Capacity per train	Trips per hour required for capacity	Headway (decimal) required (capacity or policy)	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Head-way (m:ss)
Monday-Thursday	201	Early morning	5:00	6:30	1.5	8.00	1,435	2	326	4.4	8.00	44.63	3.00	50.63	7	14	56.00	5.69	56.00	8.00	8:00
	201	Morning peak	6:30	9:00	2.5	5.00	11,360	2	600	18.9	3.17	44.63	3.00	50.63	16	32	50.70	3.04	50.70	3.17	3:10
	201	Midday	9:00	14:45	5.75	5.00	4,425	2	326	13.6	4.42	44.63	3.00	50.63	12	24	53.04	4.21	53.04	4.42	4:25
	201	Afternoon peak	14:45	18:00	3.25	5.00	9,377	2	600	15.6	3.84	44.63	3.00	50.63	14	28	53.75	4.56	53.75	3.84	3:50
	201	Early evening	18:00	21:30	3.5	5.00	2,288	2	326	7.0	5.00	44.63	3.00	50.63	11	22	55.00	5.19	55.00	5.00	5:00
	201	Late evening	21:30	23:00	1.5	8.00	1,462	2	326	4.5	8.00	44.63	3.00	50.63	7	14	56.00	5.69	56.00	8.00	8:00
	201	Night	23:00	1:00	2	15.00	319	2	326	1.0	15.00	44.63	3.00	50.63	4	8	60.00	7.69	60.00	15.00	15:00
Friday	51	Early morning	5:00	6:30	1.5	8.00	1,435	2	326	4.4	8.00	44.63	3.00	50.63	7	14	56.00	5.69	56.00	8.00	8:00
	51	Morning peak	6:30	9:00	2.5	5.00	11,360	2	600	18.9	3.17	44.63	3.00	50.63	16	32	50.70	3.04	50.70	3.17	3:10
	51	Midday	9:00	14:45	5.75	5.00	4,425	2	326	13.6	4.42	44.63	3.00	50.63	12	24	53.04	4.21	53.04	4.42	4:25
	51	Afternoon peak	14:45	18:00	3.25	5.00	9,377	2	600	15.6	3.84	44.63	3.00	50.63	14	28	53.75	4.56	53.75	3.84	3:50
	51	Early evening	18:00	21:30	3.5	5.00	2,288	2	326	7.0	5.00	44.63	3.00	50.63	11	22	55.00	5.19	55.00	5.00	5:00
	51	Late evening	21:30	23:00	1.5	8.00	1,462	2	326	4.5	8.00	44.63	3.00	50.63	7	14	56.00	5.69	56.00	8.00	8:00
	51	Night	23:00	2:00	3	8.00	757	2	326	2.3	8.00	44.63	3.00	50.63	7	14	56.00	5.69	56.00	8.00	8:00
Saturday (see note)	53	Daytime	6:00	19:00	13	5.00	1,691	1	163	10.4	5.00	44.63	3.00	50.63	11	11	55.00	5.19	55.00	5.00	5:00
	53	Evening	19:00	23:00	4	8.00	1,243	1	163	7.6	7.87	44.63	3.00	50.63	7	7	55.08	5.23	55.08	7.87	7:52
	53	Night	23:00	2:00	3	8.00	757	1	163	4.6	8.00	44.63	3.00	50.63	7	7	56.00	5.69	56.00	8.00	8:00
Sunday (see note)	60	Daytime	8:00	19:00	11	5.00	1,331	1	163	8.2	5.00	44.63	3.00	50.63	11	11	55.00	5.19	55.00	5.00	5:00
	60	Evening	19:00	23:00	4	10.00	744	1	163	4.6	10.00	44.63	3.00	50.63	6	6	60.00	7.69	60.00	10.00	10:00

Notes:
*** One-way trip counts for first period of day adjusted to include revenue service trips beginning prior to start of period to comply with requirements in PA Schedule 15-2, Part 1, 2.4 - Hours of Operation**
- Does not include Monday-Friday summer and other seasonal service reductions
- Saturday level of service also operated on Boxing Day
- Sunday level of service also operated on New Year's, Good Friday, Victoria Day, Civic Holiday, Labour Day, Thanksgiving Day, and Christmas Day
- Does not include extra service scheduled on Canada Day
- Friday Early Morning through Early Evening train length and round trip time same as Monday-Thursday

Operations Matters and Service Quantities

Step-back needed at terminals?	Drivers on duty	Hours of drivers' work per day	Hours of drivers' work per year	Number of One-Way Trips *	Rev Train Hours per day	Annual Rev Train Hours	Rev Train Km per day	Annual Rev Train Km	Rev Veh Km per day	Annual Rev Veh Km
-	7	13.3	2,673	28.5 *	13.3	2,673	361	72,466	721	144,931
-	16	40.0	8,040	94.7	40.0	8,040	1,198	240,704	2,395	481,408
-	12	69.0	13,869	156.1	69.0	13,869	1,975	396,921	3,949	793,842
-	14	45.5	9,146	101.6	45.5	9,146	1,285	258,305	2,570	516,610
-	11	38.5	7,739	84.0	38.5	7,739	1,063	213,583	2,125	427,165
-	7	10.5	2,111	22.5	10.5	2,111	285	57,210	569	114,419
-	4	8.0	1,608	16.0	8.0	1,608	202	40,682	405	81,365
-	7	13.3	678	28.5 *	13.3	678	361	18,387	721	36,774
-	16	40.0	2,040	94.7	40.0	2,040	1,198	61,074	2,395	122,148
-	12	69.0	3,519	156.1	69.0	3,519	1,975	100,711	3,949	201,423
-	14	45.5	2,321	101.6	45.5	2,321	1,285	65,540	2,570	131,080
-	11	38.5	1,964	84.0	38.5	1,964	1,063	54,193	2,125	108,385
-	7	10.5	536	22.5	10.5	536	285	14,516	569	29,032
-	7	21.0	1,071	45.0	21.0	1,071	569	29,032	1,139	58,063
-	11	147.6	7,822	322.0 *	147.6	7,822	4,073	215,885	4,073	215,885
-	7	28.0	1,484	61.0	28.0	1,484	772	40,896	772	40,896
-	7	21.0	1,113	45.0	21.0	1,113	569	30,170	569	30,170
-	11	125.6	7,535	274.0 *	125.6	7,535	3,466	207,966	3,466	207,966
-	6	24.0	1,440	48.0	24.0	1,440	607	36,432	607	36,432
Annual Total			76,707	170,330		76,707		2,154,672		3,777,995

Preliminary Service Plan / Operations Matters
Worksheet - Service Level 3 - 2022

Parameters provided by RTG for Stage 1	
(Also see cars per train by period, below) Seats per car	120
Standing room per car (square metres)	54.1
EB Peak terminal to terminal run time - start to stop (minutes)	22.28
WB Peak terminal to terminal run time - start to stop (minutes)	22.4

Calculated	
Peak service capacity per car (limited to min. seated requirement)	300
Off-peak service capacity per car	163
Two-way run time without terminal time (minutes)	44.68

This tab was brought over from the final Stage 1 Interactive Spreadsheet.
Links to other tabs have been replaced with hard inputs or links to R7-R10.

Length of Alignment (km)	12.65	
Minimum Terminal Time at each terminal	3.00	or headway, whichever is less
Terminal time below which step-back operation required	3.00	
Drivers per train - "0" for driverless, "1" otherwise	*1*	

Service design by time period / **Capacity and service level calculations**

Day type	Days per year	Time periods	Start	End	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)	Cars per train	Capacity per train	Trips per hour required for capacity	Headway (decimal) required (capacity or policy)	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Head-way (m:ss)
Monday-Thursday	201	Early morning	5:00	6:30	1.5	8.0	1,518	2	326	4.7	8.000	44.68	3.00	50.68	7	14	56.00	5.66	56.00	8.000	8:00
	201	Morning peak	6:30	9:00	2.5	5.0	12,020	2	600	20.0	2.995	44.68	3.00	50.67	17	34	50.92	3.12	50.92	2.995	3:00
	201	Midday	9:00	14:45	5.75	5.0	4,682	2	326	14.4	4.177	44.68	3.00	50.68	13	26	54.31	4.81	54.31	4.177	4:11
	201	Afternoon peak	14:45	18:00	3.25	5.0	9,922	2	600	16.5	3.628	44.68	3.00	50.68	14	28	50.79	3.06	50.79	3.628	3:38
	201	Early evening	18:00	21:30	3.5	5.0	2,421	2	326	7.4	5.000	44.68	3.00	50.68	11	22	55.00	5.16	55.00	5.000	5:00
	201	Late evening	21:30	23:00	1.5	8.0	1,547	2	326	4.7	8.000	44.68	3.00	50.68	7	14	56.00	5.66	56.00	8.000	8:00
	201	Night	23:00	1:00	2	15.0	337	2	326	1.0	15.000	44.68	3.00	50.68	4	8	60.00	7.66	60.00	15.000	15:00
Friday	51	Early morning	5:00	6:30	1.5	8.0	1,518	2	326	4.7	8.000	44.68	3.00	50.68	7	14	56.00	5.66	56.00	8.000	8:00
	51	Morning peak	6:30	9:00	2.5	5.0	12,020	2	600	20.0	2.995	44.68	3.00	50.67	17	34	50.92	3.12	50.92	2.995	3:00
	51	Midday	9:00	14:45	5.75	5.0	4,682	2	326	14.4	4.177	44.68	3.00	50.68	13	26	54.31	4.81	54.31	4.177	4:11
	51	Afternoon peak	14:45	18:00	3.25	5.0	9,922	2	600	16.5	3.628	44.68	3.00	50.68	14	28	50.79	3.06	50.79	3.628	3:38
	51	Early evening	18:00	21:30	3.5	5.0	2,421	2	326	7.4	5.000	44.68	3.00	50.68	11	22	55.00	5.16	55.00	5.000	5:00
	51	Late evening	21:30	23:00	1.5	8.0	1,547	2	326	4.7	8.000	44.68	3.00	50.68	7	14	56.00	5.66	56.00	8.000	8:00
	51	Night	23:00	2:00	3	8.0	802	2	326	2.5	8.000	44.68	3.00	50.68	7	14	56.00	5.66	56.00	8.000	8:00
Saturday (see note)	53	Daytime	6:00	19:00	13	5.0	1,789	1	163	11.0	5.000	44.68	3.00	50.68	11	11	55.00	5.16	55.00	5.000	5:00
	53	Evening	19:00	23:00	4	8.0	1,315	1	163	8.1	7.437	44.68	3.00	50.68	7	7	52.06	3.69	52.06	7.437	7:26
	53	Night	23:00	2:00	3	8.0	802	1	163	4.9	8.000	44.68	3.00	50.68	7	7	56.00	5.66	56.00	8.000	8:00
Sunday (see note)	60	Daytime	8:00	19:00	11	5.0	1,408	1	163	8.6	5.000	44.68	3.00	50.68	11	11	55.00	5.16	55.00	5.000	5:00
	60	Evening	19:00	23:00	4	10.0	787	1	163	4.8	10.000	44.68	3.00	50.68	6	6	60.00	7.66	60.00	10.000	10:00

Notes:
*** One-way trip counts for first period of day adjusted to include revenue service trips beginning prior to start of period to comply with requirements in PA Schedule 15-2, Part 1, 2.4 - Hours of Operation**
- Does not include Monday-Friday summer and other seasonal service reductions
- Saturday level of service also operated on Boxing Day
- Sunday level of service also operated on New Year's, Good Friday, Victoria Day, Civic Holiday, Labour Day, Thanksgiving Day, and Christmas Day
- Does not include extra service scheduled on Canada Day
- Friday Early Morning through Early Evening train length and round trip time same as Monday-Thursday

Operations Matters and Service Quantities

Step-back needed at terminals?	Drivers on duty	Hours of drivers' work per day	Hours of drivers' work per year	Number of One-Way Trips *	Rev Train Hours per day	Annual Rev Train Hours	Rev Train Km per day	Annual Rev Train Km	Rev Veh Km per day	Annual Rev Veh Km
-	7	13.3	2,673	28.5 *	13.3	2,673	361	72,466	721	144,931
-	17	42.5	8,543	100.2	42.5	8,543	1,267	254,689	2,534	509,378
-	13	74.8	15,025	165.2	74.8	15,025	2,089	419,982	4,179	839,963
-	14	45.5	9,146	107.5	45.5	9,146	1,360	273,312	2,720	546,624
-	11	38.5	7,739	84.0	38.5	7,739	1,063	213,583	2,125	427,165
-	7	10.5	2,111	22.5	10.5	2,111	285	57,210	569	114,419
-	4	8.0	1,608	16.0	8.0	1,608	202	40,682	405	81,365
-	7	13.3	678	28.5 *	13.3	678	361	18,387	721	36,774
-	17	42.5	2,168	100.2	42.5	2,168	1,267	64,623	2,534	129,245
-	13	74.8	3,812	165.2	74.8	3,812	2,089	106,563	4,179	213,125
-	14	45.5	2,321	107.5	45.5	2,321	1,360	69,348	2,720	138,696
-	11	38.5	1,964	84.0	38.5	1,964	1,063	54,193	2,125	108,385
-	7	10.5	536	22.5	10.5	536	285	14,516	569	29,032
-	7	21.0	1,071	45.0	21.0	1,071	569	29,032	1,139	58,063
-	11	147.6	7,822	322.0 *	147.6	7,822	4,073	215,885	4,073	215,885
-	7	28.0	1,484	64.5	28.0	1,484	816	43,272	816	43,272
-	7	21.0	1,113	45.0	21.0	1,113	569	30,170	569	30,170
-	11	125.6	7,535	274.0 *	125.6	7,535	3,466	207,966	3,466	207,966
-	6	24.0	1,440	48.0	24.0	1,440	607	36,432	607	36,432
Annual Total			78,786	175,676		78,786		2,222,307		3,910,890

Preliminary Service Plan / Operations Matters
Worksheet - Service Level 3a - 2023

Note: Stage 2 Service Plan tabs have been adapted from the Stage 1 Interactive Spreadsheet, adding new Peak Period calculations to reflect the new service patterns.

Vehicle Information		
(Also see cars per train by period, below)	Seats per car	120
	Standing room per car (square metres)	54.1
Calculated	Peak service capacity per car (limited to min. seated requirement)	300
	Off-peak service capacity per car	163

Service Plan 3a reflects early opening of Confederation Line East on 1/1/2023

Run Time and Distance inputs are hard-coded, based on information on the Run Times tab and latest alignment information

Service Plan 3a capacity targets based on Service Plan 4 targets

Minimum Terminal Time at each terminal: 3.00 or headway, whichever is less

Peak Period Service Information

AM PEAK	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
	Service Plans						
A	Tunney's	Blair Pocket	50.6	13.067	2.5	5.00	10537
B	Tunney's	Trim	74.6	24.804	2.5		
C	Tunney's	Trim	74.6	24.804	2.5		
D	Tunney's	Trim	74.6	24.804	2.5		

Capacity and service level calculations

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	17.6	3.42	3:25

Tunney's Pasture (SL 3a Confed East ONLY) to Blair/Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
13.67	50.6	3.00	56.60	5	10	68.3	8.9	68.3	13.67	22.0	12.5	287	574
13.67	74.6	3.00	80.60	6	12	82.0	3.7	82.0	13.67	22.0	15.0	544	1,089

PM PEAK	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
	Service Plans						
A	Tunney's	Blair Pocket	50.6	13.067	3.25	5.00	8698
B	Tunney's	Trim	74.6	24.804	3.25		
C	Tunney's	Trim	74.6	24.804	3.25		
D	Tunney's	Trim	74.6	24.804	3.25		

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	14.5	4.14	4:08

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
16.56	50.6	3.00	56.60	4	8	66.2	7.8	66.2	16.56	23.6	13.0	308	616
16.56	74.6	3.00	80.60	5	10	82.8	4.1	82.8	16.56	23.6	16.3	584	1,169

Service design by time period

Capacity and service level calculations

Tunney's Pasture (SL 3a Confed East ONLY) to Trim

Day type	Days per year	Time periods	Start	End	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)	Cars per train	Capacity per train	Trips per hour required for capacity	Headway (decimal) required (capacity or policy)	Headway (m:ss)	Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
Monday-Thursday	201	Early morning	5:00	6:30	1.5	8.00	1,331	2	326	4.1	8.00	8:00	16.00	74.6	3.00	80.60	6	12	96.0	10.7	96.0	16.00	17.3 *	13.8	428	856
	201	Morning peak	6:30	9:00	2.5	5.00	**10,537**	2	600	17.6	3.42	3:25					11.0	22.0				6.83	43.9	27.5	831	1,663
	201	Midday	9:00	14:45	5.75	5.00	4,105	2	326	12.6	4.77	4:46	9.53	74.6	3.00	80.60	9	18	85.8	5.6	85.8	9.53	72.4	51.8	1,796	3,592
	201	Afternoon peak	14:45	18:00	3.25	5.00	8,698	2	600	14.5	4.14	4:08					9.0	18.0				8.28	47.1	29.3	892	1,784
	201	Early evening	18:00	21:30	3.5	5.00	2,123	2	326	6.5	5.00	5:00	10.00	74.6	3.00	80.60	9	18	90.0	7.7	90.0	10.00	42.0	31.5	1,042	2,084
	201	Late evening	21:30	23:00	1.5	8.00	1,356	2	326	4.2	8.00	8:00	16.00	74.6	3.00	80.60	6	12	96.0	10.7	96.0	16.00	11.3	9.0	279	558
	201	Night	23:00	1:00	2	15.00	296	2	326	0.9	15.00	15:00	30.00	74.6	3.00	80.60	3	6	90.0	7.7	90.0	30.00	8.0	6.0	198	397
Friday	51	Early morning	5:00	6:30	1.5	8.00	1,331	2	326	4.1	8.00	8:00	16.00	74.6	3.00	80.60	6	12	96.0	10.7	96.0	16.00	17.3 *	13.8	428	856
	51	Morning peak	6:30	9:00	2.5	5.00	**10,537**	2	600	17.6	3.42	3:25					11.0	22.0				6.83	43.9	27.5	831	1,663
	51	Midday	9:00	14:45	5.75	5.00	4,105	2	326	12.6	4.77	4:46	9.53	74.6	3.00	80.60	9	18	85.8	5.6	85.8	9.53	72.4	51.8	1,796	3,592
	51	Afternoon peak	14:45	18:00	3.25	5.00	8,698	2	600	14.5	4.14	4:08					9.0	18.0				8.28	47.1	29.3	892	1,784
	51	Early evening	18:00	21:30	3.5	5.00	2,123	2	326	6.5	5.00	5:00	10.00	74.6	3.00	80.60	9	18	90.0	7.7	90.0	10.00	42.0	31.5	1,042	2,084
	51	Late evening	21:30	23:00	1.5	8.00	1,356	2	326	4.2	8.00	8:00	16.00	74.6	3.00	80.60	6	12	96.0	10.7	96.0	16.00	11.3	9.0	279	558
	51	Night	23:00	2:00	3	8.00	703	2	326	2.2	8.00	8:00	16.00	74.6	3.00	80.60	6	12	96.0	10.7	96.0	16.00	22.5	18.0	558	1,116
Saturday	53	Daytime	6:00	19:00	13	5.00	1,568	1	163	9.6	5.00	5:00	10.00	74.6	3.00	80.60	9	9	90.0	7.7	90.0	10.00	164.0 *	123.0	4,068	4,068
	53	Evening	19:00	23:00	4	8.00	1,153	1	163	7.1	8.00	8:00	16.00	74.6	3.00	80.60	6	6	96.0	10.7	96.0	16.00	30.0	24.0	744	744
	53	Night	23:00	2:00	3	8.00	703	1	163	4.3	8.00	8:00	16.00	74.6	3.00	80.60	6	6	96.0	10.7	96.0	16.00	22.5	18.0	558	558
Sunday	60	Daytime	8:00	19:00	11	5.00	1,235	1	163	7.6	5.00	5:00	10.00	74.6	3.00	80.60	9	9	90.0	7.7	90.0	10.00	140.0 *	105.0	3,473	3,473
	60	Evening	19:00	23:00	4	10.00	690	1	163	4.2	10.00	10:00	20.00	74.6	3.00	80.60	5	5	100.0	12.7	100.0	20.00	24.0	20.0	595	595
																						Annual Total	83,017	59,395	1,924,549	3,320,414

Notes:
- One-way trip counts for first period of day adjusted to include revenue service trips beginning prior to start of period to comply with requirements in PA Schedule 15-2, Part 1, 2.4 - Hours of Operation
- Does not include Monday-Friday summer and other seasonal service reductions
- Saturday level of service also operated on Boxing Day
- Sunday level of service also operated on New Year's, Good Friday, Victoria Day, Civic Holiday, Labour Day, Thanksgiving Day, and Christmas Day
- Does not include extra service scheduled on Canada Day
- Friday Early Morning through Early Evening train length and round trip time same as Monday-Thursday

Tunney's Pasture (SL 3a Confed East ONLY) to Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
6.83	74.6	3.00	80.60	12	24	82.0	3.7	82.0	6.83	43.9	30.0	1,089	2,178

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
8.28	74.6	3.00	80.60	10	20	82.8	4.1	82.8	8.28	47.1	32.5	1,169	2,337

Stage 1 KM
12.65

Tunney's Pasture (SL 3a Confed East ONLY) to Trim | **Combined Service**

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day	Number of One-Way Trips *	Trains required	Vehicles required	Pull-Outs	Pull-Ins	Stage 1 Ann Rev Veh KM	Stage 2 Ann Rev Veh KM
16.00	74.6	3.00	80.60	6	12	96.0	10.7	96.0	16.00	17.3 *	13.8	428	856	34.5	12	24	24	0	872.9	838.6
				12.0	24.0				6.83	43.9	30.0	1,089	2,178	87.8	23	46	22	0	2221.6	1,619.1
9.53	74.6	3.00	80.60	9	18	85.8	5.6	85.8	9.53	72.4	51.8	1,796	3,592	144.8	18	36	0	10	3663.3	3,519.7
				10.0	20.0				8.28	47.1	32.5	1,169	2,337	94.2	19	38	2	0	2384.0	1,737.5
10.00	74.6	3.00	80.60	9	18	90.0	7.7	90.0	10.00	42.0	31.5	1,042	2,084	84.0	18	36	0	2	2125.2	2,041.9
16.00	74.6	3.00	80.60	6	12	96.0	10.7	96.0	16.00	11.3	9.0	279	558	22.5	12	24	0	12	569.3	546.9
30.00	74.6	3.00	80.60	3	6	90.0	7.7	90.0	30.00	8.0	6.0	198	397	16.0	6	12	0	12	404.8	388.9
																		12		
16.00	74.6	3.00	80.60	6	12	96.0	10.7	96.0	16.00	17.3 *	13.8	428	856	34.5	12	24	24	0	872.9	838.6
				12.0	24.0				6.83	43.9	30.0	1,089	2,178	87.8	23	46	22	0	2221.6	1,619.1
9.53	74.6	3.00	80.60	9	18	85.8	5.6	85.8	9.53	72.4	51.8	1,796	3,592	144.8	18	36	0	10	3663.3	3,519.7
				10.0	20.0				8.28	47.1	32.5	1,169	2,337	94.2	19	38	2	0	2384.0	1,737.5
10.00	74.6	3.00	80.60	9	18	90.0	7.7	90.0	10.00	42.0	31.5	1,042	2,084	84.0	18	36	0	2	2125.2	2,041.9
16.00	74.6	3.00	80.60	6	12	96.0	10.7	96.0	16.00	11.3	9.0	279	558	22.5	12	24	0	12	569.3	546.9
16.00	74.6	3.00	80.60	6	12	96.0	10.7	96.0	16.00	22.5	18.0	558	1,116	45.0	12	24	0	0	1138.5	1,093.9
																		24		
10.00	74.6	3.00	80.60	9	9	90.0	7.7	90.0	10.00	164.0 *	123.0	4,068	4,068	328.0	18	18	18	0	4149.2	3,986.5
16.00	74.6	3.00	80.60	6	6	96.0	10.7	96.0	16.00	30.0	24.0	744	744	60.0	12	12	0	6	759.0	729.2
16.00	74.6	3.00	80.60	6	6	96.0	10.7	96.0	16.00	22.5	18.0	558	558	45.0	12	12	0	0	569.2	546.9
																		12		
10.00	74.6	3.00	80.60	9	9	90.0	7.7	90.0	10.00	140.0 *	105.0	3,473	3,473	280.0	18	18	18	0	3542.0	3,403.1
20.00	74.6	3.00	80.60	5	5	100.0	12.7	100.0	20.00	24.0	20.0	595	595	48.0	10	10	0	8	607.2	583.4
																		10		
									Annual Total	83,017	60,844	2,059,154	3,589,622	166,034					3,661,403	3,248,633
																			Total ARVK:	**6,910,036**

Preliminary Service Plan / Operations Matters
Worksheet - Service Level 4 - 2024

Note: Stage 2 Service Plan tabs have been adapted from the Stage 1 Interactive Spreadsheet, adding new Peak Period calculations to reflect the new service patterns.

Vehicle Information		
(Also see cars per train by period, below)	Seats per car	120
	Standing room per car (square metres)	54.1
Calculated	Peak service capacity per car (limited to min. seated requirement)	300
	Off-peak service capacity per car	163

Minimum Terminal Time at each terminal: 3.00 or headway, whichever is less

Peak Period Service Information

AM PEAK	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
A	Moodie	Blair Pocket	85.6	24.73	2.5	5.00	10537
B	Moodie	Trim	109.7	36.47	2.5		
C	Baseline	Trim	102.2	33.31	2.5		
D	Baseline	Trim	102.2	33.31	2.5		

Capacity and service level calculations

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	17.6	3.42	3:25

Moodie to Blair/Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
13.67	85.6	7.5	15	8.5	102.5	13.67	22.0	18.8	543	1,086
13.67	109.7	8.5	17	3.2	116.2	13.67	22.0	21.3	801	1,601

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

PM PEAK	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
A	Moodie	Blair Pocket	85.6	24.73	3.25	5.00	8698
B	Moodie	Trim	109.7	36.47	3.25		
C	Baseline	Trim	102.2	33.31	3.25		
D	Baseline	Trim	102.2	33.31	3.25		

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	14.5	4.14	4:08

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
16.56	85.6	3.00	91.56	6	12	99.3	6.9	99.3	16.56	23.6	19.5	583	1,165
16.56	109.7	3.00	115.72	7	14	115.9	3.1	115.9	16.56	23.6	22.8	859	1,718

Service design by time period

Day type	Days per year	Time periods	Start	End	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
Monday-Thursday	201	Early morning	5:00	6:30	1.5	8.00	1,331
	201	Morning peak	6:30	9:00	2.5	5.00	**10,537**
	201	Midday	9:00	14:45	5.75	5.00	4,105
	201	Afternoon peak	14:45	18:00	3.25	5.00	8,698
	201	Early evening	18:00	21:30	3.5	5.00	2,123
	201	Late evening	21:30	23:00	1.5	8.00	1,356
	201	Night	23:00	1:00	2	15.00	296
Friday	51	Early morning	5:00	6:30	1.5	8.00	1,331
	51	Morning peak	6:30	9:00	2.5	5.00	**10,537**
	51	Midday	9:00	14:45	5.75	5.00	4,105
	51	Afternoon peak	14:45	18:00	3.25	5.00	8,698
	51	Early evening	18:00	21:30	3.5	5.00	2,123
	51	Late evening	21:30	23:00	1.5	8.00	1,356
	51	Night	23:00	2:00	3	8.00	703
Saturday	53	Daytime	6:00	19:00	13	5.00	1,568
	53	Evening	19:00	23:00	4	8.00	1,153
	53	Night	23:00	2:00	3	8.00	703
Sunday	60	Daytime	8:00	19:00	11	5.00	1,235
	60	Evening	19:00	23:00	4	10.00	690

Capacity and service level calculations

Cars per train	Capacity per train	Trips per hour required for capacity	Headway (decimal) required (capacity or policy)	Headway (m:ss)
2	326	4.1	8.00	8:00
2	600	17.6	3.42	3:25
2	326	12.6	4.77	4:46
2	600	14.5	4.14	4:08
2	326	6.5	5.00	5:00
2	326	4.2	8.00	8:00
2	326	0.9	15.00	15:00
2	326	4.1	8.00	8:00
2	600	17.6	3.42	3:25
2	326	12.6	4.77	4:46
2	600	14.5	4.14	4:08
2	326	6.5	5.00	5:00
2	326	4.2	8.00	8:00
2	326	2.2	8.00	8:00
1	163	9.6	5.00	5:00
1	163	7.1	8.00	8:00
1	163	4.3	8.00	8:00
1	163	7.6	5.00	5:00
1	163	4.2	10.00	10:00

Moodie to Trim

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
				16.0	32.0				6.83	43.9	40.0	1,343	2,687
9.53	109.7	3.00	115.72	13	26	123.9	7.1	123.9	9.53	72.4	74.8	2,640	5,281
				13.0	26.0				8.28	47.1	42.3	1,442	2,883
10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
15.00	16.5	3.00	22.51	2	4	30.0	6.7	30.0	15.00	16.0	4.0	97	194
16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
				16.0	32.0				6.83	43.9	40.0	1,343	2,687
9.53	109.7	3.00	115.72	13	26	123.9	7.1	123.9	9.53	72.4	74.8	2,640	5,281
				13.0	26.0				8.28	47.1	42.3	1,442	2,883
10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	22.5	24.0	821	1,641
10.00	109.7	3.00	115.72	12	12	120.0	5.1	120.0	10.00	168.0 *	168.0	6,127	6,127
16.00	109.7	3.00	115.72	8	8	128.0	9.1	128.0	16.00	30.0	32.0	1,094	1,094
16.00	109.7	3.00	115.72	8	8	128.0	9.1	128.0	16.00	22.5	24.0	821	821
10.00	109.7	3.00	115.72	12	12	120.0	5.1	120.0	10.00	144.0 *	144.0	5,252	5,252
20.00	109.7	3.00	115.72	6	6	120.0	5.1	120.0	20.00	24.0	24.0	875	875

Annual Total	85,581	82,326	2,888,670	4,983,515

Notes:
- One-way trip counts for first period of day adjusted to include revenue service trips beginning prior to start of period to comply with requirements in PA Schedule 15-2, Part 1, 2.4 - Hours of Operation
- Does not include Monday-Friday summer and other seasonal service reductions
- Saturday level of service also operated on Boxing Day
- Sunday level of service also operated on New Year's, Good Friday, Victoria Day, Civic Holiday, Labour Day, Thanksgiving Day, and Christmas Day
- Does not include extra service scheduled on Canada Day
- Friday Early Morning through Early Evening train length and round trip time same as Monday-Thursday
- Night period service on Mon-Thurs consists of 15-minute service from Baseline to Trim and a 15-minute service shuttle from Moodie to Lincoln Fields

Baseline to Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
6.83	102.21	16	32	3.6	109.3	6.83	43.9	40.0	1,462	2,925

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
8.28	102.2	3.00	108.21	14	28	115.9	6.8	115.9	8.28	47.1	45.5	1,569	3,139

Stage 1 KM
12.65

Baseline to Trim														Combined Service						
Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day	Number of One-Way Trips *	Trains required	Vehicles required	Pull-Outs	Pull-Ins	Stage 1 Ann Rev Veh KM	Stage 2 Ann Rev Veh KM
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5	15	30	30	0	974.1	1,712.5
				16.0	32.0				6.83	43.9	40.0	1,462	2,925	87.8	32	64	34	0	2221.6	3,390.3
9.53	102.2	3.00	108.21	12	24	114.4	6.1	114.4	9.53	72.4	69.0	2,412	4,823	144.8	25	50	0	14	3663.3	6,440.5
				14.0	28.0				8.28	47.1	45.5	1,569	3,139	94.2	27	54	4	0	2384.0	3,638.2
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0	23	46	0	8	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5	15	30	0	16	569.3	1,000.8
15.00	102.2	3.00	108.21	8	16	120.0	8.9	120.0	15.00	16.0	16.0	533	1,066	32.0	10	20	0	10	809.6	449.9
																		20		
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5	15	30	30	0	974.1	1,712.5
				16.0	32.0				6.83	43.9	40.0	1,462	2,925	87.8	32	64	34	0	2221.6	3,390.3
9.53	102.2	3.00	108.21	12	24	114.4	6.1	114.4	9.53	72.4	69.0	2,412	4,823	144.8	25	50	0	14	3663.3	6,440.5
				14.0	28.0				8.28	47.1	45.5	1,569	3,139	94.2	27	54	4	0	2384.0	3,638.2
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0	23	46	0	8	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5	15	30	0	16	569.3	1,000.8
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	22.5	21.0	749	1,499	45.0	15	30	0	0	1138.5	2,001.6
																		30		
10.00	102.2	3.00	108.21	11	11	110.0	3.9	110.0	10.00	168.0 *	154.0	5,596	5,596	336.0	23	23	23	0	4250.4	7,472.6
16.00	102.2	3.00	108.21	7	7	112.0	4.9	112.0	16.00	30.0	28.0	999	999	60.0	15	15	0	8	759.0	1,334.4
16.00	102.2	3.00	108.21	7	7	112.0	4.9	112.0	16.00	22.5	21.0	749	749	45.0	15	15	0	0	569.2	1,000.8
																		15		
10.00	102.2	3.00	108.21	11	11	110.0	3.9	110.0	10.00	144.0 *	132.0	4,797	4,797	288.0	23	23	23	0	3643.2	6,405.1
20.00	102.2	3.00	108.21	6	6	120.0	8.9	120.0	20.00	24.0	24.0	799	799	48.0	12	12	0	11	607.2	1,067.5
																		12		
									Annual Total	85,581	80,216	2,850,703	4,976,364	171,162					3,779,706	6,180,173
																			Total ARVK:	**9,959,879**

Preliminary Service Plan / Operations Matters
Worksheet - Service Level 5 - 2026

Note: Stage 2 Service Plan tabs have been adapted from the Stage 1 Interactive Spreadsheet, adding new Peak Period calculations to reflect the new service patterns.

Vehicle Information		
(Also see cars per train by period, below)	Seats per car	120
	Standing room per car (square metres)	54.1
Calculated	Peak service capacity per car (limited to min. seated requirement)	300
	Off-peak service capacity per car	163

Minimum Terminal Time at each terminal: 3.00 or headway, whichever is less

Peak Period Service Information

AM PEAK	Service Plans						
	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
A	Moodie	Blair Pocket	85.6	24.73	2.5	5.00	12000
B	Moodie	Trim	109.7	36.47	2.5		
C	Baseline	Trim	102.2	33.31	2.5		
D	Baseline	Trim	102.2	33.31	2.5		

Capacity and service level calculations

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	20.0	3.00	3:00

Moodie to Blair/Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
12.00	85.6	8	16	5.2	96.0	12.00	25.0	20.0	618	1,237
12.00	109.7	10	20	5.1	120.0	12.00	25.0	25.0	912	1,824

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

PM PEAK	Service Plans						
	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
A	Moodie	Blair Pocket	85.6	24.73	3.25	5.00	9906
B	Moodie	Trim	109.7	36.47	3.25		
C	Baseline	Trim	102.2	33.31	3.25		
D	Baseline	Trim	102.2	33.31	3.25		

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	16.5	3.63	3:38

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
14.54	85.6	3.00	91.56	7	14	101.8	8.1	101.8	14.54	26.8	22.8	663	1,327
14.54	109.7	3.00	115.72	8	16	116.3	3.3	116.3	14.54	26.8	26.0	978	1,957

Service design by time period

Capacity and service level calculations

Moodie to Trim

Day type	Days per year	Time periods	Start	End	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)	Cars per train	Capacity per train	Trips per hour required for capacity	Headway (decimal) required (capacity or policy)	Headway (m:ss)	Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
Monday-Thursday	201	Early morning	5:00	6:30	1.5	8.00	1,515	2	326	4.6	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
	201	Morning peak	6:30	9:00	2.5	5.00	**12,000**	2	600	20.0	3.00	3:00					18.0	36.0				6.00	50.0	45.0	1,530	3,060
	201	Midday	9:00	14:45	5.75	5.00	4,675	2	326	14.3	4.18	4:11	8.37	109.7	3.00	115.72	14	28	117.2	3.7	117.2	8.37	82.4	80.5	3,007	6,014
	201	Afternoon peak	14:45	18:00	3.25	5.00	9,906	2	600	16.5	3.63	3:38					15.0	30.0				7.27	53.7	48.8	1,642	3,284
	201	Early evening	18:00	21:30	3.5	5.00	2,417	2	326	7.4	5.00	5:00	10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
	201	Late evening	21:30	23:00	1.5	8.00	1,545	2	326	4.7	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
	201	Night	23:00	1:00	2	15.00	337	2	326	1.0	15.00	15:00	15.00	16.5	3.00	22.51	2	4	30.0	6.7	30.0	15.00	16.0	4.0	97	194
Friday	51	Early morning	5:00	6:30	1.5	8.00	1,515	2	326	4.6	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
	51	Morning peak	6:30	9:00	2.5	5.00	**12,000**	2	600	20.0	3.00	3:00					18.0	36.0				6.00	50.0	45.0	1,530	3,060
	51	Midday	9:00	14:45	5.75	5.00	4,675	2	326	14.3	4.18	4:11	8.37	109.7	3.00	115.72	14	28	117.2	3.7	117.2	8.37	82.4	80.5	3,007	6,014
	51	Afternoon peak	14:45	18:00	3.25	5.00	9,906	2	600	16.5	3.63	3:38					15.0	30.0				7.27	53.7	48.8	1,642	3,284
	51	Early evening	18:00	21:30	3.5	5.00	2,417	2	326	7.4	5.00	5:00	10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
	51	Late evening	21:30	23:00	1.5	8.00	1,545	2	326	4.7	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
	51	Night	23:00	2:00	3	8.00	800	2	326	2.5	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	22.5	24.0	821	1,641
Saturday	53	Daytime	6:00	19:00	13	5.00	1,786	1	163	11.0	5.00	5:00	10.00	109.7	3.00	115.72	12	12	120.0	5.1	120.0	10.00	168.0 *	168.0	6,127	6,127
	53	Evening	19:00	23:00	4	8.00	1,313	1	163	8.1	7.45	7:27	14.90	109.7	3.00	115.72	8	8	119.2	4.7	119.2	14.90	32.2	32.0	1,175	1,175
	53	Night	23:00	2:00	3	8.00	800	1	163	4.9	8.00	8:00	16.00	109.7	3.00	115.72	8	8	128.0	9.1	128.0	16.00	22.5	24.0	821	821
Sunday	60	Daytime	8:00	19:00	11	5.00	1,406	1	163	8.6	5.00	5:00	10.00	109.7	3.00	115.72	12	12	120.0	5.1	120.0	10.00	144.0 *	144.0	5,252	5,252
	60	Evening	19:00	23:00	4	10.00	786	1	163	4.8	10.00	10:00	20.00	109.7	3.00	115.72	6	6	120.0	5.1	120.0	20.00	24.0	24.0	875	875
																						Annual Total	91,416	86,673	3,082,787	5,367,464

Notes:
- One-way trip counts for first period of day adjusted to include revenue service trips beginning prior to start of period to comply with requirements in PA Schedule 15-2, Part 1, 2.4 - Hours of Operation
- Does not include Monday-Friday summer and other seasonal service reductions
- Saturday level of service also operated on Boxing Day
- Sunday level of service also operated on New Year's, Good Friday, Victoria Day, Civic Holiday, Labour Day, Thanksgiving Day, and Christmas Day
- Does not include extra service scheduled on Canada Day
- Friday Early Morning through Early Evening train length and round trip time same as Monday-Thursday
- Night period service on Mon-Thurs consists of 15-minute service from Baseline to Trim and a 15-minute service shuttle from Moodie to Lincoln Fields

Baseline to Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
6.00	102.21	19	38	5.9	114.0	6.00	50.0	47.5	1,666	3,331

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
7.27	102.2	3.00	108.21	15	30	109.0	3.4	109.0	7.27	53.7	48.8	1,787	3,575

Stage 1 KM
12.65

Baseline to Trim | **Combined Service**

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day	Number of One-Way Trips *	Trains required	Vehicles required	Pull-Outs	Pull-Ins	Stage 1 Ann Rev Veh KM	Stage 2 Ann Rev Veh KM
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5 *	15	30	30	0	974.1	1,712.5
				19.0	38.0				6.00	50.0	47.5	1,666	3,331	100.0 *	37	74	44	0	2530.0	3,861.0
8.37	102.2	3.00	108.21	13	26	108.8	3.3	108.8	8.37	82.4	74.8	2,746	5,493	164.9 *	27	54	0	20	4172.0	7,334.7
				15.0	30.0				7.27	53.7	48.8	1,787	3,575	107.3 *	30	60	6	0	2715.0	4,143.3
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0 *	23	46	0	14	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5 *	15	30	0	16	569.3	1,000.8
15.00	102.2	3.00	108.21	8	16	120.0	8.9	120.0	15.00	16.0	16.0	533	1,066	32.0 *	10	20	0	10	809.6	449.9
																		20		
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5 *	15	30	30	0	974.1	1,712.5
				19.0	38.0				6.00	50.0	47.5	1,666	3,331	100.0 *	37	74	44	0	2530.0	3,861.0
8.37	102.2	3.00	108.21	13	26	108.8	3.3	108.8	8.37	82.4	74.8	2,746	5,493	164.9 *	27	54	0	20	4172.0	7,334.7
				15.0	30.0				7.27	53.7	48.8	1,787	3,575	107.3 *	30	60	6	0	2715.0	4,143.3
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0 *	23	46	0	14	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5 *	15	30	0	16	569.3	1,000.8
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	22.5	21.0	749	1,499	45.0 *	15	30	0	0	1138.5	2,001.6
																		30		
10.00	102.2	3.00	108.21	11	11	110.0	3.9	110.0	10.00	168.0 *	154.0	5,596	5,596	336.0 *	23	23	23	0	4250.4	7,472.6
14.90	102.2	3.00	108.21	8	8	119.2	8.5	119.2	14.90	32.2	32.0	1,073	1,073	64.4 *	16	16	0	7	815.1	1,433.0
16.00	102.2	3.00	108.21	7	7	112.0	4.9	112.0	16.00	22.5	21.0	749	749	45.0 *	15	15	0	1	569.2	1,000.8
																		15		
10.00	102.2	3.00	108.21	11	11	110.0	3.9	110.0	10.00	144.0 *	132.0	4,797	4,797	288.0 *	23	23	23	0	3643.2	6,405.1
20.00	102.2	3.00	108.21	6	6	120.0	8.9	120.0	20.00	24.0	24.0	799	799	48.0 *	12	12	0	11	607.2	1,067.5
																		12		
									Annual Total	91,416	84,586	3,045,075	5,361,193	182,832					4,071,996	6,656,662
																			Total ARVK:	**10,728,658**

Preliminary Service Plan / Operations Matters
Worksheet - Service Level 6 - 2031

Note: Stage 2 Service Plan tabs have been adapted from the Stage 1 Interactive Spreadsheet, adding new Peak Period calculations to reflect the new service patterns.

Vehicle Information		
(Also see cars per train by period, below)	Seats per car	120
	Standing room per car (square metres)	54.1
Calculated	Peak service capacity per car (limited to min. seated requirement)	300
	Off-peak service capacity per car	163

Minimum Terminal Time at each terminal: 3.00 or headway, whichever is less

Peak Period Service Information

AM PEAK	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
A	Moodie	Blair Pocket	85.6	24.73	2.5	5.00	13091
B	Moodie	Trim	109.7	36.47	2.5		
C	Baseline	Trim	102.2	33.31	2.5		
D	Baseline	Trim	102.2	33.31	2.5		

PM PEAK	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
A	Moodie	Blair Pocket	85.6	24.73	3.25	5.00	10806
B	Moodie	Trim	109.7	36.47	3.25		
C	Baseline	Trim	102.2	33.31	3.25		
D	Baseline	Trim	102.2	33.31	3.25		

Capacity and service level calculations

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	21.8	2.75	2:45

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	18.0	3.33	3:20

Moodie to Blair/Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
11.00	85.6	9	18	6.7	99.0	11.00	27.3	22.5	674	1,349
11.00	109.7	11	22	5.6	121.0	11.00	27.3	27.5	995	1,989

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
13.33	85.6	3.00	91.56	7	14	93.3	3.9	93.3	13.33	29.3	22.8	724	1,448
13.33	109.7	3.00	115.72	9	18	119.9	5.1	119.9	13.33	29.3	29.3	1,067	2,135

Service design by time period / Capacity and service level calculations / Moodie to Trim

Day type	Days per year	Time periods	Start	End	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)	Cars per train	Capacity per train	Trips per hour required for capacity	Headway (decimal) required (capacity or policy)	Headway (m:ss)	Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
Monday-Thursday	201	Early morning	5:00	6:30	1.5	8.00	1,653	2	326	5.1	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
	201	Morning peak	6:30	9:00	2.5	5.00	**13,091**	2	600	21.8	2.75	2:45					20.0	40.0				5.50	54.5	50.0	1,669	3,338
	201	Midday	9:00	14:45	5.75	5.00	5,100	2	326	15.6	3.84	3:50	7.67	109.7	3.00	115.72	16	32	122.7	6.5	122.7	7.67	89.9	92.0	3,280	6,561
	201	Afternoon peak	14:45	18:00	3.25	5.00	10,806	2	600	18.0	3.33	3:20					16.0	32.0				6.66	58.5	52.0	1,791	3,582
	201	Early evening	18:00	21:30	3.5	5.00	2,637	2	326	8.1	5.00	5:00	10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
	201	Late evening	21:30	23:00	1.5	8.00	1,685	2	326	5.2	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
	201	Night	23:00	1:00	2	15.00	367	2	326	1.1	15.00	15:00	15.00	16.5	3.00	22.51	2	4	30.0	6.7	30.0	15.00	16.0	4.0	97	194
Friday	51	Early morning	5:00	6:30	1.5	8.00	1,653	2	326	5.1	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
	51	Morning peak	6:30	9:00	2.5	5.00	**13,091**	2	600	21.8	2.75	2:45					20.0	40.0				5.50	54.5	50.0	1,669	3,338
	51	Midday	9:00	14:45	5.75	5.00	5,100	2	326	15.6	3.84	3:50	7.67	109.7	3.00	115.72	16	32	122.7	6.5	122.7	7.67	89.9	92.0	3,280	6,561
	51	Afternoon peak	14:45	18:00	3.25	5.00	10,806	2	600	18.0	3.33	3:20					16.0	32.0				6.66	58.5	52.0	1,791	3,582
	51	Early evening	18:00	21:30	3.5	5.00	2,637	2	326	8.1	5.00	5:00	10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
	51	Late evening	21:30	23:00	1.5	8.00	1,685	2	326	5.2	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
	51	Night	23:00	2:00	3	8.00	873	2	326	2.7	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	22.5	24.0	821	1,641
Saturday	53	Daytime	6:00	19:00	13	5.00	1,948	1	163	12.0	5.00	5:00	10.00	109.7	3.00	115.72	12	12	120.0	5.1	120.0	10.00	168.0 *	168.0	6,127	6,127
	53	Evening	19:00	23:00	4	8.00	1,432	1	163	8.8	6.83	6:50	13.66	109.7	3.00	115.72	9	9	122.9	6.6	122.9	13.66	35.1	36.0	1,282	1,282
	53	Night	23:00	2:00	3	8.00	873	1	163	5.4	8.00	8:00	16.00	109.7	3.00	115.72	8	8	128.0	9.1	128.0	16.00	22.5	24.0	821	821
Sunday	60	Daytime	8:00	19:00	11	5.00	1,534	1	163	9.4	5.00	5:00	10.00	109.7	3.00	115.72	12	12	120.0	5.1	120.0	10.00	144.0 *	144.0	5,252	5,252
	60	Evening	19:00	23:00	4	10.00	857	1	163	5.3	10.00	10:00	20.00	109.7	3.00	115.72	6	6	120.0	5.1	120.0	20.00	24.0	24.0	875	875
																						Annual Total	95,835	91,862	3,230,012	5,656,252

Notes:
- One-way trip counts for first period of day adjusted to include revenue service trips beginning prior to start of period to comply with requirements in PA Schedule 15-2, Part 1, 2.4 - Hours of Operation
- Does not include Monday-Friday summer and other seasonal service reductions
- Saturday level of service also operated on Boxing Day
- Sunday level of service also operated on New Year's, Good Friday, Victoria Day, Civic Holiday, Labour Day, Thanksgiving Day, and Christmas Day
- Does not include extra service scheduled on Canada Day
- Friday Early Morning through Early Evening train length and round trip time same as Monday-Thursday
- Night period service on Mon-Thurs consists of 15-minute service from Baseline to Trim and a 15-minute service shuttle from Moodie to Lincoln Fields

Baseline to Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
5.50	102.21	20	40	3.9	110.0	5.50	54.5	50.0	1,817	3,634

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
6.66	102.2	3.00	108.21	17	34	113.3	5.5	113.3	6.66	58.5	55.3	1,950	3,900

Stage 1 KM
12.65

Baseline to Trim														Combined Service						
Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day	Number of One-Way Trips *	Trains required	Vehicles required	Pull-Outs	Pull-Ins	Stage 1 Ann Rev Veh KM	Stage 2 Ann Rev Veh KM
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5 *	15	30	30	0	974.1	1,712.5
				20.0	40.0				5.50	54.5	50.0	1,817	3,634	109.1 *	40.0	80	50	0	2760.0	4,212.0
7.67	102.2	3.00	108.21	15	30	115.1	6.4	115.1	7.67	89.9	86.3	2,996	5,992	179.9 *	31	62	0	18	4551.3	8,001.6
				17.0	34.0				6.66	58.5	55.3	1,950	3,900	117.1 *	33	66	4	0	2961.8	4,520.0
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0 *	23	46	0	20	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5 *	15	30	0	16	569.3	1,000.8
15.00	102.2	3.00	108.21	8	16	120.0	8.9	120.0	15.00	16.0	16.0	533	1,066	32.0 *	10	20	0	10	809.6	449.9
																		20		
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5 *	15	30	30	0	974.1	1,712.5
				20.0	40.0				5.50	54.5	50.0	1,817	3,634	109.1 *	40	80	50	0	2760.0	4,212.0
7.67	102.2	3.00	108.21	15	30	115.1	6.4	115.1	7.67	89.9	86.3	2,996	5,992	179.9 *	31	62	0	18	4551.3	8,001.6
				17.0	34.0				6.66	58.5	55.3	1,950	3,900	117.1 *	33	66	4	0	2961.8	4,520.0
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0 *	23	46	0	20	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5 *	15	30	0	16	569.3	1,000.8
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	22.5	21.0	749	1,499	45.0 *	15	30	0	0	1138.5	2,001.6
																		30		
10.00	102.2	3.00	108.21	11	11	110.0	3.9	110.0	10.00	168.0 *	154.0	5,596	5,596	336.0 *	23	23	23	0	4250.4	7,472.6
13.66	102.2	3.00	108.21	8	8	109.3	3.5	109.3	13.66	35.1	32.0	1,171	1,171	70.3 *	17	17	0	6	889.2	1,563.3
16.00	102.2	3.00	108.21	7	7	112.0	4.9	112.0	16.00	22.5	21.0	749	749	45.0 *	15	15	0	2	569.2	1,000.8
																		15		
10.00	102.2	3.00	108.21	11	11	110.0	3.9	110.0	10.00	144.0 *	132.0	4,797	4,797	288.0 *	23	23	23	0	3643.2	6,405.1
20.00	102.2	3.00	108.21	6	6	120.0	8.9	120.0	20.00	24.0	24.0	799	799	48.0 *	12	12	0	11	607.2	1,067.5
																		12		
									Annual Total	95,835	89,752	3,192,275	5,650,424	191,671					4,291,676	7,015,000
																			Total ARVK:	**11,306,676**

Preliminary Service Plan / Operations Matters
Worksheet - Service Level 7 - 2036

Note: Stage 2 Service Plan tabs have been adapted from the Stage 1 Interactive Spreadsheet, adding new Peak Period calculations to reflect the new service patterns.

Vehicle Information		
(Also see cars per train by period, below)	Seats per car	120
	Standing room per car (square metres)	54.1
Calculated	Peak service capacity per car (limited to min. seated requirement)	300
	Off-peak service capacity per car	163

Minimum Terminal Time at each terminal: 3.00 or headway, whichever is less

Peak Period Service Information

	Service Plans						
AM PEAK	**From**	**To**	**Two-way Run Time**	**One-way Distance**	**Duration of period**	**Maximum Policy Headway (minutes)**	**Minimum Service Capacity (pphpd)**
A	**Moodie**	**Blair Pocket**	85.6	24.73	2.5	5.00	14400
B	**Moodie**	**Trim**	109.7	36.47	2.5		
C	**Baseline**	**Trim**	102.2	33.31	2.5		
D	**Baseline**	**Trim**	102.2	33.31	2.5		

Capacity and service level calculations

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	24.0	2.50	2:30

Moodie to Blair/Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
10.00	85.6	10	20	7.2	100.0	10.00	30.0	25.0	742	1,484
10.00	109.7	12	24	5.1	120.0	10.00	30.0	30.0	1,094	2,188

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

	Service Plans						
PM PEAK	**From**	**To**	**Two-way Run Time**	**One-way Distance**	**Duration of period**	**Maximum Policy Headway (minutes)**	**Minimum Service Capacity (pphpd)**
A	**Moodie**	**Blair Pocket**	85.6	24.73	3.25	5.00	11887
B	**Moodie**	**Trim**	109.7	36.47	3.25		
C	**Baseline**	**Trim**	102.2	33.31	3.25		
D	**Baseline**	**Trim**	102.2	33.31	3.25		

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	19.8	3.03	3:02

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
12.11	85.6	3.00	91.56	8	16	96.9	5.7	96.9	12.11	32.2	26.0	796	1,592
12.11	109.7	3.00	115.72	10	20	121.1	5.7	121.1	12.11	32.2	32.5	1,174	2,348

Service design by time period

Capacity and service level calculations

Moodie to Trim

Day type	Days per year	Time periods	Start	End	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)	Cars per train	Capacity per train	Trips per hour required for capacity	Headway (decimal) required (capacity or policy)	Headway (m:ss)	Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
Monday-Thursday	201	Early morning	5:00	6:30	1.5	8.00	1,819	2	326	5.6	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
	201	Morning peak	6:30	9:00	2.5	5.00	**14,400**	2	600	24.0	2.50	2:30					22.0	44.0				5.00	60.0	55.0	1,836	3,672
	201	Midday	9:00	14:45	5.75	5.00	5,609	2	326	17.2	3.49	3:29	6.97	109.7	3.00	115.72	17	34	118.6	4.4	118.6	6.97	98.9	97.8	3,608	7,217
	201	Afternoon peak	14:45	18:00	3.25	5.00	11,887	2	600	19.8	3.03	3:02					18.0	36.0				6.06	64.4	58.5	1,970	3,941
	201	Early evening	18:00	21:30	3.5	5.00	2,901	2	326	8.9	5.00	5:00	10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
	201	Late evening	21:30	23:00	1.5	8.00	1,854	2	326	5.7	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
	201	Night	23:00	1:00	2	15.00	404	2	326	1.2	15.00	15:00	15.00	16.5	3.00	22.51	2	4	30.0	6.7	30.0	15.00	16.0	4.0	97	194
Friday	51	Early morning	5:00	6:30	1.5	8.00	1,819	2	326	5.6	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
	51	Morning peak	6:30	9:00	2.5	5.00	**14,400**	2	600	24.0	2.50	2:30					22.0	44.0				5.00	60.0	55.0	1,836	3,672
	51	Midday	9:00	14:45	5.75	5.00	5,609	2	326	17.2	3.49	3:29	6.97	109.7	3.00	115.72	17	34	118.6	4.4	118.6	6.97	98.9	97.8	3,608	7,217
	51	Afternoon peak	14:45	18:00	3.25	5.00	11,887	2	600	19.8	3.03	3:02					18.0	36.0				6.06	64.4	58.5	1,970	3,941
	51	Early evening	18:00	21:30	3.5	5.00	2,901	2	326	8.9	5.00	5:00	10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
	51	Late evening	21:30	23:00	1.5	8.00	1,854	2	326	5.7	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
	51	Night	23:00	2:00	3	8.00	960	2	326	2.9	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	22.5	24.0	821	1,641
Saturday	53	Daytime	6:00	19:00	13	5.00	2,143	1	163	13.1	4.56	4:34	9.13	109.7	3.00	115.72	13	13	118.6	4.5	118.6	9.13	184.9 *	182.8	6,745	6,745
	53	Evening	19:00	23:00	4	8.00	1,575	1	163	9.7	6.21	6:12	12.42	109.7	3.00	115.72	10	10	124.2	7.2	124.2	12.42	38.7	40.0	1,410	1,410
	53	Night	23:00	2:00	3	8.00	960	1	163	5.9	8.00	8:00	16.00	109.7	3.00	115.72	8	8	128.0	9.1	128.0	16.00	22.5	24.0	821	821
Sunday	60	Daytime	8:00	19:00	11	5.00	1,687	1	163	10.4	5.00	5:00	10.00	109.7	3.00	115.72	12	12	120.0	5.1	120.0	10.00	144.0 *	144.0	5,252	5,252
	60	Evening	19:00	23:00	4	10.00	943	1	163	5.8	10.00	10:00	20.00	109.7	3.00	115.72	6	6	120.0	5.1	120.0	20.00	24.0	24.0	875	875
																						Annual Total	102,035	97,208	3,439,385	6,035,475

Notes:
- One-way trip counts for first period of day adjusted to include revenue service trips beginning prior to start of period to comply with requirements in PA Schedule 15-2, Part 1, 2.4 - Hours of Operation
- Does not include Monday-Friday summer and other seasonal service reductions
- Saturday level of service also operated on Boxing Day
- Sunday level of service also operated on New Year's, Good Friday, Victoria Day, Civic Holiday, Labour Day, Thanksgiving Day, and Christmas Day
- Does not include extra service scheduled on Canada Day
- Friday Early Morning through Early Evening train length and round trip time same as Monday-Thursday
- Night period service on Mon-Thurs consists of 15-minute service from Baseline to Trim and a 15-minute service shuttle from Moodie to Lincoln Fields

Baseline to Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
5.00	102.21	22	44	3.9	110.0	5.00	60.0	55.0	1,999	3,997

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
6.06	102.2	3.00	108.21	18	36	109.0	3.4	109.0	6.06	64.4	58.5	2,145	4,289

Stage 1 KM
12.65

Baseline to Trim | **Combined Service**

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day	Number of One-Way Trips *	Trains required	Vehicles required	Pull-Outs	Pull-Ins	Stage 1 Ann Rev Veh KM	Stage 2 Ann Rev Veh KM
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5 *	15	30	30	0	974.1	1,712.5
				22.0	44.0				5.00	60.0	55.0	1,999	3,997	120.0 *	44.0	88	58	0	3036.0	4,633.2
6.97	102.2	3.00	108.21	16	32	111.6	4.7	111.6	6.97	98.9	92.0	3,296	6,591	197.9 *	33	66	0	22	5006.4	8,801.7
				18.0	36.0				6.06	64.4	58.5	2,145	4,289	128.8 *	36	72	6	0	3258.0	4,972.0
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0 *	23	46	0	26	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5 *	15	30	0	16	569.3	1,000.8
15.00	102.2	3.00	108.21	8	16	120.0	8.9	120.0	15.00	16.0	16.0	533	1,066	32.0 *	10	20	0	10	809.6	449.9
																		20		
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5 *	15	30	30	0	974.1	1,712.5
				22.0	44.0				5.00	60.0	55.0	1,999	3,997	120.0 *	44	88	58	0	3036.0	4,633.2
6.97	102.2	3.00	108.21	16	32	111.6	4.7	111.6	6.97	98.9	92.0	3,296	6,591	197.9 *	33	66	0	22	5006.4	8,801.7
				18.0	36.0				6.06	64.4	58.5	2,145	4,289	128.8 *	36	72	6	0	3258.0	4,972.0
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0 *	23	46	0	26	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5 *	15	30	0	16	569.3	1,000.8
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	22.5	21.0	749	1,499	45.0 *	15	30	0	0	1138.5	2,001.6
																		30		
9.13	102.2	3.00	108.21	12	12	109.5	3.7	109.5	9.13	182.9 *	167.0	6,094	6,094	367.9 *	25	25	25	0	4653.5	8,184.5
12.42	102.2	3.00	108.21	9	9	111.7	4.8	111.7	12.42	38.7	36.0	1,288	1,288	77.3 *	19	19	0	6	978.1	1,719.6
16.00	102.2	3.00	108.21	7	7	112.0	4.9	112.0	16.00	22.5	21.0	749	749	45.0 *	15	15	0	4	569.2	1,000.8
																		15		
10.00	102.2	3.00	108.21	11	11	110.0	3.9	110.0	10.00	144.0 *	132.0	4,797	4,797	288.0 *	23	23	23	0	3643.2	6,405.1
20.00	102.2	3.00	108.21	6	6	120.0	8.9	120.0	20.00	24.0	24.0	799	799	48.0 *	12	12	0	11	607.2	1,067.5
																		12		
									Annual Total	101,929	94,178	3,395,253	6,023,811	203,964					4,576,616	7,482,670
																			Total ARVK:	**12,059,287**

Preliminary Service Plan / Operations Matters
Worksheet - Service Level 8 - 2041

Note: Stage 2 Service Plan tabs have been adapted from the Stage 1 Interactive Spreadsheet, adding new Peak Period calculations to reflect the new service patterns.

Vehicle Information		
(Also see cars per train by period, below)	Seats per car	120
	Standing room per car (square metres)	54.1
Calculated	Peak service capacity per car (limited to min. seated requirement)	300
	Off-peak service capacity per car	163

Minimum Terminal Time at each terminal: 3.00 or headway, whichever is less

Peak Period Service Information

AM PEAK	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
	Service Plans						
A	Moodie	Blair Pocket	85.6	24.73	2.5	5.00	14400
B	Moodie	Trim	109.7	36.47	2.5		
C	Baseline	Trim	102.2	33.31	2.5		
D	Baseline	Trim	102.2	33.31	2.5		

Capacity and service level calculations

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	24.0	2.50	2:30

Moodie to Blair/Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
10.00	85.6	10	20	7.2	100.0	10.00	30.0	25.0	742	1,484
10.00	109.7	12	24	5.1	120.0	10.00	30.0	30.0	1,094	2,188

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

PM PEAK	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
	Service Plans						
A	Moodie	Blair Pocket	85.6	24.73	3.25	5.00	11887
B	Moodie	Trim	109.7	36.47	3.25		
C	Baseline	Trim	102.2	33.31	3.25		
D	Baseline	Trim	102.2	33.31	3.25		

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	19.8	3.03	3:02

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
12.11	85.6	3.00	91.56	8	16	96.9	5.7	96.9	12.11	32.2	26.0	796	1,592
12.11	109.7	3.00	115.72	10	20	121.1	5.7	121.1	12.11	32.2	32.5	1,174	2,348

Service design by time period

Day type	Days per year	Time periods	Start	End	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
Monday-Thursday	201	Early morning	5:00	6:30	1.5	8.00	1,819
	201	Morning peak	6:30	9:00	2.5	5.00	**14,400**
	201	Midday	9:00	14:45	5.75	5.00	5,609
	201	Afternoon peak	14:45	18:00	3.25	5.00	11,887
	201	Early evening	18:00	21:30	3.5	5.00	2,901
	201	Late evening	21:30	23:00	1.5	8.00	1,854
	201	Night	23:00	1:00	2	15.00	404
Friday	51	Early morning	5:00	6:30	1.5	8.00	1,819
	51	Morning peak	6:30	9:00	2.5	5.00	**14,400**
	51	Midday	9:00	14:45	5.75	5.00	5,609
	51	Afternoon peak	14:45	18:00	3.25	5.00	11,887
	51	Early evening	18:00	21:30	3.5	5.00	2,901
	51	Late evening	21:30	23:00	1.5	8.00	1,854
	51	Night	23:00	2:00	3	8.00	960
Saturday	53	Daytime	6:00	19:00	13	5.00	2,143
	53	Evening	19:00	23:00	4	8.00	1,575
	53	Night	23:00	2:00	3	8.00	960
Sunday	60	Daytime	8:00	19:00	11	5.00	1,687
	60	Evening	19:00	23:00	4	10.00	943

Capacity and service level calculations

Cars per train	Capacity per train	Trips per hour required for capacity	Headway (decimal) required (capacity or policy)	Headway (m:ss)
2	326	5.6	8.00	8:00
2	600	24.0	2.50	2:30
2	326	17.2	3.49	3:29
2	600	19.8	3.03	3:02
2	326	8.9	5.00	5:00
2	326	5.7	8.00	8:00
2	326	1.2	15.00	15:00
2	326	5.6	8.00	8:00
2	600	24.0	2.50	2:30
2	326	17.2	3.49	3:29
2	600	19.8	3.03	3:02
2	326	8.9	5.00	5:00
2	326	5.7	8.00	8:00
2	326	2.9	8.00	8:00
1	163	13.1	4.56	4:34
1	163	9.7	6.21	6:12
1	163	5.9	8.00	8:00
1	163	10.4	5.00	5:00
1	163	5.8	10.00	10:00

Moodie to Trim

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
				22.0	44.0				5.00	60.0	55.0	1,836	3,672
6.97	109.7	3.00	115.72	17	34	118.6	4.4	118.6	6.97	98.9	97.8	3,608	7,217
				18.0	36.0				6.06	64.4	58.5	1,970	3,941
10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
15.00	16.5	3.00	22.51	2	4	30.0	6.7	30.0	15.00	16.0	4.0	97	194
16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
				22.0	44.0				5.00	60.0	55.0	1,836	3,672
6.97	109.7	3.00	115.72	17	34	118.6	4.4	118.6	6.97	98.9	97.8	3,608	7,217
				18.0	36.0				6.06	64.4	58.5	1,970	3,941
10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	22.5	24.0	821	1,641
9.13	109.7	3.00	115.72	13	13	118.6	4.5	118.6	9.13	184.9 *	182.8	6,745	6,745
12.42	109.7	3.00	115.72	10	10	124.2	7.2	124.2	12.42	38.7	40.0	1,410	1,410
16.00	109.7	3.00	115.72	8	8	128.0	9.1	128.0	16.00	22.5	24.0	821	821
10.00	109.7	3.00	115.72	12	12	120.0	5.1	120.0	10.00	144.0 *	144.0	5,252	5,252
20.00	109.7	3.00	115.72	6	6	120.0	5.1	120.0	20.00	24.0	24.0	875	875
									Annual Total	102,035	97,208	3,439,385	6,035,475

Notes:
- One-way trip counts for first period of day adjusted to include revenue service trips beginning prior to start of period to comply with requirements in PA Schedule 15-2, Part 1, 2.4 - Hours of Operation
- Does not include Monday-Friday summer and other seasonal service reductions
- Saturday level of service also operated on Boxing Day
- Sunday level of service also operated on New Year's, Good Friday, Victoria Day, Civic Holiday, Labour Day, Thanksgiving Day, and Christmas Day
- Does not include extra service scheduled on Canada Day
- Friday Early Morning through Early Evening train length and round trip time same as Monday-Thursday
- Night period service on Mon-Thurs consists of 15-minute service from Baseline to Trim and a 15-minute service shuttle from Moodie to Lincoln Fields

Baseline to Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
5.00	102.21	22	44	3.9	110.0	5.00	60.0	55.0	1,999	3,997

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
6.06	102.2	3.00	108.21	18	36	109.0	3.4	109.0	6.06	64.4	58.5	2,145	4,289

Stage 1 KM
12.65

Baseline to Trim														Combined Service						
Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day	Number of One-Way Trips *	Trains required	Vehicles required	Pull-Outs	Pull-Ins	Stage 1 Ann Rev Veh KM	Stage 2 Ann Rev Veh KM
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5 *	15	30	30	0	974.1	1,712.5
				22.0	44.0				5.00	60.0	55.0	1,999	3,997	120.0 *	44.0	88	58	0	3036.0	4,633.2
6.97	102.2	3.00	108.21	16	32	111.6	4.7	111.6	6.97	98.9	92.0	3,296	6,591	197.9 *	33	66	0	22	5006.4	8,801.7
				18.0	36.0				6.06	64.4	58.5	2,145	4,289	128.8 *	36	72	6	0	3258.0	4,972.0
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0 *	23	46	0	26	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5 *	15	30	0	16	569.3	1,000.8
15.00	102.2	3.00	108.21	8	16	120.0	8.9	120.0	15.00	16.0	16.0	533	1,066	32.0 *	10	20	0	10	809.6	449.9
																		20		
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5 *	15	30	30	0	974.1	1,712.5
				22.0	44.0				5.00	60.0	55.0	1,999	3,997	120.0 *	44	88	58	0	3036.0	4,633.2
6.97	102.2	3.00	108.21	16	32	111.6	4.7	111.6	6.97	98.9	92.0	3,296	6,591	197.9 *	33	66	0	22	5006.4	8,801.7
				18.0	36.0				6.06	64.4	58.5	2,145	4,289	128.8 *	36	72	6	0	3258.0	4,972.0
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0 *	23	46	0	26	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5 *	15	30	0	16	569.3	1,000.8
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	22.5	21.0	749	1,499	45.0 *	15	30	0	0	1138.5	2,001.6
																		30		
9.13	102.2	3.00	108.21	12	12	109.5	3.7	109.5	9.13	182.9 *	167.0	6,094	6,094	367.9 *	25	25	25	0	4653.5	8,184.5
12.42	102.2	3.00	108.21	9	9	111.7	4.8	111.7	12.42	38.7	36.0	1,288	1,288	77.3 *	19	19	0	6	978.1	1,719.6
16.00	102.2	3.00	108.21	7	7	112.0	4.9	112.0	16.00	22.5	21.0	749	749	45.0 *	15	15	0	4	569.2	1,000.8
																		15		
10.00	102.2	3.00	108.21	11	11	110.0	3.9	110.0	10.00	144.0 *	132.0	4,797	4,797	288.0 *	23	23	23	0	3643.2	6,405.1
20.00	102.2	3.00	108.21	6	6	120.0	8.9	120.0	20.00	24.0	24.0	799	799	48.0 *	12	12	0	11	607.2	1,067.5
																		12		
									Annual Total	101,929	94,178	3,395,253	6,023,811	203,964					4,576,616	7,482,670
																			Total ARVK:	**12,059,287**

Preliminary Service Plan / Operations Matters
Worksheet - Service Level 9 - 2047

Note: Stage 2 Service Plan tabs have been adapted from the Stage 1 Interactive Spreadsheet, adding new Peak Period calculations to reflect the new service patterns.

Vehicle Information		
(Also see cars per train by period, below)	Seats per car	120
	Standing room per car (square metres)	54.1
Calculated	Peak service capacity per car (limited to min. seated requirement)	300
	Off-peak service capacity per car	163

Minimum Terminal Time at each terminal: 3.00 or headway, whichever is less

Peak Period Service Information

AM PEAK	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
A	Moodie	Blair Pocket	85.6	24.73	2.5	5.00	14400
B	Moodie	Trim	109.7	36.47	2.5		
C	Baseline	Trim	102.2	33.31	2.5		
D	Baseline	Trim	102.2	33.31	2.5		

Capacity and service level calculations

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	24.0	2.50	2:30

Moodie to Blair/Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
10.00	85.6	10	20	7.2	100.0	10.00	30.0	25.0	742	1,484
10.00	109.7	12	24	5.1	120.0	10.00	30.0	30.0	1,094	2,188

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

PM PEAK	From	To	Two-way Run Time	One-way Distance	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)
A	Moodie	Blair Pocket	85.6	24.73	3.25	5.00	11887
B	Moodie	Trim	109.7	36.47	3.25		
C	Baseline	Trim	102.2	33.31	3.25		
D	Baseline	Trim	102.2	33.31	3.25		

Cars per train	Capacity per train	Trips per hour required for capacity	Combined Headway (decimal) required (capacity or policy)	Headway (m:ss)
2.0	600	19.8	3.03	3:02

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
12.11	85.6	3.00	91.56	8	16	96.9	5.7	96.9	12.11	32.2	26.0	796	1,592
12.11	109.7	3.00	115.72	10	20	121.1	5.7	121.1	12.11	32.2	32.5	1,174	2,348

Service design by time period

Moodie to Trim

Day type	Days per year	Time periods	Start	End	Duration of period	Maximum Policy Headway (minutes)	Minimum Service Capacity (pphpd)	Cars per train	Capacity per train	Trips per hour required for capacity	Headway (decimal) required (capacity or policy)	Headway (m:ss)	Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
Monday-Thursday	201	Early morning	5:00	6:30	1.5	8.00	1,819	2	326	5.6	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
	201	Morning peak	6:30	9:00	2.5	5.00	**14,400**	2	600	24.0	2.50	2:30					22.0	44.0				5.00	60.0	55.0	1,836	3,672
	201	Midday	9:00	14:45	5.75	5.00	5,609	2	326	17.2	3.49	3:29	6.97	109.7	3.00	115.72	17	34	118.6	4.4	118.6	6.97	98.9	97.8	3,608	7,217
	201	Afternoon peak	14:45	18:00	3.25	5.00	11,887	2	600	19.8	3.03	3:02					18.0	36.0				6.06	64.4	58.5	1,970	3,941
	201	Early evening	18:00	21:30	3.5	5.00	2,901	2	326	8.9	5.00	5:00	10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
	201	Late evening	21:30	23:00	1.5	8.00	1,854	2	326	5.7	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
	201	Night	23:00	1:00	2	15.00	404	2	326	1.2	15.00	15:00	15.00	16.5	3.00	22.51	2	4	30.0	6.7	30.0	15.00	16.0	4.0	97	194
Friday	51	Early morning	5:00	6:30	1.5	8.00	1,819	2	326	5.6	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	19.3 *	20.5	702	1,404
	51	Morning peak	6:30	9:00	2.5	5.00	**14,400**	2	600	24.0	2.50	2:30					22.0	44.0				5.00	60.0	55.0	1,836	3,672
	51	Midday	9:00	14:45	5.75	5.00	5,609	2	326	17.2	3.49	3:29	6.97	109.7	3.00	115.72	17	34	118.6	4.4	118.6	6.97	98.9	97.8	3,608	7,217
	51	Afternoon peak	14:45	18:00	3.25	5.00	11,887	2	600	19.8	3.03	3:02					18.0	36.0				6.06	64.4	58.5	1,970	3,941
	51	Early evening	18:00	21:30	3.5	5.00	2,901	2	326	8.9	5.00	5:00	10.00	109.7	3.00	115.72	12	24	120.0	5.1	120.0	10.00	42.0	42.0	1,532	3,063
	51	Late evening	21:30	23:00	1.5	8.00	1,854	2	326	5.7	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	11.3	12.0	410	821
	51	Night	23:00	2:00	3	8.00	960	2	326	2.9	8.00	8:00	16.00	109.7	3.00	115.72	8	16	128.0	9.1	128.0	16.00	22.5	24.0	821	1,641
Saturday	53	Daytime	6:00	19:00	13	5.00	2,143	1	163	13.1	4.56	4:34	9.13	109.7	3.00	115.72	13	13	118.6	4.5	118.6	9.13	184.9 *	182.8	6,745	6,745
	53	Evening	19:00	23:00	4	8.00	1,575	1	163	9.7	6.21	6:12	12.42	109.7	3.00	115.72	10	10	124.2	7.2	124.2	12.42	38.7	40.0	1,410	1,410
	53	Night	23:00	2:00	3	8.00	960	1	163	5.9	8.00	8:00	16.00	109.7	3.00	115.72	8	8	128.0	9.1	128.0	16.00	22.5	24.0	821	821
Sunday	60	Daytime	8:00	19:00	11	5.00	1,687	1	163	10.4	5.00	5:00	10.00	109.7	3.00	115.72	12	12	120.0	5.1	120.0	10.00	144.0 *	144.0	5,252	5,252
	60	Evening	19:00	23:00	4	10.00	943	1	163	5.8	10.00	10:00	20.00	109.7	3.00	115.72	6	6	120.0	5.1	120.0	20.00	24.0	24.0	875	875
																						Annual Total	102,035	97,208	3,439,385	6,035,475

Notes:
- One-way trip counts for first period of day adjusted to include revenue service trips beginning prior to start of period to comply with requirements in PA Schedule 15-2, Part 1, 2.4 - Hours of Operation
- Does not include Monday-Friday summer and other seasonal service reductions
- Saturday level of service also operated on Boxing Day
- Sunday level of service also operated on New Year's, Good Friday, Victoria Day, Civic Holiday, Labour Day, Thanksgiving Day, and Christmas Day
- Does not include extra service scheduled on Canada Day
- Friday Early Morning through Early Evening train length and round trip time same as Monday-Thursday
- Night period service on Mon-Thurs consists of 15-minute service from Baseline to Trim and a 15-minute service shuttle from Moodie to Lincoln Fields

Baseline to Trim

AM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Trains required	Vehicles required	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
5.00	102.21	22	44	3.9	110.0	5.00	60.0	55.0	1,999	3,997

Hard Input for Trains required: AM Peak fleet calcs were developed separately to optimize terminal utlization among the 4 overlapping services.

PM PEAK - Service Quantities are totaled in main service plan below

Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day
6.06	102.2	3.00	108.21	18	36	109.0	3.4	109.0	6.06	64.4	58.5	2,145	4,289

Stage 1 KM
12.65

Baseline to Trim														Combined Service						
Headway	Two-way Run Time	Min Terminal Time @ each terminal	Min Cycle Time	Trains required	Vehicles required	Avail. Cycle time	Adjusted Terminal Time @ each terminal	Adjusted Cycle Time	Headway (decimal) to be provided	Number of One-Way Trips *	Rev Train Hours per day	Rev Train Km per day	Rev Veh Km per day	Number of One-Way Trips *	Trains required	Vehicles required	Pull-Outs	Pull-Ins	Stage 1 Ann Rev Veh KM	Stage 2 Ann Rev Veh KM
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5 *	15	30	30	0	974.1	1,712.5
				22.0	44.0				5.00	60.0	55.0	1,999	3,997	120.0 *	44.0	88	58	0	3036.0	4,633.2
6.97	102.2	3.00	108.21	16	32	111.6	4.7	111.6	6.97	98.9	92.0	3,296	6,591	197.9 *	33	66	0	22	5006.4	8,801.7
				18.0	36.0				6.06	64.4	58.5	2,145	4,289	128.8 *	36	72	6	0	3258.0	4,972.0
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0 *	23	46	0	26	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5 *	15	30	0	16	569.3	1,000.8
15.00	102.2	3.00	108.21	8	16	120.0	8.9	120.0	15.00	16.0	16.0	533	1,066	32.0 *	10	20	0	10	809.6	449.9
																		20		
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	19.3 *	18.0	641	1,282	38.5 *	15	30	30	0	974.1	1,712.5
				22.0	44.0				5.00	60.0	55.0	1,999	3,997	120.0 *	44	88	58	0	3036.0	4,633.2
6.97	102.2	3.00	108.21	16	32	111.6	4.7	111.6	6.97	98.9	92.0	3,296	6,591	197.9 *	33	66	0	22	5006.4	8,801.7
				18.0	36.0				6.06	64.4	58.5	2,145	4,289	128.8 *	36	72	6	0	3258.0	4,972.0
10.00	102.2	3.00	108.21	11	22	110.0	3.9	110.0	10.00	42.0	38.5	1,399	2,798	84.0 *	23	46	0	26	2125.2	3,736.3
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	11.3	10.5	375	749	22.5 *	15	30	0	16	569.3	1,000.8
16.00	102.2	3.00	108.21	7	14	112.0	4.9	112.0	16.00	22.5	21.0	749	1,499	45.0 *	15	30	0	0	1138.5	2,001.6
																		30		
9.13	102.2	3.00	108.21	12	12	109.5	3.7	109.5	9.13	182.9 *	167.0	6,094	6,094	367.9 *	25	25	25	0	4653.5	8,184.5
12.42	102.2	3.00	108.21	9	9	111.7	4.8	111.7	12.42	38.7	36.0	1,288	1,288	77.3 *	19	19	0	6	978.1	1,719.6
16.00	102.2	3.00	108.21	7	7	112.0	4.9	112.0	16.00	22.5	21.0	749	749	45.0 *	15	15	0	4	569.2	1,000.8
																		15		
10.00	102.2	3.00	108.21	11	11	110.0	3.9	110.0	10.00	144.0 *	132.0	4,797	4,797	288.0 *	23	23	23	0	3643.2	6,405.1
20.00	102.2	3.00	108.21	6	6	120.0	8.9	120.0	20.00	24.0	24.0	799	799	48.0 *	12	12	0	11	607.2	1,067.5
																		12		
									Annual Total	101,929	94,178	3,395,253	6,023,811	203,964					4,576,616	7,482,670
																			Total ARVK:	**12,059,287**

SCHEDULE 15-3
MAINTENANCE AND REHABILITATION REQUIREMENTS

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PART 1
MAINTENANCE AND REHABILITATION

ARTICLE 1 MAINTENANCE AND REHABILITATION REQUIREMENTS

1.0 Timing Principle

(a) The Parties acknowledge the Timing Principle set out in Section 1.5(c) of the Project Agreement., and confirm that the rights and obligations of the Parties set out in or derived from this Schedule 15-3 shall be interpreted in accordance with the Timing Principle

(b) For clarification, the Timing Principle affects the interpretation of a number of the defined terms used in this Schedule, so that they shall be construed so as to reflect the expanding scope of the overall System as contemplated in Section 1.5(c)(i) to (v) of the Project Agreement. This includes the following defined terms, whether the defined term expressly refers to the Timing Principle or otherwise:

Expanded Design and Construction Performance Requirements

Expanded Design and Construction Specifications

Expanded Output Specification

Lands

Maintenance Buildings

Maintenance Services

Maintenance Specifications

Maintenance Term

MSFs or Maintenance and Storage Facilities.

Operations Crew Facilities

Operational Requirements and Specifications

Operations Services Plan

System

Vehicles

1.1 Responsibility for Maintenance and Rehabilitation

(a) Throughout the Maintenance Term, Project Co shall carry out and be fully responsible for the Maintenance Services in accordance with the terms of this Project Agreement and in such a manner as to comply with and ensure satisfaction of the requirements of this Schedule and all other applicable Project Agreement requirements.

(i) This Schedule has three Appendices that are interrelated and collectively outline the scope of the Maintenance Services:

A. Appendix A (Maintenance Performance Requirements) defines general maintenance requirements during the Maintenance Term;

B. Appendix B (Asset Preservation) defines the requirements and performance measures for preserving and maintaining the System's integrity with a view of proactive asset preservation practices during the Maintenance Term;

C. Appendix C (Expiry Date Requirements) defines the condition of System and their remaining service life before it is turned back to the City on the Expiry Date.

(ii) Table 1.1 sets out a summary list of activities comprising the Maintenance and Rehabilitation with reference to the relevant Appendix of this Schedule 15-3.

TABLE 1.1
Maintenance References

Activity	Appendix	Attachment
Appendix A Maintenance Performance Requirements		
Maintenance and Rehabilitation Plan	A	1
Operations Service Plan	A	2
Systems Maintenance Services	A	3
Track Maintenance Services	A	4
Vehicle Maintenance Services	A	5
Facilities Maintenance Services	A	6
Passenger Station Maintenance Services	A	7
Tunnel Maintenance Services	A	8
Structure Maintenance Services	A	9
Alignment Maintenance Services	A	10
Help Desk Services	A	11

TABLE 1.1
Maintenance References

Activity	Appendix	Attachment
Maintenance Records and Reporting	A	12
Maintenance Activities and Coordination	A	13
Operations and Maintenance Interface	A	14
Maintenance Responsibility Table	A	15
Vandalism and Graffiti	A	16
Appendix B Asset Preservation		
Asset Management Plan	B	Not Applicable
Appendix C Expiry Date Requirements		
Handover Maintenance Plan	C	Not Applicable

(b) The geographical boundaries within which Project Co shall carry out the Maintenance Services include all areas within the Lands and outside of the Lands to the extent that certain Maintenance Services relate to a portion of the New Municipal Infrastructure. The performance of the Maintenance Services in respect of the System shall begin on the Revenue Service Availability Date, subject to the following exceptions:

(i) In respect of the Stage 1 System, temporary roads and detours shall be maintained by Project Co from the commencement of the phase of construction works in accordance with Schedule 15-2 Part 1, Article 1.9 of the Design and Construction Specifications until the commencement of the Maintenance Term according to Good Industry Practice, be safe for travel, and meet the intent of the requirements in Appendix A of this Schedule for ongoing maintenance.

(ii) In respect of the Stage 1 System, New Municipal Infrastructure—The Design and Construction Specifications, Appendix A and Appendix C of the Maintenance Specifications apply to the New Municipal Infrastructure until such New Municipal Infrastructure is handed back to the City in accordance with Schedule 15-2 Part 1, Article 23 of the Design and Construction Specifications. The requirements of Schedule 24 – Expiry Transition Procedure shall not apply to New Municipal Infrastructure.

(iii) In respect of the Stage 1 System, Existing Infrastructure—Such existing Infrastructure shall be maintained by Project Co in accordance with Appendix A of the Maintenance Specifications, and at a minimum, at the same condition as when handed over to Project Co from the commencement of the phase of construction works in accordance with

Schedule 15-2 Part 1 Article 1.9 of the Design and Construction Specifications until the commencement of the Maintenance Term. Exclusions to the requirements of Appendix A for the purposes of maintaining the existing Infrastructure until the commencement of the Maintenance Term are further defined in Appendix A of this Schedule.

(iv) From the commencement of the Maintenance Term to the Expiry Date, and unless stated otherwise in this schedule or the Project Agreement, all Infrastructure that falls within the Lands shall be subject to all applicable requirements of this Project Agreement, which include the Maintenance Specifications in their entirety, subject to the Timing Principle For further certainty, all existing Infrastructure, which in whole or in part forms part of the System and is part of Project Co's Maintenance and Rehabilitation requirements shall be maintained to a condition as prescribed in this schedule.

(v) New System Infrastructure – In respect of the Stage 1 System, from Substantial Completion or Substantial Completion of the Fixed Components or Substantial Completion of the Vehicle Component to Revenue Service Availability Date, Project Co shall perform all Maintenance Services, and for further certainty, notwithstanding the requirements of Schedule 14 – Commissioning.

(vi) In respect of the Stage 2 East System, from East Substantial Completion (as defined in the DB Co Works Agreement) to the Stage 2 East Revenue Service Commencement Date, Project Co shall perform all Maintenance Services (subject to any conflicting requirements of the Trial Running being carried out thereon (as defined in the DB Co Works Agreement)) so as to ensure that the Stage 2 East System is in a state of good repair and ready for Revenue Service upon the occurrence of the Stage 2 East Revenue Service Commencement Date.

(vii) In respect of the Stage 2 West System, from West Substantial Completion (as defined in the DB Co Works Agreement) to the Stage 2 West Revenue Service Commencement Date, Project Co shall perform all Maintenance Services (subject to any conflicting requirements of the Trial Running being carried out thereon (as defined in the DB Co Works Agreement)) so as to ensure that the Stage 2 West System is in a state of good repair and ready for Revenue Service upon the occurrence of the Stage 2 West Revenue Service Commencement Date.

1.2 General Maintenance and Rehabilitation Obligations

(a) Project Co is responsible for all maintenance, and construction means, methods and techniques used to undertake the Maintenance Services and must provide all aspects (including labour, plant, equipment and materials) necessary for the performance of the Maintenance Services. Project Co shall in a timely and professional manner and in accordance with the requirements of this Project Agreement:

(i) execute the Maintenance Services diligently, expeditiously and in a thorough and worker-like manner consistent with Schedule 11 – Quality Management;

(ii) execute the Maintenance Services diligently, expeditiously and in a thorough and worker-like manner consistent with Schedule 17 – Environmental Obligations;

(iii) ensure that no works other than the Maintenance Services under this Project Agreement are performed on the Lands by Project Co or any person for whom Project Co is responsible at law;

(iv) use plant, equipment, and materials that:

A. are of a kind that are consistent with the Expanded Output Specifications, and for further certainty:

i where technological advancement and/or upgrades are necessary, the replacing or re-specifying of the system, subsystem or component shall be with one that is equal or better in form, fit and function when compared with the original Expanded Output Specification requirement; and

ii notwithstanding the requirements of Appendix C, when obsolescence of system components occurs, replacement of the system components shall only be necessary where the system component fails to comply with the Design Life or Expanded Output Specification requirements and not simply by virtue of the system component becoming obsolete, or as may be otherwise agreed by the City pursuant to Article 1.2(a)(iv)C;

B. are new, of good quality, and are used, handled, stored, and installed in accordance with Applicable Law and Good Industry Practice with respect to health and safety so as not to be hazardous or dangerous; and

C. where they differ from the Expanded Output Specifications, have been substituted with the City's prior written consent in accordance with the Project Agreement.

(b) Project Co shall appoint a Maintenance Director who shall, throughout the Maintenance Term and irrespective of such person's other responsibilities, have defined authority and full responsibility for ensuring, in respect of all Maintenance Services, compliance with all requirements of Schedule 15-3.

(c) Without limiting the generality of the foregoing, the job specification and responsibilities of the Maintenance Director shall include the following:

(i) directing all aspects of the Maintenance Services;

(ii) ensuring Maintenance Services issues and obligations are addressed and requirements are met in accordance with this Project Agreement;

(iii) establishing and maintaining professional working relationships with Relevant Authorities and Stakeholders through the City;

(iv) liaising with the City and with Relevant Authorities (through the City) as required and acting as the single point representative for Project Co on all matters relating to the Maintenance Services;

(v) coordinate with the Environmental/Sustainability Director with respect to the preparation and submission to the City of all reports required under the Environmental Approvals and other Permits, Licences and Approvals;

(vi) directing the preparation and submission to the City of any additional reports that may be required under the terms of the Project Agreement; and

(vii) supporting and maintaining working relationships with relevant First Nations, through the City.

1.3 Maintenance and Rehabilitation Performance Measure System Framework

(a) The performance measures for Maintenance Services are structured as described below:

(i) Performance measures and requirements stating the minimum criteria and measures for requirements relating to the Maintenance Services to be met by Project Co, which consist of the following:

A. Maintenance performance measures that define the minimum performance criteria for Asset Classes and System management requirements reflecting the expectations of System Users with respect to day-to-day serviceability (including condition and response times), as specified in Appendix A to this Schedule.

B. Asset Preservation Performance Measures (APPMs) that define the minimum asset preservation criteria during the Maintenance Term to achieve the desired levels of service and to limit the extent of asset consumption, as specified in Appendix B to this Schedule.

C. Expiry Date requirements define the remaining service life and condition of System before it is turned over to the City, as specified in Appendix C to this Schedule.

(ii) The submission of reports on a regular basis in an auditable format with sufficient detail of Project Co's activities and how the Project objectives are being met, as specified in Appendix A, B and C of this Schedule.

1.4 Availability of Maintenance Director or Substitute

(a) Project Co shall ensure that:

(i) the Maintenance Director; or

(ii) in the case of any temporary absence or unavailability of the Maintenance Director, one or more suitable substitutes, each with the qualifications and authority to act in the place and instead of the Maintenance Director during such absence or unavailability;

is at all times during the Maintenance Term available by telephone, email, and facsimile transmission or other appropriate means of communication, 24 hours per day, seven (7) days a week to respond on behalf of Project Co and its applicable Construction Contractor (or is available through Project Co, where applicable, in connection with the DB Co Interface Agreement) or Maintenance Provider to any matters relating to the Maintenance Services.

1.5 Maintenance Construction during Maintenance Period

(a) The Project Agreement requirements relating to design and construction, including the Expanded Design and Construction Specifications apply, mutatis mutandis, to any design and Maintenance Construction carried out as part of the Maintenance Services by Project Co during the Maintenance Term.

1.6 Condition of System

(a) Project Co, at its expense, shall ensure that upon the Expiry Date, each element of the System will:

(i) comply in all respects with the applicable requirements set out in Appendices A, B, and C to this Schedule; and

(ii) meet all other Project Agreement requirements, as applicable.

(b) If the Project Agreement is terminated prior to the Expiry Date, the System must meet the requirements of Appendices A and B to this Schedule 15-3 at the relevant Termination Date.

1.7 References

(a) Section 2.12 of Schedule 1 – Definitions and Interpretation applies to all documents listed in any Article titled “References” or otherwise referred to as a “Reference Document” in this Schedule 15-3, including Appendices A, B, and C hereto.

APPENDIX A
MAINTENANCE PERFORMANCE REQUIREMENTS

ARTICLE 1 MAINTENANCE OF SYSTEM

1.1 Introduction

(a) The specifications in this Schedule 15-3 apply to the Maintenance of the System.

(b) Project Agreement

(i) Any capitalized term used in this Schedule 15-3 but not defined herein has the meaning given to it in the Project Agreement.

(ii) Each reference in this Schedule 15-3 to "Section", "Article", "Appendices" and "Schedule" is a reference to a Section of, an Article of, an Appendix to or a Schedule to this Schedule 15-3, except where expressly stated otherwise.

1.2 Project Co to Maintain

(a) Project Co will have complete control of (subject to the rights and obligations of the City pursuant to the Project Agreement) and responsibility for the Maintenance of the System during the Maintenance Term.

(b) Project Co shall, in addition to and without derogation from its Maintenance obligations set out in Article 1.2(a), perform the Maintenance Services in accordance with this Schedule and otherwise in accordance with terms of the Project Agreement, to the extent that it provides for Project Co's performance of Maintenance Services that are not set out in this Schedule 15-3.

(c) So long as the Project Agreement remains in effect and has not been terminated in accordance with its terms and conditions, Project Co shall be unconditionally obligated to perform the Maintenance Services throughout and diligently at all times during the Maintenance Term in accordance with the Project Agreement, notwithstanding the existence of any Dispute, including any Dispute respecting Payments. For further certainty, in no event shall the existence of a Dispute or the fact that a Party has invoked the Dispute Resolution Procedure or Maintenance Dispute Resolution Procedure exempt Project Co, for any period of time during the Maintenance Term, from the fulfillment of its obligations to perform the Maintenance Services pursuant to the Project Agreement. For further certainty, Project Co's obligation to perform the Maintenance Services shall be subject to any Time Relief granted to Project Co by the provisions of the Project Agreement (including the Maintenance and Rehabilitation Requirements) following the occurrence of a Relief Event.

(d) In the event that a Dispute exists which relates to monetary matters, including, without limitation, any amount payable by a Party to the other under the Project Agreement, the Parties shall pay to each other all amounts payable under the Project Agreement which are not the subject matter of a

Dispute, in compliance with the terms and conditions of the Project Agreement, notwithstanding the existence of a Dispute respecting amounts payable or other monetary matters under the Project Agreement, or the fact that a Party has invoked or may invoke the Dispute Resolution Procedure with respect to such Dispute, subject to the Parties rights contained in Section 34.13 (Set-Off) of the Project Agreement.

1.3 Scope of Maintenance

(a) General

(i) Project Co shall conduct all Maintenance, on and for the System, as and when required, so as to meet and maintain the Standard.

(ii) Project Co shall perform or cause to be performed all inspection and testing on and for the System, as and when required, so as to meet and maintain the Standard.

(b) Fixed and Vehicle Component Maintenance Requirements

(i) In performing the Maintenance Project Co, shall provide all Maintenance with respect to the System including, but not limited to, all required Preventive Maintenance, Corrective Maintenance, Custodial Maintenance and Handover Maintenance for the System.

(c) Custodial Maintenance

(i) Project Co will provide Custodial Maintenance within and for the Custodial Maintenance Areas.

(ii) Project Co shall provide Custodial Maintenance for the Custodial Maintenance Areas, in accordance with the Standards set out in Appendix A.

(d) Corrective Maintenance

(i) If at any time during the Maintenance Term:

A. a Defect or a Deficiency in any design or construction of the System undertaken by Project Co during the Maintenance Term, is discovered; or

B. for any reason any element of the System requires Corrective Maintenance, Project Co will undertake Corrective Maintenance in a timely way, in accordance with the requirements of the Project Agreement.

(ii) Project Co shall perform the Corrective Maintenance in a manner that minimizes:

A. the interference to or adverse effect on the Passengers; and

B. interference which prevents compliance with the Operational Requirements and Specifications or the Revenue Service Hours required by the City's Operations Service Plan.

(e) Preventive Maintenance

(i) Project Co shall perform Preventive Maintenance for the System.

(ii) Project Co shall provide Preventive Maintenance pursuant to the Annual Preventive Maintenance Plan as described in Article 1.4 (a)(ii).

(iii) Project Co shall replace System components prior to or upon expiry of their Design Life.

(f) Allocation of Maintenance Services

(i) Project Co is responsible for Maintenance of the System and for ensuring that the Maintenance of the System is sufficient to permit the Operation of the System in accordance with the Operation Requirements and Specifications. Project Co is responsible for all elements of Maintenance on the System, excepting any element of maintenance which is expressly identified by the Project Agreement as the responsibility of the City or other Person ("**Person**" for purposes of this Article 1.3(f) shall exclude the Parties). For further certainty, any element of Maintenance for the System which is not expressly provided for by the Project Agreement shall be the obligation of Project Co. For further certainty, Project Co is not responsible for the Operation of the System.

(g) Training

(i) Notwithstanding Article 3.10, Project Co shall be responsible for providing training services for personnel carrying out Maintenance Services including:

A. preparing, revising, coordinating and scheduling Maintenance training programs as required;

B. providing training to newly-hired Maintenance Employees and providing ongoing re-certification training to existing Employees as required;

C. providing ongoing staff development training;

D. providing training to Service Providers employed by Project Co to carry out Maintenance Services on the System;

E. maintaining up to date training records on all Maintenance Employees; and

F. maintaining up to date training manuals for Operation and Maintenance Services..

(ii) Project Co shall be responsible for all training required to the City and third parties the City considers necessary, acting reasonably, as a result of any changes to the System, implemented by Project Co.

1.4 Maintenance and Rehabilitation Plan

(a) Project Co shall develop and submit, pursuant to Schedule 10 – Review Procedure, a Maintenance and Rehabilitation Plan which includes but is not limited to the requirements of this Schedule. In respect of the Stage 1 System, the Maintenance and Rehabilitation Plan shall be submitted 90 days prior to the Testing and Commissioning phase as prescribed in Schedule 14 of the Project Agreement. In respect of the Stage 2 System, the Maintenance and Rehabilitation Plan shall be amended and resubmitted pursuant to Schedule 10 – Review Procedure 90 days prior to the anticipated start date of the Testing and Commissioning phase for each of the Stage 2 East System and the Stage 2 West System, as notified to Project Co by the City at least 180 days before each such date occurs.

(i) The Maintenance and Rehabilitation Plan shall, at all times, comply with the Standard.

(ii) The Maintenance and Rehabilitation Plan shall, without limitation and at all times during the Maintenance Term, include the following for the System:

A. Custodial Maintenance Plan;

B. Corrective Maintenance Plan; and

C. Preventive Maintenance Plan.

(iii) Starting the Contract Year following the Revenue Service Availability Date, Project Co shall provide an Annual Preventive Maintenance Plan for each Contract Year which shall comply with the Maintenance and Rehabilitation Plan. The Annual Preventive Maintenance Plan shall be submitted to the City at least 60 days prior to the commencement of the Contract Year to which the Annual Preventive Maintenance Plan applies. The City shall be entitled to review and provide commentary to Project Co in respect of the Annual Preventive Maintenance Plan.

(b) Project Co shall ensure that it has sufficient staff, equipment and materials, and that there shall be proper procedures and processes in place to fulfill its obligations to perform Custodial Maintenance, Preventive Maintenance and Corrective Maintenance. Project Co shall ensure that Project Co and Contractors employed in the execution of the Maintenance Services implement policies, processes and procedures to remedy any Epidemic Defect in a timely and effective manner in order to maintain Project Co's obligations to provide the Scheduled Revenue Service Vehicles and in accordance with the Vehicle Maintenance Requirements and Standards in Appendix A.

(c) Compliance with Maintenance Plans

(i) Project Co shall perform Maintenance in accordance with and implement the Maintenance and Rehabilitation Plan.

(d) Revision of M&R Plan

(i) Project Co may at any time during the Maintenance Term, propose a revision to the Maintenance and Rehabilitation Plan, which Project Co shall propose in accordance with Schedule 10.

A. In the event that a proposed revision pursuant to Article1.4(d):

i does not comply with the Standard;

ii results in increased costs to the City in any Contract Year of the Maintenance Term; or

iii results in any adverse change to Operations;

the proposed revision shall constitute a Variation and the provisions of Schedule 22 shall apply. For further certainty, in the event that a proposed revision constitutes a Variation pursuant to this Article 1.4(d), the Maintenance and Rehabilitation Plan shall not be amended except in accordance with Schedule 22.

(ii) In the event that a proposed revision does not constitute a Variation pursuant to Article 1.4(d), should the City determine that it disagrees with the proposed revisions, the City may refer the matter to Schedule 27 of the Project Agreement (Dispute Resolution Procedure) for a resolution.

(iii) The City may at any time during the Maintenance Term, in its Discretion, propose a revision to the Maintenance and Rehabilitation Plan, and the provisions of Schedule 22 shall apply.

(iv) In the event that the proposed revision does not constitute a Variation, subject to Article 1.4 (d)(v), the Maintenance and Rehabilitation Plan shall be deemed to have been amended in accordance with a proposed revision pursuant to Schedule 10, failing which the Maintenance and Rehabilitation Plan shall not be amended except as mutually agreed between the Parties or in accordance with the Schedule 27.

(v) Notwithstanding Article 1.4 (d)(iv), the Maintenance and Rehabilitation Plan shall be deemed to be amended pursuant to Schedule 22.

1.5 Maintenance Coordination

(a) General

(i) Subject to this Article 1.5, Project Co and the City shall coordinate the Maintenance Services and the Operations, respectively, so as to facilitate effective implementation of

both the Maintenance and Rehabilitation Requirements and the Operational Requirements and Specifications, provided that:

A. at no time shall Operations be adversely affected by Maintenance Services; and

B. notwithstanding the provisions of Article 1.5 including Article 1.5(d) (Approval of Scheduled Maintenance Services) or Article 1.5(e) (Major Maintenance Shutdown Periods), Project Co shall use best/commercially reasonable efforts to prevent any complete or partial shutdowns of the System.

(b) Coordination Meetings

(i) Project Co shall communicate daily with the City Representative to discuss, review and coordinate daily activities for Maintenance of the components of the System and all other related issues.

(ii) Project Co shall attend a weekly meeting with the City to discuss, review and coordinate Maintenance of the System and all other related issues, including without limitation the implementation of the Maintenance and Rehabilitation Plan, compliance with the maintenance requirements and standards defined in the Attachments to Appendix A.

(iii) Project Co shall meet with the City to determine if Track outages are required to accommodate the Maintenance Services which Project Co plans to undertake within the System. Such meetings shall be scheduled once weekly, between Project Co, the City and any third parties whose attendance the City in its Discretion deems necessary. Project Co shall, at least one week prior to any such meeting, advise the City of any proposed Maintenance Services on the Track or System Right of Way which is scheduled to take place during the week immediately following that meeting, provided that in the event the nature of any proposed Maintenance Services is so as to require earlier notice for purposes of coordination with Operations, Project Co shall provide the City with sufficient prior notice to effect such coordination.

(c) Quarterly Performance Review

(i) The City shall, on a quarterly basis during each Contract Year, conduct a formal review of Project Co's performance of the Maintenance Services as well as the co-ordination between the City's operational scope of responsibility and Project Co's scope of maintenance responsibility (the "Quarterly Performance Review"). The Quarterly Performance Review shall include a written report drafted by the City ("Quarterly Performance Report") which includes an assessment of:

A. Review of data collected pursuant to the Project Agreement respecting Project Co's performance of the Maintenance Services, including but not limited to the Performance Monitoring Reports and Daily Operating Reports for the relevant quarter;

B. Specific incidents or failures to meet the service standards set out in Schedule 15-3 occurring during the relevant quarter, in particular repeated incidents or failures;

C. Logistical, scheduling, and/or co-ordination issues occurring during the relevant quarter;

D. Follow-up and progress reporting on Action Plans previously issued and implemented by Project Co;

E. Functioning of the contract management and interface framework set out in the Project Agreement, including performance monitoring, daily meetings, Helpdesk mechanism; and

F. Other issues relevant to the performance of the Maintenance Services in accordance with the standards set out in Schedule 15-3 and/or a smooth interface between the City and Project Co in relation to the operation and maintenance of the System.

(ii) The City and Project Co shall meet to review the Quarterly Performance Report ("Quarterly Performance Review Meeting"). The City shall provide Project Co with a draft copy of the Quarterly Performance Report at least five (5) Business Days in advance of the meeting. Project Co shall have the opportunity to respond, both during the meeting and in writing following the meeting, concerning any identified performance issues.

(iii) The City shall provide a finalized Quarterly Performance Report no later than ten (10) days following the performance review meeting between the City and Project Co. The City may, as part of such Quarterly Performance Report, issue a directive to Project Co to provide an Action Plan to address any identified issues in Project Co's performance of the Maintenance Services, provided that any such identified performance issues shall be limited to:

A. Repeated or systemic failures to provide the Maintenance Services in accordance with the standards set out in Schedule 15-3;

B. Co-ordination issues between the City and Project Co; or

C. Levels of performance which have triggered, during the relevant quarter, the issuance of a Warning Notice, Monitoring Notice, exercise of the City's Remedial Rights, or an Event of Default, under the terms of the Project Agreement.

(iv) If so required by the City, Project Co shall provide such Action Plan for the City's review and approval within twenty-one (21) days of the City's written request. The Action Plan shall include:

A. A clear statement of the performance issues to be addressed;

B. A clear statement of the methodology to address each issue;

C. A timeline for implementing the methodology;

D. Clear performance measures and performance targets for each identified issue; and

E. An expected timeline for when the methodology will yield the identified performance improvement targets.

(v) The City shall review the Action Plan within five (5) days of receipt and shall, acting reasonably, approve the Action Plan or decline to approve the Action Plan, providing details and a date for re-submission.

(d) Approval of Scheduled Maintenance Services

(i) Project Co shall obtain the prior approval of the City Representative for the scheduling of Maintenance Services on the System. The City may impose reasonable conditions on the performance of such work by Project Co so as to ensure the Operation of the System in accordance with the Operational Requirements and Specifications and the Safety Management System, and Project Co shall comply with all such conditions. The City's approval of Project Co's proposed Maintenance Services shall not be unreasonably withheld, however Project Co acknowledges that the Operation of the System in accordance with the Operational Requirements and Specifications and the Safety Management System shall be paramount.

(ii) Project Co shall coordinate Custodial Maintenance, Preventive Maintenance and Corrective Maintenance Services on the System with the City. Project Co shall advise the City in advance, and where reasonably possible on the occasion of weekly Track outage meetings identified in Article 1.5(b), of all such planned Preventive Maintenance and Corrective Maintenance, and the City and Project Co shall mutually establish the Schedule for such Maintenance. In no event shall Project Co perform such Maintenance within the Alignment without receiving prior approval from the City or TOCC as required by this Article. Project Co shall coordinate Preventive Maintenance and Corrective Maintenance activities with the TOCC:

A. All employees of Project Co performing Maintenance on the areas between or adjacent to the tracks are governed by the LRT Rules and the Standard Operating Procedures ;

B. All employees of Project Co performing Maintenance shall receive clearance from the TOCC to enter and perform Maintenance Services on the areas between or adjacent to the tracks;

C. All employees of Project Co performing Maintenance on the areas between or adjacent to the tracks shall be certified in LRT Rules and Standard Operating Procedures;

D. No equipment other than hand tools shall be operated in proximity to the areas between or adjacent to the tracks without prior approval of the TOCC;

E. Neither Drivers of Trains nor Employees operating Non-Revenue Vehicles shall operate on the track or in areas between or adjacent to the tracks unless the Drivers and / or Employees are certified to operate the Trains or Vehicles in accordance with the LRT Rules and Standard Operating Procedures, and has received appropriate clearance in accordance with Article 1.5(d)(ii);

F. Maintenance on the areas between or adjacent to the tracks shall be performed outside of Revenue Service Hours, unless the City approves the performance of specified Maintenance Services during Revenue Service Hours in accordance with Article 1.5(d)(ii) such approval not to be unreasonably withheld or delayed; and

G. Subject to Article 1.5(d)(ii)(F), in the event that Project Co carries out approved Maintenance Services during Revenue Service Hours, the Payment Mechanism shall continue to apply and Project Co shall be held accountable for all Availability Failures, Quality Failures, and/or Service Failures which occur during such period.

(e) Major Maintenance Shutdown Periods

(i) Project Co shall be permitted to shut down portions of the System during Revenue Service Hours in order to carry out major maintenance on the track, systems, or structures, subject to the conditions set out in this Article 1.5(e), for a maximum of 80 hours during each Contract Year prior to the Stage 2 East Revenue Service Commencement Date; and thereafter 200 hours during each Contract Year. A pro rata allocation shall be made in the Contract Year in which the Stage 2 East Revenue Service Commencement Date occurs. Each such period of permitted System shutdown shall be termed a “Major Maintenance Shutdown Period”.

A. During a Major Maintenance Shutdown Period, Project Co shall not be subject to deductions under the Payment Mechanism for the portions of the System which Project Co has shutdown pursuant to this Article.

B. Project Co must obtain the written approval of the City Representative, not to be unreasonably withheld, to schedule a Major Maintenance Shutdown Period. Project Co’s request for approval shall be submitted to the City Representative at least forty-five (45) calendar days in advance of the proposed Major Maintenance Shutdown Period, and shall include but not be limited to:

i the duration of such period;

ii start time;

iii end time;

iv portion(s) of the System to be shutdown and / or otherwise affected by the shutdown period, including a written explanation / rationale of the limits of the portion(s) of the System proposed to be shutdown;

v purpose of the planned Maintenance Services to be carried out during the shutdown period including a written explanation of why a Major Maintenance Shutdown period is required to perform the Maintenance Services; and

vi Traffic and transit management plans pursuant to Article 1.5(h).

C. A Major Maintenance Shutdown Period shall only be scheduled during weekends, certain holidays, and during weekdays between the hours of 23:30 and the start of the Scheduled Station Hours on the following service day.

D. Unused time shall be carried over into a subsequent Contract Year to a maximum of 160 hours, during each Contract Year prior to the Stage 2 East Revenue Service Commencement Date, and thereafter 300 hours. A pro rata allocation shall be made in the Contract Year in which the Stage 2 East Revenue Service Commencement Date occurs.

E. A Major Maintenance Shutdown Period shall only be permitted on a single segment of the system at a time, a segment of the system is defined as a section of track between two adjacent interlockings or as otherwise agreed upon between Project Co and the City.

However, at the sole discretion of the City, a concurrent shutdown of two segments of the system may be considered and approved provided:

i there are no other reasonable alternatives or approaches to conducting such maintenance work; and

ii it does not include the downtown tunnel segment.

For further certainty, the shutdown of the entire System is not permitted.

F. The City shall provide a written response within 15 calendar days of receiving Project Co's request in compliance with the provisions in Article 1.5(e)(B).

(ii) As part of the Maintenance and Rehabilitation Plan as prescribed in Appendix B of this Schedule, Project Co shall include the Major Maintenance Shutdown hours planned for

the current Contract Year and forecasted for the following Contract Years as required for the 5 year Life Cycle Plan or otherwise. On an annual basis or otherwise as required, the City and Project Co shall review the Major Maintenance Shutdown hours forecasted to consider:

A. number of planned shutdowns;

B. locations along System;

C. durations;

D. potential impact on ridership and bus / alternative service; and

E. any adjustments to the Major Maintenance Shutdown hours.

The Parties agree that the provisions of this Article 1.5(e)(ii) are without prejudice to the provisions of Article 1.5(e)(i) and that Project Co may request approval for Major Maintenance Shutdown Periods regardless of whether they are included in the plans and forecasts provided under this Article. The City Representative shall not be entitled to refuse approval for a Major Maintenance Shutdown Period on the grounds that it was not included in the plans and forecasts provided under this Article.

(f) Specific Coordination Requirements

(i) The City and Project Co shall establish LRT Rules and Standard Operating Procedures for the coordination of Maintenance and Operations activities and personnel at the Maintenance and Storage Facilities, and Project Co shall comply with such rules and procedures. The rules and procedures shall include, without limitation, the coordination of Maintenance activities with the entry of Trains into and their removal from Revenue Service. Any negligent act or omission with respect to the Operation of the System by a City employee employed in the Operation of the System, or a failure by the City or a City employee employed in the Operation of the System to comply with the LRT Rules and Standard Operating Procedures shall be a Relief Event, to the extent that any such negligent act or omission or failure materially adversely affects, or increases the cost of, the performance by Project Co of the Maintenance Services.

(ii) Project Co acknowledges that the City shall conduct training of City employees in accordance with the Safety Management System, including its ability to conduct City employee training as required during Off-Peak Periods and outside of Revenue Service Hours, and Project Co shall make reasonable efforts to cooperate with the City to accommodate all training activities in accordance with training programs approved by the City. The City and Project Co shall jointly determine the requirements for and scheduling of all such training activities, provided that the City shall have final authority to establish such requirements and scheduling. The City shall be entitled to vary the requirements for such training in response to Operations requirements. Project Co shall

ensure that Vehicles are available for use in such training activities as required and directed by the City.

(iii) Upon either the TOCC or Project Co becoming aware of the failure of any System or City owned assets, equipment or component of the System, that Party shall inform the other Party of the failure. Upon discovering or becoming aware of a failure, the City shall take immediate action to reduce, to the extent reasonably possible, loss of Scheduled Revenue Service Vehicle Kilometres and Project Co shall immediately commence Corrective Maintenance, as required.

(iv) Project Co shall obtain the prior approval of the City for the scheduling of all inspection and testing activities to be carried out on the System, such approval not to be unreasonably withheld or delayed.

(v) Project Co shall establish a plan detailing Project Co's Maintenance strategy in the event of the failure of any system, equipment or component of the System. The plan shall include response and repair strategies in the event of:

A. failures which immobilize Trains or the System;

B. problems or failures which may result in the immobilization of Trains or the System;

C. problems or failures unlikely to result in the immobilization of Trains or the System; and

D. a Train- or System-immobilizing failure occurring in the tunnel portions of the System.

(vi) Project Co shall record any incidence of the failure of any system, equipment or component of the System and shall document the actions taken by Project Co to restore the System to the required Expanded Design and Construction Performance Requirements.

(vii) In addition to the requirements of Schedule 15-2, Part 1, Article 11 (in respect of Stage 1) and to be included as part of the LRT Rules and Procedures, Project Co shall develop policies and procedures associated with weather related events and/or natural disasters (and update these as applicable to the Stage 2 System by reference to the policies and procedures developed by DB Co pursuant to Schedule 15-2, Part 1, Article 8 of the DB Co Works Agreement), including but not limited to:

A. winter snow and / or freezing rain;

B. severe wind;

C. extreme rainfalls and / or hail;

D. lightning;

E. earthquakes;

F. extreme hot or cold temperatures; and

G. flooding.

Project Co shall, in coordination with the City, define roles and responsibilities of the Parties, communication / reporting protocols, resources available and / or contingent dependent on the severity of the event, standard operating procedures, prior to, during and after the event, and procedures for recovery of System or System components which are partially or completely not functional as a result of the event.

(g) Emergency and Safety Procedures and Investigations shall be in accordance with the Expanded Design and Construction Specifications.

(h) Traffic and Transit Management During Maintenance Term

(i) Project Co is responsible for traffic management in accordance with the Ontario Traffic Manual and any Applicable Law relating to the protection of the safety of the Existing Provincial Highways, Existing Major Municipal Roadways, Existing Transitway, Minor Municipal Roadways and Other Affected Municipal and Federal Roadways Users, Project Co Parties and Other Contractors.

(ii) Project Co is responsible for transit management to the extent required by Project Co to coordinate Maintenance Activities with OC Transpo pursuant to Article 1.5.

(iii) Project Co shall coordinate with the City, OC Transpo, and other Relevant Authorities when planning and developing Traffic and Transit Management Plans.

(iv) Project Co's Traffic and Transit Management Plans shall include but are not limited to the following:

A. Maintenance and Rehabilitation Services affecting traffic and / or transit services;

B. Anticipated duration of the Maintenance and Rehabilitation Services;

C. Planned lane closures, full closures, lane shifts, detour routes and diversions;

D. Key Individuals responsible for implementation and management of Traffic and Transit Management Plan;

E. Provisions for Permits and / or Approvals required by the City, OC Transpo, or Relevant Authorities, including permitted times for lane closures, full closures, lane shifts, detour routes and diversions, and detouring and / or mitigation measures to maintain transit services; and

F. Coordination with Others that may be required as a result of the implementation of Project Co's Traffic and Transit Management Plans.

(v) Prior to implementation of Traffic and Transit Management Plans, Project Co shall obtain all required permits and approvals from the City, OC Transpo, and Relevant Authorities.

(vi) During implementation of Traffic and Transit Management Plans, Project Co shall:

A. coordinate with the City, OC Transpo, and other Relevant Authorities on all closures, full closures, detour routes, lane shifts and diversions on roads that intersect or cross Provincial Highways, Major Municipal Roadways, Transitway and Minor Municipal Roadways.

B. obtain all required closure permits or approvals.

C. notify the City, OC Transpo, and Relevant Authorities immediately of any changes to a closure, full closure, detour route, lane shift and diversion, or anticipated problems that may delay the opening time / removal of the traffic control measures and / or removal of detouring and / or mitigation measures to maintain transit services, stating the closure / permit notification number and details of the changes to and/or problems with the closure, full closure, detour route, lane shift and diversion.

(vii) Project Co shall be responsible for any such delays to the Operation of the System that result from the Traffic and Transit Management Plans and for further certainty Project Co shall be subject to all penalties resulting from loss in service as provided in this Schedule 15-3 and Schedule 20, save that (i) in relation to Maintenance Services within the median of OR174 that require road closure permits to carry out, the City shall use all reasonable endeavours to ensure that any properly and timely completed applications by Project Co for such road closure permits are approved in good time; (ii) in relation to Maintenance Services from which access to Highway 417 is required and which is under the control of MTO, the City shall use all reasonable endeavours to ensure that MTO, its agents or its contractors shall have in place appropriate procedures that recognize the need for, and shall permit access by Project Co to carry out, such maintenance upon properly and timely completed applications being made by Project Co, and (in each case) the City shall otherwise adjust the performance criteria which relate to Maintenance Services that require Highway 417 closures to ensure that Project Co is not penalized for any delay in achieving such permits which is beyond its reasonable control.

(i) Costs Incurred by Project Co

(i) The City shall not reimburse Project Co for costs incurred by Project Co as a result of any Maintenance Emergency.

(ii) The City shall reimburse Project Co for costs incurred by Project Co as a direct result of performing its obligations in response to a Non-Maintenance Emergency on the System (the **"Emergency Costs"**), in accordance with the procedure set out in Schedule 22 – Variation Procedure.

(iii) In the event that an Emergency is confirmed or determined by the City to be a Non-Maintenance Emergency, the City shall promptly so notify Project Co. Within 10 Business Days following the City's notification with respect to a Non-Maintenance Emergency, Project Co shall submit to the City an invoice for its Emergency Costs determined in accordance with Schedule 22 – Variation Procedure, with the changes necessitated by context.

(iv) Upon receipt of an invoice from Project Co pursuant to Schedule 22 – Variation Procedure, the City shall evaluate the invoiced amount of the Emergency Costs to Project Co on the basis of the City's record of the actions taken by Project Co in response to the Non-Maintenance Emergency. The City shall pay all amounts it determines to be due and payable as Emergency Costs.

(v) In the event that the City's evaluation of the Emergency Costs differs from the invoiced amount, Project Co may refer the matter to the Dispute Resolution Procedure.

1.6 Compliance

(a) Inspection and Right of Access

(i) In addition to the rights stated elsewhere in the Project Agreement, the City shall have all rights with respect to oversight and monitoring of Project Co's performance, to inspect and audit the System including the Vehicles in order to provide assurance that Project Co is performing its obligations under the Project Agreement.

(ii) The City shall ensure that any interference with the performance of the Maintenance Services which may be caused by any inspection conducted or authorized by the City is limited to the minimum interference necessary to conduct such inspection.

(iii) Notwithstanding Article 1.7 the City, subject to Article 1.6(a)(ii), shall be entitled to inspect and audit the System and/or the records and reports required to be kept under the Project Agreement, including without limitation (i) work orders and (ii) records of expenses respecting any Non-Maintenance Repair, upon reasonable prior notice, and without prior notice to Project Co where such inspection and/or audit is undertaken for cause related to:

A. an Emergency;

B. an Environmental Event or reasonable evidence that same may have occurred or have the potential to occur, including the presence or potential presence of Hazardous Substances on the System;

C. the occurrence of or reasonable evidence of the occurrence of illegal activities either on the System or with respect to the Maintenance or Operation of the System;

D. an incident which is the subject matter of an investigation, inquiry or prosecution by Relevant Authorities; or

E. upon the City's identification of an existing or potential material Safety issue on the System.

(iv) Where the City exercises its right to inspect or audit**,** a representative of Project Co shall be present during such inspection or audit. In no event shall the City's exercise of its right to inspect or audit or the presence or absence of a representative of Project Co during any such inspection or audit relieve Project Co of any of its obligations under this Schedule 15-3. The City's right to inspect and audit the records and reports required to be kept under the Project Agreement shall be subject to the right of Project Co to withhold financial information unrelated to information the City would reasonably require to exercise to the City's rights and obligations under the Project Agreement.

(v) The City has a right, at all reasonable times during the Maintenance Term, subject to Article 1.6(a)(vii), to access and inspect the System (including carrying out sample checks) and any work Project Co undertakes on the System, so as to confirm:

A. the adequacy of the supervision by Project Co for any Maintenance; and

B. that the System is being maintained in accordance with the terms of the Project Agreement.

(vi) The City may at any time appoint an agent for the purposes of carrying out any inspection or audit pursuant to the Project Agreement. The City will in a timely way advise Project Co of any requirement for Corrective Maintenance or Custodial Maintenance of which it becomes aware.

(vii) The City may at any time advise Project Co that it requires access to the Maintenance and Storage Facilities or other facilities controlled by Project Co for the purposes of inspecting Vehicles or other elements of the System. The City shall provide notice to Project Co two Business Days in advance of any planned inspection or audit for which it, or its agents, require access to the Maintenance and Storage Facilities.

(viii) Upon the City's request, acting reasonably, Project Co shall grant the City access to the Maintenance and Storage Facilities for the purpose of conducting educational tours of the

System for the public and other interested Persons, provided that the City shall give Project Co reasonable prior notice of any planned tour of the Maintenance and Storage Facilities and provided that the City's conduct of any such tour shall not impede performance of the Maintenance Services.

(b) Safety Audit

(i) Without limitation of the rights of the City pursuant to Article 1.6(a) and otherwise provided in this Agreement, the City shall be entitled at any time during the Maintenance Term to inspect and audit the System (including the Maintenance and Storage Facilities) and the records and reports required to be kept under the Project Agreement, including without limitation records of work orders respecting the Maintenance Services, for the purpose of conducting a Safety Audit. The City shall provide Project Co with such prior notice of any Safety Audit as is reasonable in the circumstance, except in the circumstances in which no notice is required pursuant to Article 1.6(a)(iii).

(ii) Project Co shall cooperate with the City to facilitate any Safety Audit. Project Co shall grant to the City and its agents, upon the City's request, access to the Maintenance and Storage Facilities and all Vehicles located therein for the purposes of conducting a Safety Audit.

(c) Review of Performance

(i) Project Co shall comply with the requirements of Schedule 11 –Quality Management. For further certainty, Project Co shall conduct regularly scheduled reviews of its performance in meeting the Standard and provide to the City a written report on such performance. Project Co shall participate in consultations with the City regarding Project Co's performance.

(ii) In the event that, upon review of Project Co's performance, as reported by Project Co or otherwise, or at any other time during the Maintenance Term, it is determined by the City, in consultation with Project Co, that Project Co's performance is failing to meet the Standard in any respect, then in addition to and not in derogation from all other remedies and obligations of the City and Project Co under the Project Agreement, Project Co shall be obligated to improve its performance in respect of the relevant matter so as to meet the Standard.

(d) City's Remedial Action

(i) Without prejudice to any other express rights of the City under the Project Agreement or otherwise, if in the City's reasonable opinion remedial action is required immediately because:

A. there is an Emergency and delay would risk damage to the System, the Real Property Interests, adjacent lands or personal property;

B. there is a public Safety concern and delay could result in personal injury or death; or

C. a Project Co Event of Default has occurred,

or where a provision of this Schedule 15-3 expressly permits the City to take remedial action, then the City may give a notice to Project Co (the "**Remedial Action Notice**") that the City will take or cause to be taken remedial action without any requirement for further notice or delay. The City may take remedial action pursuant to Article 1.6(d)(i)A or 1.6(d)(i)B without first delivering a Remedial Action Notice, but shall deliver the Remedial Action Notice thereafter. Project Co may inspect any such remedial action undertaken by the City during the performance of the remedial action, or, in the event the remedial action is taken pursuant to Articles 1.6(d)(i)A or 1.6(d)(i)B, upon receipt of the Remedial Action Notice or earlier with the consent of the City.

(e) Payment for the City Remedial Action

(i) In the event that the City takes remedial action:

A. pursuant to Article 1.6(d)(i)C; or

B. otherwise pursuant to Article 1.6(d) in the event the remedial action would not, if performed by Project Co, constitute a Non-Maintenance Repair;

(ii) Project Co shall be responsible to the City for 115% of the cost incurred by the City to complete any remedial action. For further certainty, the City shall be entitled pursuant to Article 34.13 (City's Right of Set Off) of the Project Agreement to subtract the cost incurred by the City to complete any remedial action, plus an administration fee of 15% of such cost, from any Payments due to Project Co under the Project Agreement. Any dispute which arises in connection with this Article 1.6(e) shall be settled pursuant to the Dispute Resolution Procedure.

(f) Warranties Unaffected by Remedial Action

(i) The Parties agree that:

A. no remedial action which the City may undertake in accordance with Article 1.6(d)(i)C shall affect, alter, reduce or qualify any warranty provided by Project Co or DB Co in respect of the System, including without limitation the Vehicle and Fixed Equipment Warranties and Fixed Facilities Warranties provided in Schedule 34 – Vehicle and Fixed Equipment Warranties to the Project Agreement and the Fixed Facilities Warranties; and

B. no remedial action which the City may undertake in accordance with Article 1.6(d)(i)A or 1.6(d)(i)B shall affect, alter, reduce or qualify any warranty provided by Project Co or DB Co in respect of the System, including without

limitation the Vehicle and Fixed Equipment Warranties provided in Schedule 34 – Vehicle and Fixed Equipment Warranties to the Project Agreement and the Fixed Facilities Warranties, provided that the City does not perform or cause to be performed maintenance on the subject of the warranty as part of such remedial action, excepting in the event of negligence by the City with respect to maintenance the City performs or causes to be performed on the subject of the warranty as part of such remedial action and only to the extent of any such negligence.

(ii) For further certainty, despite any remedial action undertaken by the City in accordance with Article 1.6(d), all warranties provided by Project Co pursuant to the Project Agreement shall remain in full force and effect without alteration until the date specified by the warranty for its expiry, except as otherwise provided by this Article 1.6(f).

(iii) Project Co shall deliver to the City, as a Project Co Escrow Document, an acknowledgment by the Vehicle and E&M Contractor of the terms of Article 1.6(f)(i).

(g) Remedies Cumulative

(i) For further certainty and without limiting Section 64.14 of the Project Agreement, all of the rights and remedies of the City contained in the Project Agreement including this Schedule 15-3 are cumulative and not alternative. The City may exercise separately or simultaneously any and all rights and remedies contained in this Schedule 15-3 and/or otherwise contained in the Project Agreement.

1.7 Access to Maintenance Records

(a) The City's Right to Information

(i) Without derogation from any of the other rights of the City under the Project Agreement including this Schedule 15-3, the City shall have the right to obtain from Project Co, and Project Co shall deliver to the City as soon as possible and in no event later than seven (7) days following a written request by the City, any reasonable information which is in the possession of or available to Project Co and which is directly related to the Maintenance Services or the System. Notwithstanding any provisions in this Schedule 15-3 which entitle the City to obtain access to or require production of information which is in the possession of or available to Project Co, Project Co shall not be required to deliver any business records which are legally privileged (save for reports prepared by environmental consultants other than in contemplation of litigation) or contain confidential financial information which confidential information is not reasonably required by the City for its purposes.

(b) Audits and Inspections

(i) The City may, upon prior written notice of one (1) week to Project Co, inspect and audit the records and reports required to be kept under the Project Agreement, including financial records respecting the Maintenance Services. The City's right to inspect and audit the records and reports required to be kept under the Project Agreement shall be subject to the right of Project Co to withhold financial information unrelated to information the City would reasonably require for its purposes related to the City's rights and obligations under the Project Agreement. The City shall be entitled to make copies or take extracts of Project Co's documents subject to providing Project Co with a list of the documents or extracts that have been taken. Such inspection and/or audit may take place at any reasonable time during Project Co's regular business hours at Project Co's place of business in the Maintenance and Storage Facilities or such other location where such records are regularly kept. Such inspection and audit shall be at the City's cost.

(ii) Prior to any inspection or audit by the City, Project Co may require the City and its auditors to execute confidentiality agreements acceptable to Project Co, acting reasonably, in respect of the subject matter of the audit or inspection, subject to requirements of Law where information or portions thereof cannot be kept confidential.

1.8 Records and Reporting

(a) Records and Reporting Obligations

(i) Project Co will record and retain for review and audit by the City, upon the City's request, the following information:

A. Comprehensive Custodial Maintenance, Preventive Maintenance, Corrective Maintenance, Handover Maintenance and other Maintenance records for the System including without limitation all Defects and Deficiencies identified, the date and time of the Maintenance activity undertaken in response, detailed work orders, the scope of the activity including the labour and materials used and their cost, payroll burden and indication of compliance or non-compliance with the Maintenance and Rehabilitation Plan;

B. records of all purchases, supplier invoices and transactions related to Non-Maintenance Repairs;

C. automatically collected comprehensive electronic records of all Train movements including actual arrival and departure times at all Stations in the format described in Schedule 15-2 to the Project Agreement;

D. automatically collected electronic Passenger counts;

E. automatically collected electronic records of all security alarms, equipment status or failure indicators, including the nature of the indicator, the date and time of occurrence and the date and time of the indicator clearance;

F. automatically or manually recorded descriptions of the actions initiated to respond to the incidents reported in the Attachments;

G. automatically or manually recorded information regarding incidents involving Passenger and employee Security or Safety, including the date and time of occurrence and the response taken;

H. automatically or manually recorded incidents involving damage to or Deficiencies existing in the System affecting Passengers, including date and time of occurrence and response taken;

I. automatically recorded Vehicle time and distance operated information for each Vehicle for the life of the Vehicle;

J. maintenance activities undertaken in response to a Non-Maintenance Repair and the costs of such activities;

K. the records in respect of Events of Vandalism and associated Vandalism Repair Costs required by Article 7.0 of Attachment 16 to this Schedule 15-3; and

L. all such other reports, records and information regarding the System which the City may reasonably require from time to time.

(ii) Project Co shall prepare monthly status reports identifying all Maintenance performed on the System within the last quarter of each Contract Year (the **"Monthly Activity Report"),** and shall submit the Monthly Activity Reports to the City for review within seven (7) business days after each completed quarter.

(iii) Project Co shall use an electronic asset management system (the **"Maintenance Management System"**) to track Maintenance activities performed on all major components of the System, including all information which Project Co is required to record pursuant to Article 1.8(a)(i). Project Co shall prepare monthly summary reports of such Maintenance activities, which shall be submitted to the City as part of the Monthly Activity Report. The City shall have access to the Maintenance Management System at all times for purposes of review, and for further certainty including remote access by a secured web based software for sharing information.

(iv) The "**Maintenance Management System**" shall include reliability and maintainability monitoring and reporting capabilities. Project Co shall produce monthly reliability and maintainability reports including a two year moving history for all major systems and subsystems, including but not limited to:

A. Light Rail Vehicles;

B. Train Control and Signaling;

C. Track and Maintenance of Way;

D. Substations and Overhead Catenary;

E. Structures;

F. Facilities including passenger stations and the Maintenance & Storage Facilities;

G. Shop Equipment; and

H. Maintenance of Way Equipment.

(v) Project Co shall produce reliability and maintainability reports utilizing key performance indicators including but not limited to:

A. Mean Distance Between Maintenance Failures;

B. Mean Distance Between All Failures;

C. Mean Time Between Maintenance Failures;

D. Mean Time Between All Failures;

E. Mean Time to Repair;

F. Mean Time to Restore;

G. LRV Fleet Availability;

H. Backlog of Deferred Maintenance; and

I. Campaign/Modifications Programs

(vi) As part of the Maintenance Management System as described in Article 1.8(iii), Project Co shall prepare and submit to the City a daily report (the **"Daily Report"**), in accordance with Appendix A, which shall include, but not be limited to:

A. Deficiencies of which Project Co has become aware;

B. Maintenance Services which has been undertaken or completed in respect of Deficiencies;

C. All Deficiencies reported by the City, including through any report submitted pursuant to Appendix A.

(vii) Reports

A. Project Co shall prepare all reports related to the Maintenance Services, to be submitted by the City to any federal, provincial or municipal governmental agency, railways and any other third party. Project Co shall also promptly furnish to the City copies of any citations or complaints issued to Project Co by an enforcement or regulatory body which affect the Maintenance Services or the Vehicles. Project Co will advise the City and the disposition of such citations or complaints will be coordinated through the City.

(b) Licence, Certificate and Permit Records

(i) Project Co shall be responsible for completing or cause to be completed all regulatory inspections and testing necessary for the licences, certificates and permits associated with the System.

(ii) Project Co shall maintain and furnish to the City records of all licences, certificates, and permits required to be obtained for the performance of the Maintenance Services and Operation of the System.

(c) Environmental Records, Samplings, and Reports, Project Co shall comply with Schedule 17 – Environmental Obligations.

1.9 Changes Required by the City to Maintain City Assets

Without limiting the definition or scope of a "Variation" in Schedule 22, the City may, without invalidating the Project Agreement, require a Variation from time to time during the Maintenance Term to:

(a) Inspect assets to be maintained by the City of Ottawa including but not limited to various existing retaining walls and/or bridge structures.

(b) To effect repairs to assets to be maintained by the City of Ottawa using City resources or resources contracted to the City of Ottawa; or

(c) To contract with Project Co for repairs to City assets in the event that Project Co prices to perform the work are considered reasonable and commercially acceptable.

Upon the City performing work on, under, over or adjacent to the right of way requiring Project Co-supplied equipment or personnel, Project Co will respond in accordance with Schedule 22 – Variation Procedure. With respect to the matters described in this Article 1.9, Schedule 22 – Variation Procedure shall apply provided that Project Co will be entitled to its Direct Costs (as such term is defined in Schedule 22 – Variation Procedure), with markup of 5% in accordance with Schedule 22 – Variation Procedure.

1.10 Utilities

(a) Project Co shall be responsible for all utility work for the System during the Maintenance Term, including but not limited to:

(i) Relocation and / or installation of new utilities resulting from Project Co's responsibility and performance of the requirements included in Schedule 15-3;

(ii) Removal and / or decommissioning of existing utilities resulting from Project Co's responsibilities and performance of the requirements included in Schedule 15-3; and

(iii) All approvals, permits, and costs determined by the utility provider resulting from Project Co's performance of the requirements included in Article 1.10. For further certainty, all such approvals and permits shall be contemplated as Project Co Permits.

(b) For further clarity, the City shall be responsible for all regular monthly service charges associated with the operation of the System throughout the Maintenance Term, excluding any service charges resulting from Article 1.10 (a).

ARTICLE 2 MAINTENANCE AND PERFORMANCE STANDARDS

2.1 Applicable Standards

(a) Project Co shall at all times and in all respects undertake the Maintenance required:

(i) to meet the Expanded Design and Construction Performance Requirements for the System;

(ii) so that the Design Life of the System including its components and subsystems is realized throughout the Maintenance Term;

(iii) in accordance with Law;

(iv) in accordance with the Safety Management System;

(v) in accordance with the Security Management System;

(vi) to permit the Operation of the System to meet all Scheduled Revenue Service Kilometres in accordance with the Operations Service Plan;

(vii) to ensure that the Maintenance of the System is sufficient to permit the Operation of the System (to the extent that Maintenance is relevant to Operation) to meet the Operational Requirements and Specifications , including without limitation the Headway required by the Operational Requirements and Specifications, subject to traffic issues, issues related to the Operation of the System, or any other matters unrelated to Design, Construction and Maintenance; and

(viii) to meet or exceed the Maintenance and Service requirements including for further certainty the Attachments to this Schedule.

2.2 Quality Performance Criteria

(a) Project Co shall comply with the requirements set out in this Schedule and the Project Agreement.

(b) In event that the City identifies or is notified of a Deficiency in the System which constitutes a failure to meet the Quality Performance Criteria, as defined in the Attachments to this Appendix, including as a result of any report by a Driver, the City shall promptly provide notification to Project Co of the existence of the Deficiency through the Help Desk Services.

ARTICLE 3 OPERATION OF THE SYSTEM

3.1 Operation by City

(a) The City shall be responsible for the Operation of the System.

3.2 Service Level

(a) The City shall determine the Service Level to be provided by Project Co in accordance with the Operations Service Plan at all times during the Maintenance Term, subject to the notice periods provided for in Article 3.3, below. For clarity, the City may:

(i) Require a Service Level Increase;

(ii) Require a Service Level Decrease; or

(iii) Modify a Service Level and require Project Co to provide such modified level of service.

(b) Unless otherwise agreed by Project Co and the City, Project Co shall be required to provide:

(i) on the Revenue Service Availability Date: Service Level 1;

(ii) on the Stage 2 East Revenue Service Availability Date: Service Level 3A; and

(iii) on the Stage 2 West Revenue Service Availability Date: Service Level 4.

and unless provided otherwise pursuant to a Variation instructed pursuant to Schedule 22 – Variations:

(A) the Service Level specified in paragraph (ii) above shall be the only Service Level that may apply after the Stage 2 East Revenue Service Availability Date and prior to the Stage 2 West Revenue Service Availability Date;

(B) the Service Level specified in paragraph (iii) above shall be the minimum Service Level that may apply after the Stage 2 West Revenue Service Availability Date.

(c) The City may vary any aspect of the Operations Service Plan in its sole discretion, subject to the notice periods provided for in Article 3.3, below, and subject to any rights of Project Co granted by this Article 3 to the extent that such variance of the Operations Service Plan results in a Major Service Change, Medium Service Change, or Minor Service Change.

3.3 Booking Process

(a) The City shall provide to Project Co, at least thirty (30) calendar days prior to the commencement of each quarterly Booking (quarterly Booking dates are normally January 1, end of April, End of June, and start of September of each year), the Revenue Service requirements for that Booking period in the form of:

(i) confirmation of the Service Level and Operations Service Plan for that Booking period;

(ii) the number of Vehicles constituting the minimum required fleet for the duration of the Peak and Off-Peak Periods during that Booking period, in accordance with the relevant Service Level (the **"Scheduled Revenue Service Vehicles"**); and

(iii) the Train consist assignments and pull-out schedule for each MSF during that Booking period.

(b) The maximum number of Vehicles assigned to each MSF shall be agreed upon by the City and Project Co The operating schedule will be constructed such that the fleet count is rebalanced between MSFs at the conclusion of revenue service each day. For further certainty, a Revenue Service Vehicle shall not be required to return to the MSF from which it originated. The City may modify the Booking for a given day (including the Train consist assignments and Scheduled Revenue Service Vehicles at each MSF for any period of the service day) provided that the City gives Project Co at least seven (7) days' notice.

(c) The City may request a modification to the Booking for a given day (including the Train consist assignments and Scheduled Revenue Service Vehicles for each MSF for any period of the service day) less than seven (7) days before the proposed modification.

(i) If such a request is made, less than seven days before the proposed Booking modification, Project Co and the City shall mutually make reasonable efforts to provide the modified level of service while preserving Project Co's ability to fulfill its Maintenance Services obligations.

3.4 Hand Off of Trains

(a) Project Co shall ensure that, at the start of Revenue Service each Peak Period and each Off-Peak Period, the Scheduled Revenue Service Vehicles at each MSF are composed into Train consists according to the Booking requirements and are made available to the City, in accordance with the Vehicle Availability Standards of Appendix A, to be entered into Revenue Service.

(b) Project Co shall develop clear procedures, in consultation with the City for the hand off of Trains between Project Co and the City at the start of each Peak or Off-Peak period as required pursuant to the LRT Rules, and Standard Operation Procedures.

(c) Project Co and the City shall mutually make reasonable efforts such that during Off-Peak Periods and outside of Revenue Service Hours, Vehicles which are not in Revenue Service and which the City in its Discretion has not elected to utilize for Driver training, special events or other purposes as the City shall determine, from time to time, shall be made available to Project Co at the Maintenance and Storage Facility of Project Co's choosing for Maintenance activities. The City shall, in exercising its Discretion, take into account the obligations of Project Co to perform the Maintenance Services.

(d) The process for coordinating unscheduled movements of Vehicles between the MSFs for maintenance or other reasons shall be developed jointly between Project Co and the City. Project Co shall provide the City with a minimum 24 hours' notice of the required transfer of specific Vehicles. If a vehicle is disabled at the Moodie MSF and repairs can only be made at the Belfast MSF, it shall be moved to the Belfast MSF on the same day that it went disabled, notwithstanding any such movement of a disabled Vehicle to the Belfast MSF shall be coordinated between Project Co and the City to occur outside of peak service, or as otherwise agreed upon by Project Co and the City. The City shall provide the necessary drivers to support such transfer movements. To minimize unscheduled movements of trains between the MSFs the City will identify a minimum of five Blocks that will be scheduled to pull out of one MSF and pull into the other MSF at the conclusion of the day's scheduled assignment.

3.5 Major Service Changes – Service Level Increase

(a) The City may require a Service Level Increase by providing written notice to Project Co clearly indicating the desired new Service Level and the date on which such new Service Level is to be implemented, which must be not less than thirty (30) months from the date of the notice ("Service Level Increase Date"). On the Service Level Increase Date, the scope of Project Co's Maintenance Services obligations including the number of Scheduled Revenue Service Vehicles which the City is entitled to book, shall become based on the requested Service Level.

(b) A Service Level Increase shall trigger a change in the Annual Service Payment and Volume Payment, in accordance with Schedule 20 – Payment Mechanism, on the Service Level Increase Date. For the avoidance of doubt, this shall also apply in the event of an automatic Service Level Increase caused by the occurrence of the Stage 2 East Revenue Service Availability Date and the Stage 2 West Revenue Service Availability Date pursuant to Article 3.2(b) above.

(c) Project Co shall implement the Service Level Increase earlier than the thirty (30) month period, in the following circumstances:

(i) If additional vehicle fleet capacity, sufficient to provide the Service Level Increase, is or will be available to Project Co within a shorter period of time; or

(ii) If the City and Project Co mutually agree to implement the Service Level Increase at an earlier date.

3.6 Major Service Changes – Service Level Decrease

(a) The City may require a Service Level Decrease by providing written notice to Project Co clearly indicating the desired new Service Level and the date on which such new Service Level is to be implemented, which must be not less than six (6) months from the date of the notice ("Service Level Decrease Date"). On the Service Level Decrease Date, the scope of Project Co's Maintenance Services obligations including the number of Scheduled Revenue Service Vehicles which the City is entitled to book, shall become based on the requested Service Level.

(b) The City and Project Co may mutually agree to implement the Service Level Decrease earlier than the six (6) month period.

(c) A Service Level Decrease shall trigger a change in the Annual Service Payment and Volume Payment, as a City-initiated Variation following the process set out in Schedule 22 – Variations, provided that:

(i) The pricing provided by Project Co in its Proposal for the new Service Level which has been requested by the City through the Service Level Decrease, shall serve as the basis for the revised Annual Service Payment and Volume Payment to be arrived at through the Variation process and, in the absence of any demonstrable evidence of increased costs presented by Project Co pursuant to (ii), below, shall presumptively be the revised Annual Service Payment and Volume Payment;

(ii) Project Co must clearly demonstrate any additional costs resulting from the Service Level Decrease which justify an Annual Service Payment and/or Volume Payment in excess of that put forward in Project Co's Proposal for the relevant Service Level; and

(iii) Project Co's claim for additional costs pursuant to (ii), above, shall be limited to:

A. Breakage or termination costs related to labor which was required to maintain the in-service vehicle fleet associated with the higher Service Level but which is no longer required to maintain the in-service vehicle fleet associated with the lower Service Level; and

B. Costs related to the maintenance of any Surplus Vehicle Fleet. Project Co shall take all commercially reasonable steps to minimize costs associated with Surplus Vehicle Fleet.

(d) Following a Service Level Decrease, Project Co shall continue to provide Maintenance Services to the Surplus Vehicle Fleet, as required, such that the Surplus Vehicle Fleet remains capable of meeting the Vehicle Availability Standards. This obligation is subject to Project Co's obligation in Article 3.6(c)(iii)(B), above, to take commercially reasonable steps to minimize costs in doing so.

(e) Following a Service Level Decrease, the City may, in its sole discretion, take steps to sell, transfer, lease, find alternative uses for, or otherwise dispose of any Surplus Vehicle Fleet.

3.7 Other Major Service Changes

(a) Any other Major Service Change shall trigger a change in the Annual Service Payment and Volume Payment, as a City-initiated Variation following the process set out in Schedule 22 – Variations, provided that:

(i) Any revisions to the Annual Service Payment and/or Volume Payment shall be determined based on unit costs reflected in Project Co's pricing for the Service Level(s) which most closely resemble the parameters used for the Major Service Change.

3.8 Medium Service Changes

(a) An amendment of the Operations Service Plan which results in a Medium Service Change shall entitle Project Co to apply for additional compensation under the Variation process, provided that any such additional compensation shall be limited to costs related to the portion of Revenue Service Vehicle Kilometres in excess of 120% of the relevant Baseline Vehicle Kilometres.

(b) Where a Medium Service Change is apparent retroactively (for example, at the end of a Contract Year when the total Revenue Service Vehicle Kilometres for that Contract Year is found to have exceeded 120% of the Baseline Vehicle Kilometres), then Project Co may apply for retroactive lump sum compensation.

(c) Where a Medium Service Change is apparent in advance (for example, a variation to the Operations Service Plan for an upcoming Contract Year which will result in Revenue Service Vehicle Kilometres for that Contract Year in excess of 120% of the Baseline Vehicle Kilometres), then Project Co may apply for compensation in the form of adjustments to the forthcoming Annual Service Payment and/or the Volume Payment.

3.9 Minor Service Changes

(a) An amendment to the Operations Service Plan which results in a Minor Service Change shall not constitute a Variation, and for further certainty shall not result in any adjustment to the Annual Service Payment or other compensation to Project Co outside of the Payment Mechanism.

3.10 Driver Training

(a) Project Co shall provide training to City-designated Train-the-Trainers on, modifications to new and existing vehicles, modifications by Project Co to new System Infrastructure, modifications by Project Co to System Infrastructure, and for further certainty, contemplate changes to the operation of the System on an incremental and as-needed basis. The City shall be responsible for training and certifying drivers for both the Stage 1 System and the Stage 2 System.

3.11 LRT Rules and Procedures

(a) Project Co shall abide by the LRT Rules and Standard Operating Procedures, where applicable, in its performance of the Maintenance Services.

(b) Project Co shall cooperate with the City in the ongoing development of the LRT Rules and Standard Operating Procedures throughout the Maintenance Term, including the identification and implementation of such changes and adjustments to the LRT Rules and Standard Operating

Procedures as the City may in its Discretion, but with the participation of Project Co, deem advisable.

(c) Prior to the Revenue Service Availability Date (in respect of the Stage 1 System), and prior to the Stage 2 East Revenue Service Availability Date and Stage 2 West Revenue Service Availability Date (in respect of the Stage 2 East System and Stage 2 West System, respectively), Project Co shall support the City in updating LRT Rules and Standard Operating Procedures as applicable to the new Scheduled Revenue Service Vehicles and new System Infrastructure.

(d) Project Co shall prepare and abide by Maintenance policy and procedure manuals which set out instructions to employees and technical procedures for the provision of Maintenance Services. All policy and procedure manuals shall comply with the provisions of this Schedule 15-3. Project Co shall provide ongoing training to its Employees and shall monitor the performance of all Maintenance Services so as to ensure the policies and procedures are complied with.

(e) Project Co shall implement quality control and assurance procedures, including without limitation the requirements set out in Schedule 11 of the Project Agreement, as amended from time to time, in respect of the Maintenance Services.

ARTICLE 4 SPECIFIC CITY RESPONSIBILITIES

(a) The City shall be responsible for the following maintenance obligations with respect to the System.

(i) existing retaining walls that are within the Lands which have not been modified or altered or improved in any manner by Project Co, and for further certainty as identified in the Maintenance Responsibility Table in Attachment 15;

(ii) existing bridges that are within the Lands which have not been modified or altered or improved by Project Co in any manner as part of Project Co's Work, and for further certainty as identified in the Maintenance Responsibility Table in Attachment 15;

(iii) communications systems (to the extent of the obligations identified as City responsibilities in the Maintenance Responsibility Table);

(iv) existing watermains that fall within the Lands, and for further certainty are not contemplated as part of the New Municipal Infrastructure;

(v) existing sewers, that fall within the Lands, and for further certainty are not contemplated as part of the New Municipal Infrastructure;

(vi) existing street lights and illumination that fall within the Lands which have not been modified or altered or improved in any manner by Project Co;

(vii) existing traffic signals that are within the Lands which have not been modified or altered or improved in any manner by Project Co;

(viii) existing utilities that are within the Lands which have not been modified or altered or improved in any manner by Project Co; and

(ix) existing artwork that are within the Lands, and for further certainty as described in Schedule 15-2, Part 1, Article 13 and Data Room, (in respect of the Stage 1 System) and as described in Schedule 15-2, Part 1, Article 12 of the DB Co Works Agreement (in respect of the **Stage 2** System)

(b) If existing Infrastructure that falls within the Lands is modified or altered or improved by Project Co, Project Co shall be responsible for the existing Infrastructure which modifications, alterations, or improvements have adversely or are considered detrimental to the life cycle or asset preservation requirements and Project Co using all applicable regulations, codes, and specifications and applying engineering principles and Good Industry Practices cannot demonstrate to the City, with the City acting reasonably, that the modifications or alterations or improvements are not detrimental to the existing Infrastructure.

ARTICLE 5 SECURITY

5.1 System Security

(a) The City shall provide Security for the System, except as otherwise expressly provided in this Schedule. The City shall have governing and paramount authority for all matters of Security on or relating to the System. Project Co shall cooperate with the City to ensure the Safety and Security of the public, Passengers, employees and the System.

5.2 Project Co's Security Obligations

(a) Project Co shall be responsible for locking and unlocking all doors or gates required to:

(i) control Passenger access to the System, and for further certainty by ensuring the Passenger Stations are available pursuant to the Station Access Standard as described in Attachment 7 of Appendix A to this Schedule;. This includes ensuring, in cooperation with Transit Law Enforcement Unit, that all Passengers have left the public areas of the OLRT system prior to lockdown.

(ii) restrict unauthorized entry or trespassing to the System through engineering controls, and for further certainty to ensure the System is unavailable and not accessible by unauthorized persons, public, or Passengers; or

(iii) control or allow Passenger and workers egress or evacuation from the System when an emergency situation is declared and emergency response and preparedness requires evacuation from the System as being part of the Standard Operating Procedures for such an emergency.

(b) Project Co shall provide Security for the Maintenance and Storage Facilities, subject to the City's governing and paramount authority for Security as provided in Article 5.1(a). Project Co shall, without limitation:

(i) erect (to the extent within the Project Scope) and maintain fencing along the perimeter of the Maintenance and Storage Facilities to prevent unauthorized entry;

(ii) establish and monitor Security measures so as to protect the Maintenance and Storage Facilities from unauthorized entry, criminal activity and vandalism, which measures may include but shall not be limited to:

A. security alarm systems;

B. Maintenance staff competently trained in the provision of Security for the System, working 24 hours per day from Monday to Sunday;

C. card access entry systems;

D. closed circuit television systems; and

E. the establishment of secure public zones;

(iii) respond to incidents of unauthorized entry to or criminal activity within the Maintenance and Storage Facilities. Project Co shall notify the City of such incidents in accordance with the Standard Operating Procedures.

(c) Project Co shall establish policies and procedures with respect to Security for the Maintenance and Storage Facilities in compliance with this Schedule. Project Co's Security policies and procedures shall be submitted to the City for its review and approval.

(d) Project Co's performance of the Maintenance Services, including its Security obligations, shall comply with:

(i) the Standard Operating Procedures regarding Security for the System;

(ii) any Security policies and procedures and Security Standards with respect to the System; and

(iii) any directions or instructions from the City with respect to the City's Security policies and procedures.

(e) In the event that, in the ordinary course of its performance of the Maintenance Services, Project Co becomes aware of any criminal or other activity on the System which it appears may pose a threat to the Safety and Security of the public and/or the System, Project Co shall immediately notify the City of such activity.

(f) For further certainty, in the event of an Emergency, or in the event that, in the Discretion of the City, it shall be desirable for insuring the Safety or Security of the public, Passengers or the System, the City shall have the right to establish additional Security measures for the System, and Project Co shall immediately comply with such additional Security measures as directed by the City.

(g) In furtherance of the authority of the City referred to in this Schedule, the City shall be entitled to approve any and all plans and procedures of Project Co with respect to the Security obligations of Project Co contained in Article 5.2 and to make inspections from time to time in the City's Discretion to ascertain whether Project Co is in compliance with the Security obligations of Project Co contained in Article 5.2.

(h) The provisions contained in Article 5.2 shall not derogate from Project Co's primary responsibility to provide all Security for the Maintenance and Storage Facilities.

5.3 Project Co's Employees

(a) Project Co shall establish and implement a system of security clearance and identification with respect to its employees, to be approved by the City. Project Co's system of security clearance

and identification shall comply with the Employee Security Standard. Project Co shall ensure that each of its employees have met the Employee Security Standard.

5.4 Compliance with System Security

(a) Project Co shall comply with any and all decisions of the City respecting matters of Security affecting the System. The City may direct Project Co to effect compliance with the Security Standard and Project Co shall forthwith act in accordance with such directions in the performance of the Maintenance Services under this Schedule 15, including its Security obligations. In the event that the City amends the Security Standard, the City shall issue a City Direction and Project Co shall forthwith comply with the amended Security Standard in its performance of the Maintenance Services, including its Security obligations.

5.5 Changes to Security

(a) For further certainty, in the event that the City amends the Employee Security Standard or the Security Standard with the result that Project Co's costs of compliance are increased, the amendment shall constitute a Variation and the provisions of Schedule 22 – Variation Procedure shall apply. The City shall make reasonable efforts to inform Project Co of any change to the Employee Security Standard where such change affects the Employees.

ARTICLE 6 TECHNICAL CAPACITY

(a) Project Co shall ensure that, as a result of Project Contracts and Sub-Contracts into which it has entered in accordance with the Project Agreement, it has the necessary professional capabilities, qualifications, licences, skilled personnel, experience, expertise and financial resources, and that it shall provide the necessary tools, equipment and materials, to perform the Maintenance Services in an efficient, professional and timely manner in accordance with the terms and conditions of the Project Agreement.

(b) Project Co shall ensure that the management assigned to the Maintenance Services, including the management of Project Co, Project Contractors and the Sub-Contractors, as applicable, shall have knowledge and expertise in the area of maintenance of LRT systems, and all components thereof including LRVs, sufficient to fulfill Project Co's obligations under the Project Agreement, and additionally that such management shall have authority to make decisions concerning the daily functions and management of the Maintenance Services consistent with the Project Agreement.

(c) Technical Support

(i) In addition to the requirements of Schedule 14 in relation to the Stage 1 System and notwithstanding Project Co's obligations included in this schedule, Project Co shall provide sufficient technical support and capacity during the Maintenance Term. In fulfilling this requirement, Project Co shall:

A. coordinate with the City for the most efficient and least disruptive effect on the Operation of the System, when the Operation of the System is impaired as a result of any Maintenance Service deficiency;

B. coordinate Project Co service providers and deploy Corrective Maintenance Plans required to address any Maintenance Service deficiency; and

C. consider lessons learned during this period and propose any improvements to the Maintenance and Rehabilitation Plan, LRT Rules and Procedures, and Standard Operating Procedures.

ARTICLE 7 PROJECT CO RESPONSE

(a) Project Co shall include as part of the Maintenance and Rehabilitation Plan's Custodial, Corrective, and Preventative Maintenance Plans as prescribed in Appendix A Article 1.4 of this Schedule 15-3, Project Co's contemplated Response planned against the Key Performance Measures as detailed in Schedule 15-3 Appendix A Attachments 3 to 10 inclusive in all instances where the Response is indicated as "Immediate". When contemplating the planned Response within the respective subplans to the Maintenance and Rehabilitation Plan, any reference to "Immediate" in Schedule 15-3 Appendix A Attachments 3 to 10 inclusive shall have the meaning as provided in Schedule 15-3 Appendix A Article 7.0 (b) following the Stage 2 East Revenue Service Availability Date (in respect of Responses on the Stage 1 System and the Stage 2 East System) and following the Stage 2 West Revenue Service Availability Date (in respect of Responses on the Expanded System)

(b) An Immediate Response Time is defined as follows:

(i) When the event Response can reasonably be expected to be undertaken by custodial staff and occurs at a Station (which for clarity does not include the guideway at Station Platforms), the Response Time shall be 30 minutes. For further clarity, Responses to Custodial Maintenance Standard events categorized in Schedule 15-3 Appendix A Attachment 7 Article 3.0(a)(i)A i. through iii., shall have a Response Time of 30 minutes.

(ii) When the event Response is to be undertaken by a technician anywhere within the Alignment or does not otherwise fall within the scope of Article 7.0(b)(i)above, the Response Time shall be as follows:

A. 35 minutes within the limits generally described from

i. Moodie LMSF to Lincoln Fields Station;

ii. Dominion Station to Blair Station; and

iii. excluding the portions of the System within the limits expressly described in B below;

B. 45 minutes within the limits generally described from

i. East of Blair Station to Trim Station;

ii. East of Lincoln Fields Station to just west of Dominion Station;

iii. South of Lincoln Fields Station to Baseline Station; and

iv. excluding the portions of the System within the limits expressly described in A above.

APPENDIX A – ATTACHMENT 1

MAINTENANCE AND REHABILITATION PLAN

Project Co shall prepare and submit the Maintenance and Rehabilitation Plan to be attached as Appendix A Attachment 1 in accordance with this Schedule.

APPENDIX A – ATTACHMENT 2

OPERATIONS SERVICE PLAN

APPENDIX A – ATTACHMENT 3

SYSTEMS MAINTENANCE SERVICES

1.0 Scope of Services

(a) Project Co shall be responsible for the Custodial, Preventive, and Corrective Maintenance activities on all of the systems assets, including but not limited to:

(i) traction power system, including substations and overhead contact system;

(ii) train control system, including the BCC and TOCC control system components supplied by Project Co; and

(iii) communications systems (excluding Public Services Safety Radio system), safety and security, and public information.

2.0 Service Requirements

(a) In general, Project Co shall maintain all systems assets in accordance with the Fixed Component Availability Standard, to ensure that the service levels outlined in the Operating Service Plan can be provided at all times during Revenue Hours.

(b) Traction Power

(i) Project Co shall be responsible to ensure that traction power as required in the Expanded Design and Construction Specifications is available at all times.

(ii) Notwithstanding Project Co's obligations to ensure that Traction Power is available, Project Co is not obliged to pay for or supply electricity to the System during the Maintenance Term.

(iii) Project Co shall maintain the Traction Power System in a state of good repair and working order in accordance with the approved Corrective and Preventive Maintenance Plans.

(iv) Project Co shall maintain the Traction Power System and its components to meet the Fixed Component Availability Standard.

(v) Project Co shall immediately respond to and repair any failure of any element of the Traction Power System (substations, power distribution, overhead contact system, etc.) whether or not the Fixed Component Availability Standard is violated.

(vi) Project Co shall have available as part of its Maintenance tools and equipment the following: grounding rods, switchgear test and calibration equipment, contact wire repair and replacement trailer and insulation test equipment.

(c) Train Control

(i) Train Control/Signals

A. Project Co shall maintain the Train Control systems in a state of good repair and working order in accordance with the approved Corrective and Preventive Maintenance Plans.

B. Project Co shall maintain the Train Control systems and its components to meet the Fixed Component Availability Standard.

C. Project Co shall immediately respond to and repair any failure of any element of the Train Control systems whether or not the Fixed Component Availability Standard is violated.

D. Project Co shall use diagnostic equipment and test software to identify problems.

E. Project Co shall have backup copies of the original operating system and application software immediately available for use.

F. Project Co shall implement procedures for verifying the integrity of all vital signal and train control vital software when any software changes, reloads or upgrades are made.

G. Project Co shall maintain strict version control of all software on all train control and signalling systems. Version control records shall be made available for inspection by the City or by regulatory agencies upon request.

H. Project Co shall perform all periodic and corrective maintenance required by the System Safety Plan described in Schedule 15-2, Part 4, Article 5 (and adapted as reasonably required to accommodate the Stage 2 System when Maintenance Services start on those parts of the System) and in accordance with the approved safety procedures.

I. Project Co shall maintain records of all preventive and corrective maintenance performed on the Train Control systems. These records shall be made available to the City and to regulatory agencies upon request.

J. Project Co shall monitor the security of the Train Control network and shall take counter measures against intrusion attempts and attacks. All attacks and intrusion attempts shall be reported to the City.

(ii) Transit Operations Control Centre

A. Project Co shall test and troubleshoot all transit monitoring, operation and control equipment, including computers, software, electronic devices and communication equipment, supplied for the TOCC by Project Co as part of the System.

B. Project Co shall ensure that the BCC at the Maintenance and Storage Facilities is operational at all times, so as to be available in the event Operations cannot be conducted from the TOCC.

C. Project Co shall ensure the hardware and software for the System is kept up to date, in accordance with the manufacture's recommendations and latest revisions.

D. Project Co shall maintain an adequate number of spare parts to allow for an immediate replacement of equipment.

E. In the event of a failure of any element of the TOCC which causes the System to fail to meet the Fixed Component Availability Standard, Project Co shall immediately respond and Repair the Deficiency.

F. In the event of a failure which does not violate the Fixed Component Availability Standard, Project Co shall respond within one (1) hour of notification, to perform Corrective Maintenance on the failure.

(d) Communications Systems

(i) Radio Communications

A. Project Co shall work with the Radio System Supplier to ensure that radio transmission and reception via the City wide radio network meets the expected Radio system reliability necessary to achieve operational and maintenance performance targets for the OLRT.

B. On discovery of a radio Fault Project Co shall implement special operational procedures record and notify the Radio System Supplier of the failure condition.

C. Project Co shall permit the Radio System Supplier to perform corrective maintenance to maintain availability of the radio system. Where necessary or as part of a supplementary agreement, Project Co shall provide training and protection to the City of Ottawa Public Services Safety Radio System or Radio Supplier employees. Project Co shall carry out regular radio protocol checks and provide evidence that these are conducted at prescribed intervals.

(ii) Safety and Security Systems

A. Project Co shall maintain all Safety and Security systems elements in a state of good repair and working order in accordance with the approved Corrective and Preventive Maintenance Plans.

B. Project Co shall maintain all Safety and Security systems elements and its components to meet the Fixed Component Availability Standard.

C. Project Co shall immediately respond to and repair any failure of any element of the Safety and Security systems whether or not the Fixed Component Availability Standard is violated.

D. Project Co shall use diagnostic equipment and test software to identify problems.

E. Project Co shall have backup copies of the original operating system and application software immediately available for use.

F. In case of breakdowns and failures, Project Co shall have procedures and resources in place to dispatch forthwith the resources necessary to perform Corrective Maintenance.

(iii) Passenger Information Systems

A. Project Co shall maintain the Passenger information systems at the Stations and on the Vehicles under the Project Agreement (including Schedule 15-3) in accordance with the Passenger Information Systems Standard.

B. Passenger information systems refers to the Passenger information systems located at Stations that display train arrival/departure times, delay information, cancellation information, destination, general announcements, news or advertising displays.

C. Project Co shall be responsible for identifying the defect and performing remedial actions in accordance with the Passenger Information Systems Standard and the timeframes established in the Performance Indicators. Notwithstanding, the defect, timelines and remedial actions identified, prevailing legislation and City by-laws shall take precedence if they are more restrictive.

(e) Project Co shall ensure compliance with Schedule 17- Environmental Obligations.

(f) Project Co's performance with respect to vandalism and graffiti shall be in accordance with:

(i) Appendix A, Attachment 10 – Alignment Maintenance Services, Article 2.0(f) "Vandalism and Graffiti Repair", Article 3.0(e) "Vandalism and Graffiti Standard", and Article 5.0 "Performance Criteria", and for further certainty, Project Co's rectification and / or response times and the assessment of Service Failure Points; and

(ii) Appendix A, Attachment 16 – Vandalism and Graffiti.

3.0 Service Standards

(a) Fixed Component Availability Standard

(i) Any Fixed Component in the System (including train control, traction power, communications, etc.) is considered to not meet the Standard if any Defect or Deficiency is identified in that Fixed Component that:

A. affects the Safety of the public, Passengers or Driver in a manner contrary to the Safety Management System;

B. adversely affects Operations such that the System does not meet the Operational Requirements and Specifications.

(b) Passenger Information Systems Standard

(i) A component of the Passenger information system (at a station or on a Vehicle) will fail to meet the Standard in the event any of the following failures occur:

A. If visual system information does not display on display unit;

B. If the display unit is not readable (poor picture quality or fuzzy) from 3m away;

C. If the audio system is not audible and intelligible, in whole or in part; or

D. If the system is not performing according to requirements (missing or wrong information).

4.0 Quality Monitoring and Reporting

(a) Periodically, the City will audit Project Co's Systems Maintenance documentation and reporting. Failures to maintain documentation and report on Systems Maintenance activities will result in penalties being assessed as described in the Performance Criteria.

(b) Maintenance Plans

(i) Project Co shall at all times maintain complete and updated versions of the Custodial Maintenance Plan, the Corrective Maintenance Plan, and the Preventive Maintenance Plan.

(ii) Project Co shall follow the requirements set out in Article 1.4 of Appendix A with regard to the drafting, approval, and revisions process for these Maintenance Plans.

(c) Maintenance Reporting

(i) Project Co shall report on the status and completion of various Systems Maintenance activities.

(ii) Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to reporting procedures and the Daily, Monthly, and Annual submittals that are required.

5.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime	N/A = Not Applicable Immediate ("Immed.") = refer to Appendix A Article 7.0 "Project Co Response"	N/A = Not Applicable	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
Systems Elements (Train Control, Traction Power, Communications)							
KPM A(3)2.0(b)(vi)	Project Co shall have available as part of its Maintenance tools and equipment the following: grounding rods, switchgear test and calibration equipment, contact wire repair and replacement trailer and insulation test equipment.	QF	Major	NA	NA	R	Project Co to be permitted reasonable Remedial Period, based on nature of non-compliance.
KPM A(3)2.0(c)(i)(E)	Project Co shall have backup copies of the original operating system and application software immediately available for use.	QF	Major	NA	1 week	R	
KPM A(3)2.0(c)(ii)(A)	Project Co shall test and troubleshoot all transit monitoring, operation and control equipment, supplied for the TOCC by Project Co	QF	Major	NA	1 week	R	
KPM A(3)2.0(c)(ii)(B)	Project Co shall ensure that the BCC is operational at all times.	QF	Major	NA	1 hour	PE	

KPM A(3)2.0(c)(ii)(C)	Project Co shall ensure the hardware and software for the System is kept up to date.	QF	Major	NA	NA	R	Project Co to be permitted reasonable Remedial Period, based on nature of non-compliance.
KPM A(3)2.0(c)(ii)(E)	In the event of a failure of any element of the TOCC which causes the System to fail to meet the Fixed Component Availability Standard, Project Co shall immediately respond and Repair the Deficiency.	SF	Major	30 minutes	2 hours	PE	
KPM A(3)2.0(c)(ii)(F)	In the event of a failure which does not violate the Fixed Component Availability Standard, Project Co shall respond within two (2) hours of notification, to perform Corrective Maintenance on the failure.	SF	Major	2 hours	8 hours	PE	
KPM A(3)2.0(d)(ii)(A)	Project Co shall maintain all Safety and Security systems elements in a state of good repair and working order in accordance with the approved Corrective and Preventive Maintenance Plans.	QF	Major	NA	NA	R	Project Co to be permitted reasonable Remedial Period, based on nature of non-compliance.
KPM A(3)2.0(d)(ii)(C)	Project Co shall immediately respond to and repair any failure of any element of the Safety and Security systems whether or not the Fixed Component Availability Standard is violated.	SF	Major	Immed.	4 hours	PE	
KPM A(3)2.0(d)(ii)(E)	Project Co shall have backup copies of the original operating system and application software immediately available for use.	QF	Major	NA	1 week	R	
KPM A(3)2.0(d)(iii)(A)	Failure of Passenger Information Systems to meet Passenger Information Systems Standard due to items (A), (B), or (D) of the Standard. (Display or information-related defects)	SF	Medium	2 hours	24 hours	PE	SF assessed per PIS monitor, up to a maximum exposure of 10 PIS monitors malfunctioning at any one time.
KPM A(3)2.0(d)(iii)(A)	Failure of Passenger Information Systems to meet Passenger Information Systems Standard due to item (C) of the Standard. (Audio-related defects)	SF	Medium	2 hours	24 hours	PE	SF assessed per PIS speaker, up to a maximum exposure of 10 PIS speakers malfunctioning at any one time.

APPENDIX A – ATTACHMENT 4

TRACK MAINTENANCE SERVICES

1.0 Scope of Services

(a) Project Co shall be responsible for the Custodial, Preventive, and Corrective Maintenance activities of all Track infrastructure on the System including but not limited to:

(i) All mainline, yard lead, and storage yard Track;

(ii) All switches and crossovers; and

(iii) Railbed and other supporting portions of the Track infrastructure.

2.0 Service Requirements

(a) Project Co shall maintain all Track components (including track, switching gear, and rail related components) in a state of good repair and working order in accordance with the approved Maintenance and Rehabilitation Plan.

(b) Project Co shall conduct maintenance activities to ensure that all Track meets the Fixed Component Availability Standard.

(c) Project Co shall provide vegetation control on the Alignment and Custodial Maintenance for the Tracks in accordance with the Standards described in Attachment 10 – Alignment Maintenance Services.

(d) In case of breakdowns and failures, Project Co shall have procedures in place to dispatch forthwith the appropriate resources necessary to Repair the problems.

(e) Project Co shall provide and use manually operated and propelled Track quality measurement equipment.

(f) Project Co shall have available the necessary tools, materials and equipment required to perform the Track Maintenance Services.

(g) Project Co shall ensure compliance with Schedule 17- Environmental Obligations.

(h) Project Co's performance with respect to vandalism and graffiti shall be in accordance with:

(i) Appendix A, Attachment 10 – Alignment Maintenance Services, Article 2.0(f) "Vandalism and Graffiti Repair", Article 3.0(e) "Vandalism and Graffiti Standard", and Article 5.0 "Performance Criteria", and for further certainty, Project Co's rectification and / or response times and the assessment of Service Failure Points; and

(ii) Appendix A, Attachment 16 – Vandalism and Graffiti.

3.0 Service Standards

(a) Track Maintenance Standard

(i) All track components shall be in a state of good repair and functioning in accordance with the Design and Construction Requirements and the approved Maintenance and Rehabilitation Plan.

(b) Fixed Component Availability Standard

(i) Any Fixed Component in the System (including track and related track components) is considered to not meet the Standard if any Defect or Deficiency is identified in that Fixed Component that:

A. affects the Safety of the public, Passengers or Driver in a manner contrary to the Safety Management System; or

B. adversely affects Operations such that the System does not meet the Operation Requirements and Specifications.

(c) Quality Monitoring and Reporting

(i) Periodically, the City will audit Project Co's Track Maintenance documentation and reporting. Failures to maintain documentation and report on Track Maintenance activities will result in penalties being assessed as described in the Performance Criteria.

(d) Maintenance Plans

(i) Project Co shall at all times maintain complete and updated versions of the Custodial Maintenance Plan, the Corrective Maintenance Plan, and the Preventive Maintenance Plan.

(ii) Project Co shall follow the requirements set out in Article 1.4 of Appendix A with regard to the drafting, approval, and revisions process for these Maintenance Plans.

(e) Maintenance Reporting

(i) Project Co shall report on the status and completion of various Track Maintenance activities.

(ii) Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to reporting procedures and the Daily, Monthly, and Annual submittals that are required.

4.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime	N/A = Not Applicable **Immediate (“Immed.”)**= refer to Appendix A Article 7.0 “Project Co Response”	N/A = Not Applicable	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
Track Maintenance Services							
KPM A(4)2.0(e)	Project Co shall provide and use manually operated and propelled Track quality measurement equipment.	QF	Major	NA	NA	PE	Maximum exposure of one QF per event of non-compliance.

APPENDIX A – ATTACHMENT 5

VEHICLE MAINTENANCE SERVICES

1.0 Scope of Services

(a) Project Co shall be responsible for the Custodial, Preventive, and Corrective Maintenance activities for the following Vehicle Maintenance Services activities including but not limited to:

(i) Vehicle Cleaning;

A. Daily Vehicle Inspection and Cleaning; and

B. Regular Heavy Vehicle Cleaning;

(ii) Vehicle Maintenance;

(iii) Provision of Vehicles to the City for Revenue Service in accordance with the Cleaning and Maintenance requirements.

2.0 Service Requirements

(a) Vehicle Cleaning

(i) Project Co shall maintain the Vehicles in a condition which is physically clean and suitable to be placed into Revenue Service.

(ii) Project Co shall inspect the Vehicles with sufficient regularity to maintain the foregoing standard, provided that the frequency of inspection of Vehicles shall never be less than daily. Such inspections may where feasible be conducted in the course of performing the Maintenance required to maintain the foregoing standard, subject to the requirement that Project Co undertake the required frequency of inspection.

(iii) Project Co shall develop vehicle cleaning procedures and plans that will be incorporated into the Custodial Maintenance Plan.

(iv) On a daily basis, Project Co shall ensure that the Vehicle and its components are clean and in a good state of operation and repair in accordance with the Vehicle Cleaning Standards.

(v) Within a 21 service day cycle or more often if required, Project Co shall undertake a deep cleaning and repair of Vehicle components in accordance with the Vehicle Cleaning Standards.

(vi) Twice a year, at the end of the winter and summer seasons, Project Co shall take the Vehicle off-line for a thorough breakdown and cleaning. Project Co shall undertake major repairs at this time and the Vehicle shall be pressure washed and sanitized.

(b) Vehicle Maintenance

(i) General

A. Project Co shall perform Preventive and Corrective Maintenance in accordance with the maintenance plan requirements and the requirements of Schedule 15-3.

B. Project Co shall ensure that all Vehicle Components affecting passenger safety and/or the safe operation of the vehicle are in accordance with the Safety Management System.

C. Project Co shall ensure that all Vehicle Components that do not affect passenger safety and/or the safe operation of the vehicle are fully functional, materially undamaged, and in good condition, subject to normal wear and tear.

D. Project Co shall develop a Corrective Maintenance Plan, based on industry best practices and manufacturer's recommendations for the selected Vehicle type, to ensure that damage to or failures of all Vehicles and Vehicle components are addressed and corrected in accordance with the requirements of this Article.

E. Project Co shall develop a Preventive Maintenance Plan, based on industry best practices and manufacturer's recommendations for the selected Vehicle type, to ensure that the fleet is maintained in a state of good repair.

(ii) Daily Activities – Inspection and Corrective Maintenance

A. Project Co shall ensure that all Vehicles comprising a Train consist are inspected prior to entering Revenue Service and meet the Vehicle Maintenance Standard. The inspection shall include all matters on an inspection checklist which has been approved by the City. Following the inspection, Project Co shall provide a copy of the checklist to the Driver, who shall verify, prior to accepting the Vehicle, that the checklist has been completed and signed by a responsible and qualified Project Co Employee.

B. Any structural or paint / wrap damage to a Vehicle must be reported in the Daily Report. A thorough inspection shall be conducted of the drive train and safety components when structural damage is evident or suspected. Project Co shall undertake Corrective Maintenance of the damaged components, including paint/wrap finishing.

(iii) Regular Preventive Maintenance Activities

A. Project Co shall conduct regular preventive maintenance activities on Vehicles in accordance with best practices and manufacturer's recommendations as laid out in the Preventive Maintenance Plan as described in **Appendix A Articles 1.3 and 1.4**.

B. Project Co shall conduct additional rehabilitation activities on the Vehicle Fleet as necessary in accordance with the asset preservation requirements, as described in Appendix B.

(c) Vehicle Availability

(i) Vehicles Entering Revenue Service

A. Project Co shall ensure that, at the start of Revenue Service of each Peak Period and each Off-Peak Period, the number of Trains which are required for Revenue Service Vehicle Kilometres in that Peak Period or Off-Peak Period, as applicable, in compliance with the Operations Service Plan and the Train consist assignments as established by the City, are available at each MSF to be entered into Revenue Service in accordance with the Vehicle Availability Standards.

B. This number of Vehicles shall constitute the minimum required Vehicle fleet for the duration of that Peak Period or Off-Peak Period (the "**Scheduled Revenue Service Vehicles"**).

C. In the event that any Train scheduled to be entered into Revenue Service is prohibited from being placed into Revenue Service pursuant to Article 3.0(c), Project Co shall immediately either:

i Perform Cleaning or Corrective Maintenance on the Deficient Vehicle(s); or

ii Replace the Deficient Vehicle(s) in the Train consist with another available Vehicle.

D. If a Vehicle or Train identified to enter Revenue Service cannot be replaced with a Vehicle or Train that meets the Vehicle Availability Standard, Project Co shall perform Cleaning or Corrective Maintenance or provide a replacement Vehicle or Train as soon as possible.

(ii) Vehicles In Revenue Service

A. Project Co shall ensure that at all times during Service Hours the number of Trains which are required for Revenue Service Vehicle Kilometres in that Peak Period or Off-Peak Period, as applicable, in compliance with the Operations Service Plan and the Train consist assignments as established by the City , meet the Vehicle Availability Standards.

B. In the event that any Vehicle that is part of a Train in Revenue Service is found not to meet either the Vehicle Cleaning or the Vehicle Maintenance Standard and Public Safety or comfort is compromised, Project Co shall, as necessary, either:

i Promptly perform Cleaning or Corrective Maintenance on the Deficient Vehicle(s) without removing it from Revenue Service, subject to Article 1.5 of Appendix A or;

ii Promptly remove the Train from Revenue Service and replace the Deficient Vehicle(s) in the Train consist with another available Vehicle(s).

C. Project Co shall, where reasonably possible, perform Cleaning or Corrective Maintenance to correct the Defect or Deficiency on the Vehicle(s) without removing the Train from Revenue Service. For further certainty, the removal of a Train from Revenue Service pursuant to the above statements does not derogate from Project Co's obligations under these Vehicle Maintenance Services Requirements, including the provision of the Scheduled Revenue Service Vehicles.

D. If a Vehicle or Train in Revenue Service cannot be replaced with a Vehicle or Train that meets the Vehicle Availability Standard, Project Co shall perform Cleaning or Corrective Maintenance or provide a replacement Vehicle or Train as soon as possible.

(d) Project Co shall ensure compliance with Schedule 17 – Environmental Obligations.

(e) Project Co's performance with respect to vandalism and graffiti shall be in accordance with:

(i) Appendix A, Attachment 10 – Alignment Maintenance Services, Article 2.0(f) "Vandalism and Graffiti Repair", Article 3.0(e) "Vandalism and Graffiti Standard", and Article 5.0 "Performance Criteria", and for further certainty, Project Co's rectification and / or response times and the assessment of Service Failure Points; and

(ii) Appendix A, Attachment 16 – Vandalism and Graffiti.

3.0 Service Standards

(a) Vehicle Cleaning Standards

(i) Daily Inspection and Cleaning Standard

A. Vehicles shall meet the following standard daily before entering Revenue Service:

i Clean Driver's cab including floor, seat, dashboard and windshield;

ii Clean interior windows;

iii Vehicle clean of all litter, spills, bodily fluids, personal accidents, unsanitary conditions and garbage;

iv Vehicle clean after Vehicle maintenance operations;

v Clean seats;

vi Seat covers are not damaged or torn;

vii Gum has been removed from seat covers, handrails and seat backs;

viii Graffiti marks have been removed;

ix Any loose floor mats/fittings have been repaired;

x Floor has been cleaned if soiled including vacuum and mopping;

xi Working CCTV;

xii Working Passenger information systems;

xiii Lights are not burnt out or flickering;

xiv Vehicle lights, lenses, windshield, windows, mirrors and wipers are clean and functional; and

xv Vehicle exterior is clean and has been washed at least once in the last three (3) days.

(ii) Heavy Cleaning Standard

A. Vehicles shall meet the Heavy Cleaning Standard if Project Co completes the following cleaning activities and repairs within 21 service days or more often as required:

i Deep cleaning of the vehicle including vacuuming, mopping and washing;

ii Scuff and burn marks have been removed;

iii Gum has been removed from floors;

iv Graffiti damage has been repaired;

v Loose/rattling panels, fixtures and screws have been repaired;

vi Loose/rattling doors have been repaired;

vii Damaged seats, handrails and fixtures have been replaced;

viii Paint/wrap surface damage has been repaired;

ix Ceiling damage has been repaired; and

x Exterior surface elements, including glass, panels, trim, paint/wrap and finishing details have been inspected and repaired as required.

(b) Vehicle Maintenance Standards

(i) Train Scheduled for Revenue Service

A. A Train scheduled for Revenue Service shall not meet the Vehicle Maintenance Standard if any Vehicle in the Train consist meets any of the following:

i Any condition that affects Passenger or Driver Safety in a manner contrary to the Safety Management System;

ii Malfunction of Driver control elements or Driver seat;

iii The failure of brakes to meet the Design and Construction Performance Requirements;

iv Any Deficiency in Vehicle operation such that the Vehicle cannot maintain the Headway required by the Operations Service Plan;

v Broken or damaged Vehicle furniture;

vi Broken windshield, glass elements, mirrors, wipers, closed circuit television, etc.;

vii Malfunctioning or broken regulatory Vehicle elements, including brake lights, turn signals and headlights;

viii Malfunctioning doors;

ix Malfunction of Vehicle Passenger information systems;

x Malfunctioning communication equipment;

xi Malfunctioning interior illumination;

xii Malfunctioning heating, ventilating and air conditioning systems; A malfunctioning heating system shall be defined as a system that is not capable of maintaining an interior temperature of at least +15ºC with the door(s) closed when the outside air temperature is colder than minus -18ºC. A malfunctioning air conditioning system shall be defined as a system not capable of maintaining an interior temperature of less than +27ºC with the door(s) closed when the outside air temperature is in excess of +27ºC, but not greater than +35ºC;

xiii Any failure of any Vehicle Component to perform its intended purpose; and

xiv Damage to Vehicle or Vehicle components as a result of vandalism or graffiti.

(ii) Vehicles In Revenue Service

A. A Train in Revenue Service shall not meet the Vehicle Maintenance Standard if any Vehicle in the Train consist meets any of the following:

i Any unsafe condition that may affect Passenger or Driver Safety, or safe Vehicle operation (including suspension failure and on board CCTV failure) in a manner contrary to the Safety Management System;

ii Any Deficiency in Vehicle operation such that the Train cannot maintain the scheduled Headway, including the loss of traction drive on one bogie;

iii Malfunction of Driver control elements and Driver seat;

iv Brake failure on any single axle or dragging brake and/or inconsistent and deteriorated brake operation;

v Broken windshield, glass elements, mirrors or wipers that pose an immediate Safety hazard in a manner contrary to the Safety Management System;

vi Regulatory Vehicle elements, such as brake lights and headlights, that pose an immediate Safety hazard in a manner contrary to the Safety Management System;

vii Malfunctioning doors (such that more than one door is locked off);

viii Malfunctioning heating system when outside temperature is below 0ºC;

ix Malfunctioning air conditioning and ventilation system when outside temperature is above 25ºC;

x Malfunctioning radio communication equipment;

xi Malfunctioning illumination where Safety is compromised (in a manner contrary to the Safety Management System);

xii Broken/damaged Vehicle furniture elements where Safety is compromised (in a manner contrary to the Safety Management System);

xiii Train interior fouled by bodily fluids, spills or unsanitary conditions (The conditions in Article 3(b)(ii)(A)(xiii) shall not result in Failure Points, however Project Co shall promptly remedy the condition as soon as possible);

xiv If there is graffiti on Vehicles or Vehicle components , and results in non-compliance to the vandalism and graffiti standard as described in Attachment 10; and

xv Vandalism on Vehicles or Vehicle components, and results in a non-compliance to the Safe operation of the Train and / or Schedule 17 – Environmental Obligations.

(c) Vehicle Availability Standards

(i) Vehicles Entering Revenue Service

A. A Train shall not be considered available and shall not be permitted to be entered into Revenue Service if any of the Vehicles in the Train consist fails to meet:

i The Vehicle Cleaning Standard set out in Article 3.0 (a), or

ii The Vehicle Maintenance Standard for Vehicles entering Revenue Service set out in Article 3.0 (b).

B. The City, in its Discretion, may permit a Vehicle which fails to meet

i the Vehicle Cleaning Standard described in Article 3.0 (a) to be entered into Revenue Service as part of a Train consist, or

ii the Vehicle Maintenance Standard Article 3.0(b)(i)A(xiv) to the extent that temporary repairs and remedial action required for compliance with the Vandalism and Graffiti Standard included in Attachment 10 Article 3(e) and Attachment 16 are performed.

C. Notwithstanding the foregoing, in no event shall the City permit a Vehicle to enter Revenue Service as part of a Train consist if an identified Deficiency in the Vehicle results in the Vehicle's failure to meet the requirements of the Safety Management System, affects Passenger Safety or comfort, or otherwise prevents the safe operation of the Train.

D. In no event shall the fact that the City permits or has permitted a Vehicle which does not comply with the Vehicle Cleaning Standard to enter in Revenue Service as part of a Train consist relieve Project Co of its obligation to comply with the Vehicle Cleaning Standard or alter such obligation, including with respect to such Vehicle.

(ii) Vehicles In Revenue Service

A. A Train already in Revenue Service shall no longer be considered available if any of the Vehicles in the Train consist fails to meet:

i the Design and Construction Performance Requirements;

ii the Vehicle Cleaning Standard set out in Article 3.0(a); or

iii the Vehicle Maintenance Standard for Vehicles in Revenue Service set out in Article 3.0(b).

B. The City in its Discretion may permit a Train which is engaged in Revenue Service, and which does not meet either the Vehicle Cleaning or the Vehicle Maintenance Standard, to remain in Revenue Service.

C. In the event that the City permits any such Train to remain in Revenue Service, following the removal of the Train from Revenue Service, Project Co shall perform Cleaning or Corrective Maintenance, upon the train's return to either MSF. For further certainty, Cleaning or Corrective Maintenance shall be performed on the train prior to releasing the train for revenue service.

D. Notwithstanding the foregoing, in no event shall the City permit a Train to remain in Revenue Service if an identified Defect or Deficiency in any Vehicle(s) in the Train consist results in the Train's failure to comply with the Safety Management System or otherwise prevents the safe operation of the Train.

E. In no event shall the fact that the City permits or has permitted a Train which does not meet either the Vehicle Cleaning or the Vehicle Maintenance Standard to remain in Revenue Service relieve Project Co of its obligation to meet the Vehicle Cleaning and the Vehicle Maintenance Standard, but in the event that the City permits or has permitted a Train which does not meet either the Vehicle Cleaning or the Vehicle Maintenance Standard to remain in Revenue Service, in accordance with the provisions of this Schedule 15-3 (including Appendix A) a Non Performance Adjustment Charge is applicable only to the extent that there is a Service Availability Loss, if any, in respect of such Vehicle.

4.0 Quality Monitoring and Reporting

(a) Periodically, the City shall audit the Project Co's Vehicle Cleaning and Maintenance documentation and reporting. Failures to maintain documentation and report on Vehicle Cleaning and Maintenance activities will result in penalties being assessed as described in the Performance Criteria section.

(b) Maintenance Plans

(i) Project Co shall at all times maintain complete and updated versions of the Custodial Maintenance Plan, the Corrective Maintenance Plan, and the Preventive Maintenance Plan.

(ii) Project Co shall follow the requirements set out in Article 1.4 of Appendix A with regard to the drafting, approval, and revisions process for these Maintenance Plans.

(c) Maintenance Reporting

(i) Project Co shall report on the status and completion of various Vehicle Cleaning and Maintenance activities, including Daily Inspection and Cleaning, Weekly and Heavy Cleaning, Corrective Maintenance, and Preventive Maintenance.

(ii) Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to reporting procedures and the Daily, Monthly, and Annual submittals that are required.

5.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime	N/A = Not Applicable **Immediate ("Immed.") =** = refer to Appendix A Article 7.0 "Project Co Response"	N/A = Not Applicable ND = Correct by start of service the following day	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
Vehicle Maintenance Services							
KPM A(5)2.0(a)(v)	On a 21 service day cycle or more often if required, Project Co shall undertake a deep cleaning and repair of Vehicle components in accordance with the Vehicle Cleaning Standards.	QF	Medium	NA	ND	PE	Maximum exposure of one QF per vehicle per 21 service day cycle.
KPM A(5)2.0(a)(vi)	Twice a year, at the end of the winter and summer seasons, Project Co shall take the Vehicle off line for a thorough breakdown and cleaning.	QF	Major	NA	I month	B	Maximum exposure of one QF per vehicle per calendar month.

APPENDIX A – ATTACHMENT 6

FACILITIES MAINTENANCE SERVICES

1.0 Scope of Services

(a) Project Co shall be responsible for the Custodial, Preventive, and Corrective Maintenance activities in the major buildings and facilities of the System, including but not limited to:

(i) Belfast and Moodie Maintenance and Storage Facilities

A. Maintenance Buildings;

B. Storage Yards; and

C. Operations Crew Facilities.

(ii) TOCC.

2.0 Service Requirements

(a) Custodial Maintenance Requirements

(i) Project Co shall conduct all physical removal of dirt, soot, stains, marks, liquids and materials that come in contact with floors, walls, doors, windows, furniture and other building components.

(ii) Project Co shall repair any broken or malfunctioning floors, walls, doors, windows, furniture and other building components.

(iii) Project Co shall be responsible for identifying the defect and performing remedial actions in accordance with the Custodial Maintenance Standard and the timeframes established in the Performance Criteria. Notwithstanding the defect, timelines and remedial actions identified, prevailing legislation and city by-laws shall take precedence if they are more restrictive.

(iv) Project Co shall place particular attention on the Cleaning and Maintenance of washroom facilities, locker rooms, cafeteria, offices and general areas frequented by people.

(v) Project Co shall immediately clean or repair any defect that affects the Safety of the public or the Employees of Project Co and the City in accordance with the Custodial Maintenance Standard.

(vi) Project Co shall conduct daily debris removal and general cleaning of frequented areas in accordance with the Daily Custodial Maintenance Standard.

(vii) Project Co shall conduct weekly heavy cleaning of interior and frequented areas in accordance with the Weekly Custodial Maintenance Standard.

(viii) Project Co shall conduct seasonal cleaning and maintenance of exterior surfaces and surface treatments in accordance with the Seasonal Custodial Maintenance Standard.

(ix) Project Co shall conduct bi-annual heavy cleaning of floor surfaces in accordance with the Bi-Annual Custodial Maintenance Standard.

(b) Corrective and Preventive Maintenance Requirements

(i) Maintenance Buildings

A. Project Co shall maintain the Maintenance Buildings.

B. Project Co shall provide all necessary trade fixtures, shop tools, heavy lifts, washers, equipment, vehicles and furniture as may be necessary in the Maintenance Buildings to undertake the Maintenance activities.

C. Project Co shall provide all security for the Maintenance Buildings. Project Co shall ensure the security of the Maintenance Building perimeter is maintained and immediately repaired if it is breached.

D. Project Co shall maintain the Maintenance Buildings and associated Vehicle Maintenance equipment in a state of good repair and working order in accordance with the approved Maintenance and Rehabilitation Plan.

E. Project Co shall provide Corrective Maintenance for:

i all interior Maintenance Building services (including but not limited to cleaning, heating, ventilation, air conditioning, sewage, potable water, painting, lighting and electrical services); and

ii the exterior of the Maintenance Buildings including lighting.

F. Project Co shall Repair damage and vandalism as may be required.

(ii) Storage Yards

A. Project Co shall maintain the Storage Yards.

B. Project Co shall be responsible and will have the authority for operations, Security and Safety within the Storage Yards.

C. Project Co shall, in cooperation with the City, implement a Maintenance operations procedure to ensure the efficient transfer of Vehicles at the beginning and the end of each shift.

D. Project Co shall maintain the Storage Yards in a state of good repair and working order in accordance with the approved Maintenance and Rehabilitation Plan.

E. Project Co shall provide Preventive Maintenance, Corrective Maintenance and Custodial Maintenance for the Storage Yard in accordance with the Standards established for the following other Maintenance types:

i Alignment Maintenance Services; and

ii Track Maintenance Services.

(iii) Operations Crew Facility

A. Project Co shall provide all Security for the Operations Crew Facilities.

B. Project Co shall ensure the Security of the Operations Crew perimeter is maintained and immediately repaired if it is breached.

C. Project Co shall maintain the Operations Crew Facilities along with the BCC, in a state of good repair and working order in accordance with the approved Maintenance and Rehabilitation Plan.

D. Project Co shall provide Corrective Maintenance for:

i all interior Operations Crew Facilities services (including but not limited to cleaning, heating, ventilation, air conditioning, sewage, potable water, painting, lighting and electrical services); and

ii the exterior of the Operations Crew Facilities including lighting.

E. Project Co shall provide Custodial Maintenance for the Operations Crew Facilities along with the BCC, in accordance with the Custodial Maintenance Standard.

(c) Place de Ville Entrance Connection Maintenance Responsibilities

(i) The structural maintenance of the new vehicular and pedestrian link shall be the responsibility of Project Co

(ii) The custodial and day to day maintenance of the new vehicular and pedestrian link shall be as follows:

A. The developer shall be responsible for the custodial and day to day maintenance of the pedestrian link and vehicular link.

B. The specific custodial and day to day maintenance of the vehicular and pedestrian link shall be the responsibility of the developer and Project Co as follows:

i The developer shall clean/maintain the glass panels on the north face of the pedestrian link.

ii Project Co shall be responsible for the cleaning/maintenance of the glass panels on the south face of the pedestrian link and the remainder of the station concourse/platform.

(iii) Project Co shall be responsible for the maintenance of the entrance connection to grade up to and including the inside faces of the wall of the entrance connection.

(iv) The developer shall be responsible for the maintenance of the exterior walls of the entrance connection within the development.

(d) Baseline Station Entrance Connection Maintenance Responsibilities

[NTD: Contemplated Algonquin College connection, details to be reconciled as part of Schedule 46]]

(e) Bayshore Station Entrance Connection Maintenance Responsibilities

[NTD: future connection is protected for in the PSOS, but no connection anticipated upon revenue service]

(f) [NTD: Bayview demarcation between Confederation and Trillium Lines, details to be reconciled as part of Schedule 46]

(g) Place d'Orleans Station Entrance Connection Maintenance Responsibilities

[NTD: Contemplated Place d'Orleans connection, details to be reconciled as part of Schedule 46]

(h) Project Co shall ensure compliance with Schedule 17 – Environmental Obligations.

(i) Project Co's performance with respect to vandalism and graffiti shall be in accordance with:

(i) Appendix A, Attachment 10 – Alignment Maintenance Services, Article 2.0(f) "Vandalism and Graffiti Repair", Article 3.0(e) "Vandalism and Graffiti Standard", and Article 5.0 "Performance Criteria", and for further certainty, Project Co's rectification and / or response times and the assessment of Service Failure Points; and

(ii) Appendix A, Attachment 16 – Vandalism and Graffiti.

3.0 Service Standards

(a) Custodial Maintenance Standard

(i) The buildings and facilities within the Scope of Facilities Maintenance Services shall fail to meet the Custodial Maintenance Standard if:

A. Any condition exists that impacts Public Safety or the Safety of the Employees of Project Co and the City or fails to comply with the Safety Management System, including:

i any accidental spills or bodily fluids;

ii floor treatments that represent a tripping hazard;

iii any unsafe accumulation of ice and snow, and for clarity accumulation of ice and snow shall be deemed to be "unsafe" if not in compliance with the Snow and Ice Clearing Standard including safe access to all areas of the buildings and facilities; and

iv illumination and / or lighting levels are not in compliance with the Expanded Design and Construction Specifications or benchmarking levels as otherwise determined prior to the Revenue Service Availability Date for the Stage 1 System, prior to the Stage 2 East Revenue Service Availaiblity Date for the Stage 2 East System and prior to the Stage 2 West Revenue Service Availability Date for the Stage 2 West System.

B. Any damage as a result of vandalism and/or graffiti has not been repaired as required and specified elsewhere.

C. Any of the subsequent time-dependent standards are violated:

(ii) Daily Custodial Maintenance Standard

A. Buildings and facilities under Project Co's responsibility shall meet the Daily Custodial Maintenance Standard if the following conditions exist after daily cleaning activities:

i All debris has been removed and disposed of; and

ii General cleaning of frequented areas (including offices, washrooms, locker rooms, and cafeteria) has occurred. These general cleaning activities include washing floors, cleaning toilets, cleaning urinals, restocking supplies, and cleaning counters, basins, cooking surfaces, and mirrors.

(iii) Weekly Custodial Maintenance Standard

A. Buildings and facilities under Project Co's responsibility shall meet the Weekly Custodial Maintenance Standard if the following conditions exist after heavy cleaning activities have occurred weekly (or more frequently as required):

i hard floors are washed;

ii carpets are vacuumed;

iii surfaces dusted;

iv gum, scuff marks and other similar semi-permanent markings have been removed by use of scrapping, abrasives and/or chemical removal;

v inside windows are clean; and

vi non-slip carpets used during inclement weather are clean.

(iv) Seasonal Custodial Maintenance Standard

A. Buildings and facilities under Project Co's responsibility shall meet the Seasonal Custodial Maintenance Standard if the following conditions exist after seasonal cleaning activities have occurred:

i Windows and exterior surfaces are thoroughly cleaned; and

ii Damaged surface treatments have been painted, repaired, or replaced as needed.

(v) Bi-Annual Custodial Maintenance Standard

A. Buildings and facilities under Project Co's responsibility shall meet the Bi-Annual Custodial Maintenance Standard if the following conditions exist after bi-annual cleaning activities have occurred:

i Carpets are steam cleaned; and

ii All linoleum floors are burnished.

4.0 Quality Monitoring and Reporting

(a) Periodically, the City will audit the Project Co's Facilities Maintenance documentation and reporting. Failures to maintain documentation and report on Facilities Maintenance activities will result in penalties being assessed as described in the Performance Criteria section.

(b) Maintenance Plans

(i) Project Co shall at all times maintain complete and updated versions of the Custodial Maintenance Plan, the Corrective Maintenance Plan, and the Preventive Maintenance Plan.

(ii) Project Co shall follow the requirements set out in Article 1.4 of Appendix A with regard to the drafting, approval, and revisions process for these Maintenance Plans.

(c) Maintenance Reporting

(i) Project Co shall report on the status and completion of various Facilities Maintenance activities.

(ii) Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to reporting procedures and the Daily, Monthly, and Annual submittals that are required.

5.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime	N/A = Not Applicable **Immediate (“Immed.”) =** refer to Appendix A Article 7.0 “Project Co Response”	N/A = Not Applicable ND = Correct by start of service the following day	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
Facilities Maintenance Services							
KPM A(6)2.0(a)(v)	Project Co shall immediately clean or repair any defect that affects the Safety of the public or the Employees of Project Co and the City in accordance with the Custodial Maintenance Standard.	SF	Major	30 minutes	1 hour	PE	SF assessed per defect.
KPM A(6)2.0(a)(vi)	Project Co shall conduct daily debris removal and general cleaning of frequented areas in accordance with the Daily Custodial Maintenance Standard.	QF	Minor	NA	ND	D	Maximum exposure of one QF per day per facility.
KPM A(6)2.0(a)(vii)	Project Co shall conduct weekly heavy cleaning of interior and frequented areas in accordance with the Weekly Custodial Maintenance Standard.	SF	Minor	NA	24 hours	W	
KPM A(6)2.0(a)(viii)	Project Co shall conduct seasonal cleaning and maintenance of exterior surfaces and surface treatments in accordance with the Seasonal Custodial Maintenance Standard.	SF	Minor	NA	7 days	Q	
KPM A(6)2.0(a)(ix)	Project Co shall conduct bi-annual heavy cleaning of floor surfaces in accordance with the Bi-Annual Custodial Maintenance Standard.	QF	Minor	NA	1 week	B	Maximum exposure of one QF per week per facility.

APPENDIX A – ATTACHMENT 7

PASSENGER STATION MAINTENANCE SERVICES

1.0 Scope of Services

(a) Project Co shall be responsible for the Custodial, Preventive, and Corrective Maintenance activities on all Passenger Stations including but not limited to:

(i) Electrical, mechanical, HVAC, and other infrastructure;

(ii) Elevator and escalators;

(iii) Green roofs;

(iv) Building structural elements; and

(v) Integrated architectural elements, including Artwork.

2.0 Service Requirements

(a) Custodial Maintenance Requirements

(i) Project Co shall conduct all physical removal of dirt, soot, stains, marks, liquids and materials that come in contact with floors, walls, doors, windows, furniture and other Passenger Station components.

(ii) Project Co shall repair any broken or malfunctioning floors, walls, doors, windows, furniture and other Passenger Station components.

(iii) Project Co shall be responsible for identifying the defect and performing remedial actions in accordance with the Custodial Maintenance Standard and the timeframes established in the Performance Indicators. Notwithstanding, the defect, timelines and remedial actions identified, prevailing legislation and City by-laws shall take precedence if they are more restrictive.

(iv) Project Co shall immediately clean or repair any Passenger Station defect that affects the Safety of the public or the Employees of Project Co and the City in accordance with the Custodial Maintenance Standard.

(v) Project Co shall conduct daily trash removal and general cleaning of frequented areas in accordance with the Daily Custodial Maintenance Standard.

(vi) Project Co shall conduct weekly heavy cleaning of interior and frequented areas in accordance with the Custodial Maintenance Standard.

(vii) Project Co shall conduct bi-annual heavy cleaning in accordance with the Bi-Annual Custodial Maintenance Standard.

(b) Maintenance Requirements

(i) Project Co shall maintain all Passenger Stations in the System and all Passenger Station components in a good state of repair and working order in accordance with the approved Corrective and Preventive Maintenance Plans.

(ii) Project Co shall maintain all Passenger Stations in the System and all Passenger Station components in accordance with the Passenger Station Access Standard.

(c) Escalator and Elevator Maintenance Requirements

(i) Project Co shall regularly inspect and maintain all escalators and elevators in accordance with manufacturer and governmental regulatory requirements to maintain the Station Access Standard.

(ii) Project Co shall perform preventive and corrective maintenance in accordance with manufacturer recommendations, and the accepted maintenance plan.

(iii) Escalators shall be maintained in service so as to provide at least one form of vertical transportation at all times during Revenue Service Hours, in accordance with the following conditions:

A. Where a station platform or entrance is serviced by more than one escalator, routine maintenance or escalator failure shall not be allowed to take out of service more than one escalator servicing such entrance or platform, concurrently during Revenue Service Hours.

B. Where a station platform or entrance is serviced by only one escalator, routine maintenance or escalator failure shall not be allowed to take the escalator out of service concurrently during Revenue Service Hours with any elevator servicing such entrance or platform.

(iv) Elevators shall be maintained to minimize disruption to vertical transportation, particularly for mobility impaired passengers. Routine elevator maintenance or elevator failure shall not be allowed to take out of service more than one elevator serving a Station entrance or platform, concurrently.

(d) Project Co's shall ensure compliance with Schedule 17 – Environmental Obligations.

(e) Project Co's performance with respect to vandalism and graffiti shall be in accordance with:

(i) Appendix A, Attachment 10 – Alignment Maintenance Services, Article 2.0(f) "Vandalism and Graffiti Repair", Article 3.0(e) "Vandalism and Graffiti Standard", and

Article 5.0 "Performance Criteria", and for further certainty, Project Co's rectification and/or response times and the assessment of Service Failure Points; and

(ii) Appendix A, Attachment 16 – Vandalism and Graffiti.

3.0 Service Standards

(a) Custodial Maintenance Standard

(i) Passenger Stations shall fail to meet the Custodial Maintenance Standard if:

A. Any condition exists that impacts Public Safety or the Safety of the Employees of Project Co and the City or fails to comply with the Safety Management System, including:

i any accidental spills or bodily fluids;

ii floor treatments that represent a tripping hazard;

iii free from any unsafe accumulation of ice and snow, and for clarity accumulation of ice and snow shall be deemed to be "unsafe" if not in compliance with the Snow and Ice Clearing Standard pursuant to Attachment 10 of this Schedule, including safe access to all areas of the buildings and facilities;

iv illumination and / or lighting levels are not in compliance the Expanded Design and Construction Specifications; or benchmarking levels as otherwise determined prior to the Revenue Service Availability Date for the Stage 1 System, prior to the Stage 2 East Revenue Service Availaiblity Date for the Stage 2 East System and prior to the Stage 2 West Revenue Service Availability Date for the Stage 2 West System; and

B. Any damage as a result of vandalism and/or graffiti has not been repaired as required and specified elsewhere.

C. Any of the subsequent time-dependent standards are violated.

(ii) Daily Custodial Maintenance Standard

A. Passenger Stations under Project Co's responsibility shall meet the Custodial Maintenance Standard if the following conditions exist after daily cleaning activities:

i All trash and debris has been removed and disposed of; and

ii General cleaning of high passenger frequented areas has occurred. These general cleaning activities include washing floors and cleaning station furniture as needed.

(iii) Weekly Custodial Maintenance Standard

A. Passenger Stations under Project Co's responsibility shall meet the Weekly Custodial Maintenance Standard if the following conditions exist after heavy cleaning activities have occurred weekly (or more frequently as required):

i station floors are washed;

ii all station surfaces are dusted and cleaned; and

iii gum, scuff marks and other similar semi-permanent markings have been removed inside windows are clean.

(iv) Bi-Annual Custodial Maintenance Standard

A. Buildings and facilities under Project Co's responsibility shall meet the Bi-Annual Custodial Maintenance Standard if the following conditions exist after bi-annual cleaning activities have occurred:

i Windows, floors and exterior surfaces are thoroughly cleaned; and

ii Damaged surface treatments have been painted, repaired, or replaced as needed.

(b) Station Access Standard and Hours of Operation

(i) Passenger Stations must be open and in compliance with the Station Access Standard at least 15 minutes before the first scheduled Revenue Service train, and closed within 15 minutes after the last scheduled Revenue Service train ("Scheduled Station Hours") or as otherwise directed from time to time by the City Representative.

(ii) A Station is considered to meet the Station Access Standard if:

A. All entrances to the Station are open and passengers have access to the passenger waiting areas in the Station;

B. Each Station platform is accessible from each station entrance, via: (i) elevator; or (ii) alternate means of vertical transportation within 50m of the station entrance;

C. The Station is free from any unsafe accumulation of ice and snow, and for clarity accumulation of ice and snow shall be deemed to be "unsafe" only if: (1) the Station is not in compliance with the Snow and Ice Clearing Standard pursuant to

Attachment 10 of this Schedule, and (2) safe access to Trains for all passengers, including mobility impaired passengers, is compromised;

D. The Station is free from any other hazard or event that results in passengers, including mobility impaired passengers, being unable to safely enter and leave the Station for purposes of accessing Trains, for example, failures with fire life safety systems; and

E. During any period of time when a Station does not meet the Station Access Standard due to non-compliance with one or more of the standards listed above in subsections (ii)(A) to (ii)(D), Project Co shall make best efforts to mitigate the effects of such non-compliance and to provide, where possible, safe access to Trains for as many passengers as possible.

4.0 Quality Monitoring and Reporting

(a) Periodically, the City will audit the Project Co's Passenger Station Maintenance documentation and reporting. Failures to maintain documentation and report on Passenger Station Maintenance activities will result in penalties being assessed as described in the Performance Criteria section.

(b) Maintenance Plans

(i) Project Co shall at all times maintain complete and updated versions of the Custodial Maintenance Plan, the Corrective Maintenance Plan, and the Preventive Maintenance Plan.

(ii) Project Co shall follow the requirements set out in Article 1.4 of Appendix A with regard to the drafting, approval, and revisions process for these Maintenance Plans.

(c) Maintenance Reporting

(i) Project Co shall report on the status and completion of various Passenger Station Cleaning and Maintenance activities, including Daily Inspection and Cleaning, Weekly and Bi-Annual Custodial, Corrective Maintenance, and Preventive Maintenance.

(ii) Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to reporting procedures and the Daily, Monthly, and Bi-Annual submittals that are required.

5.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency		
AF =Availability Failure SF = Service Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle	N/A = Not Applicable **Immediate (“Immed.”)** = refer to Appendix A	N/A = Not Applicable ND = Correct by start of service the following	PR PE D W M	= = = = =	Per Request Per Event Daily Weekly Monthly

QF = Quality Failure	Availability deduction regime St. Avail = Captured by the Station Availability deduction regime	Article 7.0 "Project Co Response"	day	Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
Facilities Maintenance Services							
KPM A(7)2.0(a)(iv)	Project Co shall immediately clean or repair any defect that affects the Safety of the public or the Employees of Project Co and the City in accordance with the Custodial Maintenance Standard.	SF	Major	Immed.	1 hour	PE	Immed considers technical response warranted as planned pursuant to Appendix A Article 7.0(a)
KPM A(7)2.0(a)(v)	Project Co shall conduct daily trash removal and general cleaning of frequented areas in accordance with the Daily Custodial Maintenance Standard.	QF	Medium	NA	ND	D	Maximum exposure of one QF per day per station.
KPM A(7)2.0(a)(vi)	Project Co shall conduct weekly heavy cleaning of interior and frequented areas in accordance with the Weekly Custodial Maintenance Standard.	SF	Medium	NA	24 hours	W	
KPM A(7)2.0(a)(vii)	Project Co shall conduct bi-annual heavy cleaning of floor surfaces in accordance with the Bi-Annual Custodial Maintenance Standard.	SF	Medium	NA	7 days	B	
KPM A(7)2.0(b)(i)	Project Co shall maintain all Passenger Stations in a state of good repair and working order in accordance with the approved Corrective and Preventive Maintenance Plans.	QF	Major	NA	NA	R	Project Co to be permitted reasonable Remedial Period, based on nature of non-compliance. Maximum exposure of one QF per Remedial Period, per station.
KPM A(7)2.0(c)(iii)	Escalators shall be maintained in service in accordance with Article 2.0(c)(iii)	SF	Major	30 Minutes	4 hours	PE	SF assessed per escalator.
KPM A(7)2.0(c)(iv)	Elevators shall be maintained in service in accordance with Article 2.0(c)(iv)	SF	Major	30 minutes	4 hours	PE	SF assessed per elevator.

APPENDIX A – ATTACHMENT 8

TUNNEL MAINTENANCE SERVICES

1.0 Scope of Services

(a) Project Co shall be responsible for the Custodial, Preventive, and Corrective Maintenance activities on all Tunnels in the System, as well as all related Tunnel components and systems.

(b) Project Co's obligation for Maintenance of Tunnels includes but is not limited to:

(i) Structural maintenance;

(ii) Drainage;

(iii) Maintenance of active Fire/Life/Safety Systems; and

(iv) Maintenance of passive Fire/Life/Safety Systems.

2.0 Service Requirements

(a) Project Co shall maintain all Tunnel and all Tunnel components and systems within Project Co's responsibility in a state of good repair and working order in accordance with the approved Preventive and Corrective Maintenance Plans.

(b) Project Co shall maintain all Tunnel and all Tunnel components and systems to ensure that the Fixed Availability Component Standard as provided in Article 3.0(a) is met and that service can be safely and reliably provided.

(c) Custodial Maintenance

(i) Project Co shall perform all Custodial Maintenance activities in the tunnel areas in accordance with the Requirements and Standards described in Attachment 10 Alignment Maintenance Services.

(ii) Tunnel Drainage

A. Project Co shall maintain all drainage inlets and other structures in the Tunnel in accordance with the Tunnel Drainage Standard.

B. Project Co shall ensure that all pumps and other drainage equipment in the Tunnel are fully functional at all times.

C. Project Co shall place special focus on ensuring proper drainage at the tunnel portals when performing maintenance of tunnel drainage activities.

(iii) Passive Fire/Life/Safety Systems

A. Project Co shall maintain all emergency egress pathways and related components including, but not limited to: walkways, access doors, and emergency signage in the Tunnel.

B. Project Co shall maintain these emergency egress elements according to the Emergency Egress Standard.

(iv) Active Fire/Life/Safety Systems

A. Project Co shall conduct all inspection, maintenance, and testing of all active Fire/Life/Safety protection systems. Active Fire/Life/Safety protection systems include, but are not limited to the following:

i Tunnel lighting, including emergency lighting;

ii Smoke and fire detection;

iii Tunnel ventilation;

iv Backup power systems; and

v Security systems and intrusion detection.

(d) Structural Maintenance

(i) Project Co shall maintain all structural Tunnel elements within Project Co's responsibility in a state of good repair and working order in accordance with the approved Preventive and Corrective Maintenance Plans.

(ii) Project Co shall prepare and implement plans and procedures for Structural maintenance of Tunnel in the Preventive Maintenance Plan that includes an annual inspection program that ensures the Safety and integrity of the structures.

(iii) Project Co shall conduct inspections of structures which shall include but not be limited to:

A. Detailed visual survey of all support and sub-structure structures;

B. Detailed tactile inspection of all support and sub-structure structures; and

C. Concrete coring and testing to determine the condition of the concrete.

(iv) Project Co shall undertake the work set out in the Expanded Design and Construction Specifications and Schedule 15-3 to the Project Agreement on an annual basis or more frequently as may be required and in accordance with any applicable local, provincial, or national requirements.

(e) Project Co's shall ensure compliance with Schedule 17 – Environmental Obligations.

(f) Project Co's performance with respect to vandalism and graffiti shall be in accordance with:

(i) Appendix A, Attachment 10 – Alignment Maintenance Services, Article 2.0(f) "Vandalism and Graffiti Repair", Article 3.0(e) "Vandalism and Graffiti Standard", and Article 5.0 "Performance Criteria", and for further certainty, Project Co's rectification and/or response times and the assessment of Service Failure Points; and

(ii) Appendix A, Attachment 16 – Vandalism and Graffiti.

3.0 Service Standards

(a) Fixed Component Availability Standard

(i) Any Fixed Component in the System (including Tunnel structures, drainage features, and Fire/Life/Safety Systems) is considered to not meet the Standard if any Defect or Deficiency is identified in that Fixed Component that:

A. affects the Safety of the public, Passengers or Driver in a manner contrary to the Safety Management System;

B. adversely affects Operations such that the System does not meet the Operation Requirements and Specifications;

C. free from any unsafe accumulation of ice and snow, and for clarity accumulation of ice and snow shall be deemed to be "unsafe" if not in compliance with the Snow and Ice Clearing Standard including safe access to all areas of the buildings and facilities;

D. illumination and/or lighting levels are not in compliance with the Expanded Design and Construction Specifications; or benchmarking levels as otherwise determined prior to the Revenue Service Availability Date for the Stage 1 System, prior to the Stage 2 East Revenue Service Availaiblity Date for the Stage 2 East System and prior to the Stage 2 West Revenue Service Availability Date for the Stage 2 West System; or

E. any damage as a result of vandalism and/or graffiti has not been repaired as required and specified elsewhere.

(b) Tunnel Drainage Standard

(i) Any of the following conditions shall constitute a Tunnel Drainage failure:

A. Any debris blocking a drainage inlet or other drainage structure; or

B. Any ponding and/or standing water within the Tunnel.

(c) Passive Fire/Life/Safety Systems Standard

(i) At all times, all emergency egress pathways and related components in the Tunnel (including, but not limited to walkways, access doors, and emergency signage) shall be kept clear, functional, and available for use in the event of an emergency.

(d) Active Fire/Life/Safety Systems Standard

(i) At all times, the various Active Fire/Life/Safety systems elements should be inspected, maintained, and tested to ensure they function according to the requirements of the Expanded Design and Construction Specifications and Schedule 15-3. Project Co will be responsible to test the Active Fire/Life/Safety systems no less than monthly. In addition, they will provide a written report to the City detailing the proper working condition of each element of the system. Any defects must be detailed in the report, which must include an acceptable repair schedule.

4.0 Quality Monitoring and Reporting

(a) Periodically, the City will audit the Project Co's Tunnel Maintenance documentation and reporting. Failures to maintain documentation and report on Tunnel Maintenance activities will result in penalties being assessed as described in the Performance Criteria section.

(b) Maintenance Plans

(i) Project Co shall at all times maintain complete and updated versions of the Custodial Maintenance Plan, the Corrective Maintenance Plan, and the Preventive Maintenance Plan.

(ii) Project Co shall follow the requirements set out in Article 1.4 of Appendix A with regard to the drafting, approval, and revisions process for these Maintenance Plans.

(c) Maintenance Reporting

(i) Project Co shall report on the status and completion of various Tunnel Maintenance activities.

(ii) Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to reporting procedures and the Daily, Monthly, and Annual submittals that are required.

5.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency		
AF =Availability Failure SF = Service	Major Medium Minor Veh. Avail. = Captured	N/A = Not Applicable **Immediate (“Immed.”)** = refer	N/A = Not Applicable ND = Correct by start of service	PR PE D W	= = = =	Per Request Per Event Daily Weekly

Failure QF = Quality Failure	by the Vehicle Availability deduction regime St. Avail = Captured by the Station Availability deduction regime	to Appendix A Article 7.0 "Project Co Response"	the following day	M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
Tunnel Maintenance Services							
KPM A(8)2.0(a)	Project Co shall maintain all Tunnel and all Tunnel components and systems within Project Co's responsibility in a state of good repair and working order in accordance with the approved Preventive and Corrective Maintenance Plans.	QF	Major	NA	NA	R	Project Co to be permitted reasonable Remedial Period, based on nature of non-compliance.
KPM A(8)2.0(c)(i)	Project Co shall perform all Custodial Maintenance activities in the tunnel areas in accordance with the Requirements and Standards described in Attachment 10 Alignment Maintenance Services.	As per relevant KPM in Attachment 10.					
KPM A(8)2.0(c)(ii)(A)	Project Co shall maintain all drainage inlets and other structures in the Tunnel in accordance with the Tunnel Drainage Standard.	SF	Medium	2 hours	24 hours	PE	SF assessed per defect/issue.
KPM A(8)2.0(c)(ii)(B)	***Project*** Co shall ensure that all pumps and other drainage equipment in the Tunnel are fully functional at all times.	SF	Medium	2 hours	24 hours	PE	SF assessed per defect/issue.
KPM A(8)2.0(d)(f)	Project Co shall perform maintenance activities on any vandalism within the Tunnel in accordance with the vandalism and graffiti control requirements in Attachment 10 - Alignment Maintenance Services.	As per relevant KPM in Attachment 10.					
KPM A(8)2.0(c)(iii)	Project Co shall comply with the Passive Fire/Life/Safety Systems Standards	QF	Major	NA	Immed.	PE	

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
KPM A(8)2.0(c)(vi)	Project Co shall comply with the Active Fire/Life/Safety Systems Standards	QF	Major	NA	48 hours	PE	
KPM A(8)2.0(d)(i)	Project Co shall maintain all structural Tunnel elements within Project Co's responsibility in a state of good repair and working order in accordance with the approved Preventive and Corrective Maintenance Plans.	QF	Major	NA	NA	R	Project Co to be permitted reasonable Remedial Period, based on nature of non-compliance.
KPM A(8)2.0(d)(iii) to (iv)	Project Co shall conduct inspections of structures in compliance with Articles 2.0(d) (iii) and (iv)	QF	Major	NA	1 month	A	Maximum exposure of one QF per month.

APPENDIX A – ATTACHMENT 9

STRUCTURE MAINTENANCE SERVICES

1.0 Scope of Services

(a) Project Co shall be responsible for maintaining structures, unless as identified otherwise in the Maintenance Responsibility Table.

(b) Project Co's obligation for Maintenance of the Fixed Facilities includes, without limitation, all structural elements, including bridges, retaining walls, drainage outlets, culverts and other fixed structures in such a manner as to meet the minimum Bridge Condition Index as prescribed in Appendix B, and ensuring the structure's integrity and durability is not compromised.

2.0 Service Requirements

(a) Project Co shall maintain all bridges and structures within Project Co's responsibility in a state of good repair and working order in accordance with the approved Preventive and Corrective Maintenance Plans.

(b) Project Co shall prepare and implement plans and procedures for Structural maintenance in the Preventive Maintenance Plan that includes an annual inspection program that ensures the Safety and integrity of the structures.

(c) Project Co shall maintain all bridges and structures to meet the Fixed Component Availability Standard.

(d) Project Co shall conduct inspections of structures which shall include but not be limited to:

(i) Detailed visual survey of all support and sub-structure structures;

(ii) Detailed tactile inspection of all support and sub-structure structures;

(iii) Underwater inspection; and

(iv) Destructive and / or non-destructive testing to determine the condition of the structural component.

(e) Project Co shall undertake the work set out in the Expanded Design and Construction Specifications and Schedule 15-3 to the Project Agreement on an annual basis or more frequently as may be required and in accordance with the requirements provided in Appendix B.

(f) Project Co's shall ensure compliance with Schedule 17 – Environmental Obligations.

(g) Project Co's performance with respect to vandalism and graffiti shall be in accordance with:

(i) Appendix A, Attachment 10 – Alignment Maintenance Services, Article 2.0(f) "Vandalism and Graffiti Repair", Article 3.0(e) "Vandalism and Graffiti Standard", and

Article 5.0 "Performance Criteria", and for further certainty, Project Co's rectification and/or response times and the assessment of Service Failure Points; and

(ii) Appendix A, Attachment 16 – Vandalism and Graffiti.

3.0 Service Standards

(a) Fixed Component Availability Standard

(i) Any Fixed Component in the System (including bridges and structures) is considered to not meet the Standard if any Defect or Deficiency is identified in that Fixed Component that:

A. affects the Safety of the public, Passengers or Driver in a manner contrary to the Safety Management System;

B. adversely affects Operations such that the System does not meet the Operation Requirements and Specifications;

C. free from any unsafe accumulation of ice and snow, and for clarity accumulation of ice and snow shall be deemed to be "unsafe" if not in compliance with the Snow and Ice Clearing Standard including safe access to all areas of the buildings and facilities;

D. illumination and / or lighting levels are not in compliance with the Expanded Design and Construction Specifications; or benchmarking levels as otherwise determined prior to the Revenue Service Availability Date for the Stage 1 System, prior to the Stage 2 East Revenue Service Availaiblity Date for the Stage 2 East System and prior to the Stage 2 West Revenue Service Availability Date for the Stage 2 West System; or

E. any damage as a result of vandalism and / or graffiti has not been repaired as required and specified elsewhere.

4.0 Quality Monitoring and Reporting

(a) Periodically, the City shall audit Project Co's Structure Maintenance documentation and reporting. Failure to maintain documentation and report on Structure Maintenance activities will result in penalties being assessed as described in the Performance Criteria section.

(b) Maintenance Plans

(i) Project Co shall at all times maintain complete and updated versions of the Custodial Maintenance Plan, the Corrective Maintenance Plan, and the Preventive Maintenance Plan.

(ii) Project Co shall follow the requirements set out in Article 1.4 of Appendix A with regard to the drafting, approval, and revisions process for these Maintenance Plans.

(c) Maintenance Reporting

(i) Project Co shall report on the status and completion of various Structure Maintenance activities.

(ii) Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to reporting procedures and the Daily, Monthly, and Annual submittals that are required.

5.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime St. Avail = Captured by the Station Availability deduction regime	N/A = Not Applicable **Immediate (“Immed.”)** = refer to Appendix A Article 7.0 “Project Co Response”	N/A = Not Applicable ND = Correct by start of service the following day	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
Structure Maintenance Services							
KPM A(9)2.0(a)	Project Co shall maintain all bridges and structures within Project Co’s responsibility in a state of good repair and working order in accordance with the approved Preventive and Corrective Maintenance Plans.	QF	Major	NA	NA	R	Project Co to be permitted reasonable Remedial Period, based on nature of non-compliance. QF assessed per defect/issue.
KPM A(9)2.0(d) and (e)	Project Co shall conduct inspections of structures in compliance with Articles 2.0(d) and (e)	QF	Major	NA	1 month	A	Project Co to be permitted reasonable Remedial Period, based on nature of non-compliance. QF assessed per inspection type.

APPENDIX A – ATTACHMENT 10

ALIGNMENT MAINTENANCE SERVICES

1.0 Scope of Services

(a) Project Co shall be responsible for the Custodial, Preventive, and Corrective Maintenance activities for the Alignment Maintenance activities including but not limited to:

(i) Vegetation Control, including Grass, Weed, and Tree and Shrub Control, including Green roof Station(s);

(ii) Debris Collection and Removal;

(iii) Drainage Control;

(iv) Vandalism and Graffiti Repair, including and as indicated in Attachments 3 to 9;

(v) Maintenance of Fencing; and

(vi) Snow and Ice Removal, including and as indicated in Attachments 3 to 9.

2.0 Service Requirements

(a) Project Co shall conduct all Custodial, Corrective, and Preventive Maintenance activities along the System Alignment unless assigned to others in the Maintenance Responsibility Table.

(b) The following sections provide details about Project Co's responsibilities for specific maintenance types.

(c) Vegetation Control

(i) Project Co shall perform Grass and Weed Control in order to:

A. maintain the condition of the ballast;

B. ensure sight distances;

C. provide unobstructed view;

D. control noxious weeds (The Weed Control Act and Regulations);

E. reduce drainage impairment;

F. improve turf; and

G. improve landscape and overall aesthetics.

(ii) Grass Control

A. Project Co shall conduct mowing or trimming operations to control grass growth in accordance with the Vegetation Control Standard.

B. Project Co shall conduct seeding, sodding, or planting to control erosion in accordance with the Vegetation Control Standard.

C. Project Co shall be responsible for identifying the defect and performing remedial actions in accordance with the Vegetation Control Standard and the timeframes established in the Performance Indicators. Notwithstanding, the defect, timelines and remedial actions identified, prevailing legislation and City by-laws shall take precedence if they are more restrictive.

D. Project Co shall perform inspections during growing seasons to ensure compliance included herein, the Expanded Design and Construction Specifications, and the Project Agreement.

(iii) Weed Control

A. Project Co shall conduct weed control operations to eradicate or control undesirable herbaceous vegetation (including grass) using integrated management techniques.

B. Project Co shall remove, by mechanical mowing or chemical spraying (in accordance with prevailing legislation and City by-laws), deficient weed growth in accordance with the Vegetation Control Standard.

C. Project Co shall be responsible for identifying the defect and performing remedial actions in accordance with the Vegetation Control Standard and the timeframes established in the Performance Indicators. Notwithstanding, the defect, timelines and remedial actions identified, prevailing legislation and City by-laws shall take precedence if they are more restrictive.

D. Project Co shall perform inspections during growing seasons to ensure compliance with the requirements included herein, the Expanded Design and Construction Specifications and the Project Agreement.

(iv) Tree and Shrub Maintenance and Control

A. Project Co shall perform Tree and Shrub Control in order to:

i maintain a safe environment;

ii maintain the condition of the ballast;

iii prevent fires;

iv ensure sight distances;

v prevent encroachment into track clearance envelope;

vi maintain clearance to overhead catenary system;

vii provide unobstructed view; and

viii improve landscape and overall aesthetics.

B. Project Co shall conduct tree and shrub maintenance consisting of various activities including, but not limited to, trimming, fertilizing and watering, as required to keep trees and shrubs healthy and in control and in accordance with:

i the Vegetation Control Standard; and

ii accepted horticultural and arboricultural standards.

C. Project Co shall conduct ongoing Preventive Maintenance on trees and shrubs during the Maintenance Term.

D. Project Co shall be responsible for identifying the defect and performing remedial actions in accordance with the Vegetation Control Standard and the timeframes established in the Performance Indicators. Notwithstanding, the defect, timelines and remedial actions identified, prevailing legislation and City by-laws shall take precedence if they are more restrictive.

E. Project Co shall perform inspections which shall be carried out by a qualified professional with the knowledge of tree and shrub maintenance practices and identification and diagnosis of diseases and defects. The qualified professional must have a minimum of three years' experience in the field of tree and shrub maintenance.

(d) Debris Collection and Disposal

(i) Project Co shall conduct all debris collection and disposal in order to:

A. prevent damage to vehicles;

B. prevent damage to equipment and property;

C. manage environmental, commercial, residential and tourism concerns; and

D. maintain the image of the LRT and the landscape aesthetics.

(ii) Project Co shall collect and dispose of objectionable items such as rubbish (garbage, cans, bottles, paper, plastic products, etc.), dead animals, batteries, tires, metal products,

containers, rocks, building materials, etc., in according with the Debris Collection and Disposal Standard Attachment 10 Article 3(c).

(iii) Project Co shall perform all debris collection and disposal activities in accordance with local, provincial, and national Health and Safety regulations and at least on a weekly basis. In the case of a dead animal carcass, Project Co shall remove within 24 hours of becoming aware of such debris.

(iv) Project Co shall ensure that debris is promptly removed from the Custodial Maintenance Areas.

(v) Project Co shall immediately notify the TOCC and the police of any suspicious items that may have been placed with the specific intent to cause public harm or property damage.

(vi) Project Co shall be responsible for identifying the defect and performing remedial actions in accordance with the Debris Collection and Disposal Standard and the timeframes established in the Performance Indicators. Notwithstanding, the defect, timelines and remedial actions identified, prevailing legislation and City by-laws shall take precedence if they are more restrictive.

(e) Fences

(i) Project Co shall provide and maintain perimeter security fencing, rectify Safety Deficiencies and perform Custodial Maintenance with respect to the Alignment in accordance with the Fencing Standard.

(ii) Project Co shall maintain all of the fencing including physical barriers made of chain link fence, farm fence, wooden materials, metal panels, composite materials, concrete, brick and various types of Noise walls owned by the City within the Alignment and Maintenance and Storage Facilities under the Project Agreement (including Schedule 15-3).

(iii) Project Co shall be responsible for identifying the defect and performing remedial actions in accordance with the Fencing Standard and the timeframes established in the Performance Indicators.

(iv) Project Co shall immediately take temporary and / or permanent measures if considered a Security or Safety concern. Notwithstanding, the defect, timelines and remedial actions identified, prevailing legislation and city by-laws shall take precedence if they are more restrictive.

(f) Vandalism and graffiti repair

(i) Project Co shall remove all graffiti and repair all vandalism to promote the LRT image and ensure the safe operation of the LRT.

(ii) Project Co shall remedy graffiti and vandalism on the System in accordance with the Vandalism and Graffiti Standard.

(iii) Project Co shall cover or remove offensive material and graffiti by painting over, cleaning, or mechanical removal in accordance with the Vandalism and Graffiti Standard.

(iv) Project Co shall repair any infrastructure or components damaged by vandalism in accordance with the Vandalism and Graffiti Standard. Notwithstanding the requirements provided in Attachment 16 – Vandalism and Graffiti, Project Co shall present proposals to the City for approval or repair or replacement of equipment or parts damaged by vandalism to LRT infrastructure, equipment, or landscaping before proceeding with repairs.

(v) Project Co shall be responsible for identifying the defect and/or upon becoming aware performing remedial actions in accordance with the Vandalism and Graffiti Standard and the timeframes established in the Performance Criteria. Notwithstanding, the defect, timelines and remedial actions identified, prevailing legislation and City by-laws shall take precedence if they are more restrictive.

(g) Drainage Control

(i) Project Co shall inspect and clean all drainage culverts, outlets and ditches to ensure they are not blocked and functioning as intended in accordance with the Drainage Control Standard.

(ii) Project Co will remove any vegetation impeding proper drainage in accordance with the Drainage Control Standard.

(iii) Project Co will conduct efforts to eliminate ponding and/or standing water, in accordance with:

A. the City of Ottawa program to control the spread of the West Nile Virus; and

B. the Drainage Control Standard.

(iv) Project Co shall undertake formal drainage design and construction treatments in persistent problem areas to eliminate the water ponding/standing concerns, in accordance with Project Agreement including Schedule 15-2 and this Schedule 15-3.

(v) In response to ponding and/or standing water during the Spring and Summer months, Project Co shall notify the City, such that the City will provide remedial measures if necessary, in accordance with its West Nile Virus monitoring and treatment plans.

(h) Snow and Ice Clearing, Sanding, De-Icing and Removal

(i) Project Co shall perform all ice and snow clearing and removal services for the System in accordance with the Snow and Ice Removal Standard.

(ii) Project Co shall perform all snow and ice clearing, de-icing and removal (including the application of other ice melt products and / or use of other means and methods for meeting the Snow and Ice Removal Standard) in order to:

A. ensure the Safety of Driver, passengers and pedestrians throughout the System, except in the areas as otherwise identified in the Maintenance Responsibility Table;

B. permit the safe operation of Vehicles on the System in accordance with the Safety Management System, designated emergency evacuation routes, and the Operational Requirements and Specifications. This includes the clearing and removal of snow and ice on the Tracks, turnouts, and switches and Overhead Catenary System as may be required to ensure safe operation of the Vehicles.

C. permit safe access to the System by Drivers, Passengers and pedestrians, and for further certainty to ensure compliance with the Station Access Standard; and permit safe emergency egress and access only routes up to public right-of-way (including MUPs, sidewalks, roadways and plazas).

(iii) Project Co shall coordinate with the City when operations outside of Revenue Hours are necessary to prevent the accumulation of snow on the Tracks and ice on the Overhead Catenary System.

(iv) Project Co shall have available equipment for plowing / clearing the Tracks when necessary.

(v) At the daily meeting prior to an anticipated weather event, Project Co shall review with the City, Project Co's weather event policies and procedures, including but not limited to:

A. Forecasted severity of the weather event;

B. Project Co's resources allocated to address the weather event and in maintaining compliance with the Standard along with the Safe operation of the System;

C. Project Co's designated Employee(s) responsible for reporting the progress of performance prior to, during, and after the weather event; and

D. Project Co shall be responsible to coordinate with the City and other third party service providers.

(vi) At the daily meeting following the storm event, Project Co shall review with the City, Project Co's performance in meeting the Standard.

(i) Project Co's shall ensure compliance with Schedule 17 – Environmental Obligations.

3.0 Service Standards

(a) Custodial Maintenance Standard

(i) The Alignment Maintenance Services shall fail to meet the Custodial Maintenance Standard if:

A. Any condition exists that impacts Public Safety or the Safety of the Employees of Project Co and the City or fails to comply with the Safety Management System, including:

i any unsafe accumulation of ice and snow, and for clarity accumulation of ice and snow shall be deemed to be "unsafe" if not in compliance with the Snow and Ice Clearing Standard including safe access to all areas of the Alignment designated for emergency evacuation routes; and

ii illumination and / or lighting levels are not in compliance with the Expanded Design and Construction Specifications; or benchmarking levels as otherwise determined prior to the Revenue Service Availability Date for the Stage 1 System, prior to the Stage 2 East Revenue Service Availaiblity Date for the Stage 2 East System and prior to the Stage 2 West Revenue Service Availability Date for the Stage 2 West System.

(b) Vegetation Control Standard

(i) Grass Control Standard

A. The following areas and heights of grass growth shall constitute a grass control deficiency to be corrected by Project Co:

i Any grass growing along Tracks within ballast and shoulder areas and between pavement or concrete cracks;

ii Any grass in urban areas, areas adjacent to residential homes or manicured lawns and at the Maintenance and Storage Facilities, exceeding 100mm in height;

iii Any grass outside of urban areas, areas away from residential homes and manicured lawns exceeding 300mm in height; or

iv Locations where lack of vegetation is causing erosion.

(ii) Weed Control Standard

A. The following areas of weed growth shall constitute a weed control deficiency to be corrected by Project Co:

i Weeds growing along Tracks within ballast and shoulder areas and between pavement or concrete cracks;

ii Noxious weeds that are identified through a weed control order or by-law;

iii Noxious weeds that are identified to pose a negative economic impact to horticultural, agricultural and residential land uses; or

iv Weeds impeding drainage or contributing to erosion by destroying desirable groundcovers.

(iii) Tree and Shrub Control Standard

A. The following types of tree and shrub growth shall constitute a tree and shrub control deficiency to be corrected by Project Co:

i dead trees and shrubs;

ii evidence of disease or pests;

iii any broken and damaged trees, limbs or branches;

iv limbs or branches encroaching on track clearance envelope;

v limbs or branches encroaching on overhead catenary system; or

vi any uncontrolled areas of growth such as wild brush areas, or growth encroaching on public areas.

(c) Debris Collection and Disposal Standard

(i) The presence of any of the following shall constitute a debris collection deficiency to be corrected by Project Co:

A. any debris within the Alignment that remains after one week from when Project Co becomes aware of the presence of the debris:

i all debris along Tracks within ballast, shoulder areas, in the Alignment and at Maintenance and Storage Facilities;

ii any debris along Tracks within ballast and shoulder areas that may affect the Safety or operation of the LRT; or

iii any debris that may present a public Safety concern, environmental or property damage.

B. any dead animal carcasses within the System Alignment that are not removed within 24 hours of becoming aware.

(d) Fencing Standard

(i) Any of the following shall constitute a fencing deficiency to be corrected by Project Co:

A. any damaged fence not owned by the City;

B. any damage to fence owned by the City; or

C. damaged or defective personnel access gates or locks.

(e) Vandalism and Graffiti Standard

(i) All vandalism and graffiti must be covered or removed by painting over, cleaning, or mechanical removal within 24 hours of Project Co identifying and / or becoming aware of the defect.

(ii) Project Co shall report any vulgar, hate, racist, or gang related vandalism and graffiti to the Transit Law Enforcement Unit immediately. The City will provide a quick reference guide to Project Co for recognizing hateful symbols and text, of which may be revised by the City from time to time.

(iii) If considered vulgar hateful, racist, or gang related the defect shall not be covered or removed until the City's Police or Transit Law Enforcement Unit has conducted a crime scene investigation and subsequent release of the crime scene for Project Co's remedial action.

(iv) If permanent repairs cannot be completed with the initial response time, any infrastructure or components damaged by vandalism and graffiti must be repaired within the Remedial Period (time required to complete permanent repairs as proposed by Project Co, acting reasonably and based on the nature and extent of the damage, with the time being determined from when Project Co identified and / or became aware of the defect until such time that permanent repairs are complete), and notwithstanding the requirements of Attachment 16 – Vandalism and Graffiti, after City approval of the proposed remedy.

(v) In all cases, if public Safety or the continued operation of the System at the prescribed service levels is a concern, temporary repairs shall be made immediately.

(f) Drainage Control Standard

(i) Any of the following conditions shall constitute a Drainage Control Deficiency to be corrected by Project Co:

A. Any vegetation growth impeding drainage;

B. Any debris blocking a drainage culvert, outlet, or ditch; or

C. Any ponding and/or standing water during the Spring and Summer months.

(g) Snow and Ice Removal Standard

(i) During the weather event, the following shall constitute snow and ice deficiencies on the System to be corrected by Project Co:

A. any accumulation in excess of trace amounts at the Station Platforms, public areas (where Project Co is responsible for surface maintenance), and for further certainty Project Co is responsible for snow and ice clearing/removal on walking surfaces within 3 metres of the entrance and / or building facade for an entrance;

B. any snow and ice accumulation that impairs the operation of the System, including but not limited to the following:

i on the Tracks;

ii turnouts and switches;

iii Overhead Catenary System;

iv MSFs;

v designated emergency evacuation routes; or

vi as may be required to ensure safe operation of the System.

(ii) Prior to the start of the next Revenue Service day after the weather event has ended, the following shall constitute snow and ice deficiencies on the System:

A. any accumulation in excess of trace amounts at the Station Platforms, public areas (where Project Co is responsible for surface maintenance), and for further certainty Project Co is responsible for snow and ice clearing/removal on walking surfaces within 3 metres of the entrance and/or building facade for an entrance;

B. any snow and ice accumulation along the Tracks, Guideway, and MSFs that impairs the operation of the System.

4.0 Quality Monitoring and Reporting

(a) Periodically, the City will audit the Project Co's Alignment Maintenance documentation and reporting. Failures to maintain documentation and report on Alignment Maintenance activities will result in penalties being assessed as described in the Performance Criteria section.

(b) Maintenance Plans

(i) Project Co shall at all times maintain complete and updated versions of the Custodial Maintenance Plan, the Corrective Maintenance Plan, and the Preventive Maintenance Plan.

(ii) Project Co shall follow the requirements set out in Article 1.4 of Appendix A with regard to the drafting, approval, and revisions process for these Maintenance Plans.

(c) Maintenance Reporting

(i) Project Co shall report on the status and completion of various Alignment Maintenance activities.

(ii) Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to reporting procedures and the Daily, Monthly, and Annual submittals that are required.

5.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime St. Avail = Captured by the Station Availability deduction regime	N/A = Not Applicable **Immediate (“Immed.”)** = refer to Appendix A Article 7.0 “Project Co Response”	N/A = Not Applicable ND = Correct by start of service the following day	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
Alignment Maintenance Services							
KPM A(10)3.0(a)	Project Co shall carry out Custodial Maintenance in accordance with Article 3.0(a)	SF	Minor	NA	1 day	PE	SF assessed per issue not in compliance with Standard.
KPM A(10)2.0(c)(ii)	Project Co shall carry out Grass Control in accordance with Article 2.0(c)(ii) and the Vegetation Control Standard.	SF	Minor	NA	7 days	PE	SF assessed per segment to a maximum exposure of 10 segments in non-compliance at any one time.
KPM A(10)2.0(c)(iii)	Project Co shall carry out Weed Control in accordance with Article 2.0(c)(iii) and the Vegetation Control Standard.	SF	Minor	NA	7 days	PE	SF assessed per segment to a maximum exposure of 10 segments in non-compliance at any one time.
KPM A(10)2.0(c)(iv)(B)(i)	Project Co shall carry out Tree and Shrub Maintenance and Control in accordance with the Vegetation Control Standard, Item A(i) (free from dead trees and shrubs).	SF	Minor	NA	NA	PE	SF assessed per segment to a maximum exposure of 10 segments in non-compliance at any one time.

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
KPM A(10)2.0(c)(iv)(B)(i)	Project Co shall carry out Tree and Shrub Maintenance and Control in accordance with the Vegetation Control Standard, Item A(ii) (free from evidence of disease or pests).	SF	Minor	NA	NA	PE	SF assessed per segment to a maximum exposure of 10 segments in non-compliance at any one time.
KPM A(10)2.0(c)(iv)(B)(i)	Project Co shall carry out Tree and Shrub Maintenance and Control in accordance with the Vegetation Control Standard, Item A(iii) (free from broken and damaged trees, etc.).	SF	Minor	NA	14 days	PE	SF assessed per segment to a maximum exposure of 10 segments in non-compliance at any one time.
KPM A(10)2.0(c)(iv)(B)(i)	Project Co shall carry out Tree and Shrub Maintenance and Control in accordance with the Vegetation Control Standard, Item A(iv) (free from uncontrolled areas of growth etc.).	SF	Minor	NA	28 days	PE	SF assessed per segment to a maximum exposure of 10 segments in non-compliance at any one time.
KPM A(10)2.0(c)(iv)(C)	Project Co shall conduct ongoing Preventive Maintenance on trees and shrubs during the Maintenance Term as required by Article 2.0 (c)(iv)(C)	QF	Minor	NA	NA	R	
KPM A(10)2.0(d)(ii)	Project Co shall carry out Debris Collection and Disposal in accordance with Article 2.0(d)(ii) and the Debris Collection and Disposal Standard.	SF	Major	NA	NA	PE	SF assessed per segment to a maximum exposure of 10 segments in non-compliance at any one time.
KPM A(10)2.0(d)(iv)	Project Co shall ensure that debris is promptly removed from the Custodial Maintenance Areas.	SF	Major	NA	4 hours	PE	SF assessed per segment to a maximum exposure of 10 segments in non-compliance at any one time.
KPM A(10)2.0(d)(v)	Project Co shall immediately notify TOCC and the police of any suspicious items that may have been placed with the specific intent to cause public harm or property damage.	QF	Major	NA	NA	PE	Maximum exposure of 1 QF per incident.

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
KPM A(10)2.0(e)(i)	Project Co shall carry out maintenance of fencing in accordance with Article 2.0(e)(i) and the Fencing Standard.	SF	Minor	NA	7 days	PE	SF assessed per segment to a maximum exposure of 10 segments in non-compliance at any one time.
KPM A(10)2.0(e)(iv)	Project Co shall immediately take temporary and / or permanent measures if an identified defect is considered a Security or Safety concern.	SF	Major	Immed.	4 hours	PE	SF assessed per segment to a maximum exposure of 10 segments in non-compliance at any one time. Immed considers technical response warranted as planned pursuant to Appendix A Article 7.0(a)
KPM A(10)2.0(f)(ii)	Project Co shall remedy all vulgar or offensive graffiti and vandalism in accordance with the Graffiti and Vandalism Standard.	SF	Medium	Immed.	24 hours	PE	SF assessed per area/incident of graffiti. Immed considers technical response warranted as planned pursuant to Appendix A Article 7.0(a)
KPM A(10)2.0(f)(ii)	Project Co shall repair any infrastructure or components damaged by vandalism in accordance with the Graffiti and Vandalism Standard.	SF	Medium	NA	ND	PE	SF assessed per area/incident of vandalism and graffiti. Project Co to be permitted reasonable Remedial Period, based on nature and extent of damage.
KPM A(10)2.0(f)(ii)	Project Co shall repair any infrastructure or components damaged by vandalism, where public safety or continuation of Service is a concern, in accordance with the Graffiti and Vandalism Standard.	SF	Major	Immed.	4 hours	PE	SF assessed per area/incident of vandalism. Immed considers technical response warranted as planned pursuant to Appendix A Article 7.0(a)

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
KPM A(10)2.0(g)(i)	Project Co will inspect and clean all drainage culverts, outlets and ditches to ensure they are not blocked and functioning as intended in accordance with the Drainage Control Standard.	SF	Minor	NA	7 days	PE	SF assessed per defect/issue to a maximum exposure of 10 defects/issues at any one time.
KPM A(10)2.0(g)(ii)	Project Co will remove any vegetation impeding proper drainage in accordance with the Drainage Control Standard.	SF	Minor	NA	7 days	PE	SF assessed per defect/issue to a maximum exposure of 10 defects/issues at any one time.
KPM A(10)2.0(g)(v)	In response to ponding and/or standing water during the Spring and Summer months, Project Co shall notify the City.	QF	Major	NA	NA	PE	Maximum exposure of 1 QF per incident.
KPM A(10)2.0(h)(iv)	Project Co shall have available equipment for plowing / clearing the Tracks when necessary.	QF	Major	NA	NA	PE	Maximum exposure of 1 QF per incident.

APPENDIX A – ATTACHMENT 11

HELP DESK SERVICES

1.0 Scope of Services

(a) Project Co shall develop, implement, maintain up to date and provide to the City upon request appropriate operational policies, procedures and practices relative to help desk services. The information and documentation shall initially be provided to the City ten (10) months prior to the Required Revenue Service Availability Date for review in accordance with the review process described in Schedule 10 of the RFP. Subsequently the plans, sample reports, policies, practices and operational procedures shall be submitted to the City throughout the Maintenance Term as required, and at a minimum, annually on the anniversary of the Revenue Service Availability Date of each year for review using the process described in Schedule 10 – Review Procedure.

(b) Project Co shall provide help desk service 24 hours per day and for 365(6) days per year throughout the Maintenance Term, with provisions for backup if required, which shall form the day-to-day notification interface between the City and Project Co and any of its Project Co Parties in relation to the following matters:

(i) all enquiries and service requests for assistance relating to the Project Co Services;

(ii) notification of Events, complaints or compliments from any of the Passengers relating to the Project Co Services;

(iii) service requests for temporary changes to the delivery and scope of the Project Co Services which shall not be a Variation;

(iv) monitoring of System and system alarms including duress alarms;

(v) notification of accidents or emergencies;

(vi) notification of safety issues or concerns related to the SMS;

(vii) notification of security issues or concerns related to the SeMS;

(viii) notification of trespassing or un-authorized access to the System;

(ix) request for information relating to the operation of the help desk service;

(x) update of progress regarding any Events notified to the help desk; and

(xi) Lost and found.

(c) Project Co shall provide updates to the instructions for help desk services to the City from time-to-time, as required.

(d) Following the completion of the user instructions, Project Co shall ensure that all Project Co Staff, Project Co Parties and the City representatives are trained and/or familiarized with these help desk service instructions.

(e) Project Co shall make the initial determination and categorize each and every service request and Event using the classification (priority) protocol established pursuant to Article (a) as part of the help desk services. .

(f) Project Co shall maintain, as part of the help desk service, a daily electronic log of all service requests and calls reporting Events, along with lost and found items recovered within the System. The help desk service shall record into the electronic log all relevant details, including but not limited to the following information:

(i) help desk / Project Co receiving and recording the request or Event;

(ii) requester's name;

(iii) date and time;

(iv) location;

(v) nature of the request or Event;

(vi) service required;

(vii) classification (priority);

(viii) unique request reference identifier;

(ix) the Project Co Party, if applicable, and contact name to which the request was passed on to;

(x) date and time the request was passed on to the relevant Project Co Party;

(xi) action taken and by whom; and

(xii) Response Time and Rectification Time.

(g) As part of the help desk service, Project Co shall maintain a daily electronic log of all lost and found items recovered from within the System. The help desk service shall record into the electronic log the following:

(i) Project Co employee that recovered or is reporting the lost and found item;

(ii) date and time item was recovered / reported;

(iii) assigned item number;

(iv) description of the item; and

(v) location where the item was recovered, including vehicle number or station.

(h) Project Co shall not delete or alter any details recorded by the help desk unless approved by the City or designate and the following information is recorded:

(i) The exact nature and impact of the amendment;

(ii) The reason for the amendment; and

(iii) By whom the amendment was authorized.

(i) Project Co shall ensure that in the event of Emergencies, at whatever time, the help desk service is alerted and to report and / or record the incident or Event to internal and external authorities, subject to the provisions resulting from LRT Rules and Standard Operating Procedures and the Emergency Response Plan prepared by Project Co as per Schedule 15-2, Part 1 Article 11, and subsequently updated by DB Co as per the DB Co Works Agreement Schedule 15-2, Part 1 Article 8. Project Co shall coordinate the Response Time and log the details of the Emergency.

(j) Project Co shall ensure that the help desk service maintains confidentiality consistent with the LRT Rules and Standard Operating Procedures as established by Schedule 15-4 and the Project Agreement.

(k) Project Co and all Project Co Staff shall at all times adhere to, update and maintain as current the operational policies and procedures set out and agreed with the City pursuant to Schedule 15-4 – Regulatory Standards. On a quarterly basis pursuant to Appendix A Article 1.5(c), Project Co will provide the City or designate a report detailing where non-adherence has been identified.

(l) Project Co shall prepare and submit a monthly summary report in a format suitable to the City as part of the Monthly Activity Report as described in Appendix A, Article 1.8 – Records and Reporting.

(m) Project Co shall provide the capability for City Employees who have made service requests to review and monitor the status of their requests over the internet.

(n) Project Co shall, when receiving a call about services not provided by Project Co or about issues related to the City responsibilities, redirect the caller to the appropriate City contact as directed by the City.

(o) Project Co shall deliver all lost and found items recovered within the System to the City's lost and found during the next regular business day or as directed by the City.

(p) Quality Monitoring

(i) Prior to the Revenue Service Commencement Date, Project Co and the City shall develop, maintain and implement a system for recording and acting on Passenger or Driver feedback and satisfaction with respect to the help desk services in accordance with the provisions set out in this attachment.

2.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime St. Avail = Captured by the Station Availability deduction regime	N/A = Not Applicable	N/A = Not Applicable ND = Correct by start of service the following day	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
Help Desk Services							
KPM A(11)(b)	The help desk service is available during Revenue Service operating times for the Project Tern.	SF	Major	30 minutes	1 hour	R	
KPM A(11)(c) and (d)	Help Desk Service Instructions are updated and training provided to Project Co and City Employees.	QF	Major	N/A	N/A	M	Maximum exposure of one QF per Contract Month
KPM A(11)(e) and (f)	All Service Requests and Failure Events are categorized and recorded in accordance with this Attachment.	QF	Medium	N/A	N/A	PE	One QF per incident of non-compliance (incident is defined as failure to record a single request or event)
KPM A(11)(g) and (o)	All lost and found items recovered from within the System are recorded and delivered in accordance with this Attachment.	QF	Medium	N/A	N/A	PE	One QF per incident of non-compliance (incident is defined as failure to record and deliver a single item or group of items)
KPM A(11)(i)	Report Events to internal and external authorities, subject to LRT Rules and Standard Operating Procedures, Environmental Reporting requirements, and Emergency Response Plan requirements, and log the details in the event of an emergency.	SF	Major	N/A	N/A	PE	Maximum exposure of SF per incident of failure to report.

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Notes
KPM A(11)(j)	Confidentiality is maintained in accordance with the Project Agreement	QF	Major	N/A	N/A	PE	Maximum exposure of one QF per Contract Month.
KPM A(11)(k)	Project Co adheres to the operational policies and procedures provided by Schedule 15-4 – Regulatory Standards.	QF	Major	N/A	N/A	B	QF assessed per identified non-adherence. Maximum exposure of 5 QF per report.
KPM A(11)(k)	Every quarter pursuant to Appendix A Article 1.5(c) Project Co shall provide the City Representative or designate a report detailing where non-adherence has been identified.	QF	Major	N/A	1 week	B	
KPM A(11)(m)	Project Co will provide the capability for City Employees who have made service requests to review and monitor the status of their requests over the internet	QF	Major	N/A	N/A	M	One QF per Contract Month
TDB	All requests and Events reported to the help desk service are answered and coordinated promptly in accordance with the specifications.	QF	Major	N/A	N/A	PE	QF assessed per request or event not dealt with in accordance with specifications. Maximum of 5 QF per day.

APPENDIX A – ATTACHMENT 12

MAINTENANCE RECORDS AND REPORTING

1.0 Maintenance Records and Reporting

(a) Pursuant to Appendix A, Article 1.8, periodically, the City will audit the Project Co's Maintenance records and reporting. Failures to maintain records and report on Maintenance activities will result in penalties being assessed as described in the Performance Criteria section.

(b) Maintenance Plans

(i) Project Co shall follow the requirements set out in Article 1.4 of Appendix A with regard to the drafting, approval, and revisions process for the Maintenance and Rehabilitation Plan.

(ii) Project Co shall at all times maintain complete and updated versions of the Maintenance and Rehabilitation Plan, along with the sub plans described as the Custodial Maintenance Plan, the Corrective Maintenance Plan, and the Preventive Maintenance Plan. The performance requirements associated with the Asset Management Plan and the Handover Maintenance Plan are included in Appendices B and C respectively.

(c) Maintenance Reporting

(i) Project Co shall report on the status and completion of various Maintenance activities.

(ii) Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to maintenance reporting procedures and the Daily, Monthly, and Annual submittals that are required.

2.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime St. Avail = Captured by the Station Availability deduction regime	N/A = Not Applicable	N/A = Not Applicable ND = Correct by start of service the following day	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Application (Maximum Project Co exposure)
Maintenance Records and Reporting							
A(12)1.0(c)(ii)	Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to the Daily submittals that are required. (Daily Report as per Article 1.8(a)(vi))	QF	Minor	NA	NA	D	1 QF per day
A(12)1.0(c)(ii)	Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to the Monthly submittals that are required. (Monthly Activity Report as per Article 1.8(a)(ii))	QF	Minor	NA	NA	M	1 QF per month
A(12)1.0(c)(ii)	Project Co shall follow the maintenance reporting requirements set out in Article 1.8 of Appendix A with regard to reports submitted to a third party (per Article 1.8(a)(vii)	QF	Major	NA	NA	PR	1 QF per request
A(12)1.0(b)(i)	Project Co shall submit Annual Preventative Maintenance Plan in compliance with Article 1.4(a)(iii) of Appendix A.	QF	Major	NA	NA	A	1 QF per Contract Year
A(12)1.0(c)(ii)	Project Co shall comply with the record-keeping requirements of Article 1.8(a)(i).	QF	Major	NA	NA	R	1 QF per Contract Month
A(12)1.0(b)(ii)	Project Co shall at all times maintain complete and updated versions of the Maintenance and Rehabilitation Plan, along with the sub plans described as the Custodial Maintenance Plan, the Corrective Maintenance Plan, and the Preventive Maintenance Plan.	QF	Major	NA	NA	R	1 QF per Contract Month

APPENDIX A – ATTACHMENT 13

MAINTENANCE ACTIVITIES AND COORDINATION

1.0 Maintenance Activities and Coordination

(a) Pursuant to Appendix A, Article 1.4, when performing the Maintenance Services, Project Co shall provide all maintenance activities, as defined in whole or in part as part by the Maintenance and Rehabilitation Plan, and maintenance coordination, as defined in whole or in part by Appendix A of this schedule and for further clarity including the LRT Rules and Procedures, in accordance with the performance requirements described throughout Schedule 15-3 and diligently at all times during the Maintenance Term in accordance with the Project Agreement, notwithstanding Project Co's rights and entitlements as provided elsewhere in the Project Agreement.

(b) Performance Requirements

(i) General

A. Project Co shall coordinate and perform such Maintenance activities within the System only upon receiving prior approval from the City as required by Appendix A, Article 1.5.

B. Project Co shall ensure all Employees performing Maintenance on the System are governed by the LRT Rules and the Standard Operating Procedures.

C. Project Co shall ensure all Employees performing Maintenance on the System receive clearance from the TOCC to enter and perform Maintenance Services when so required by the LRT Rules and Standard Operation Procedures.

D. Project Co shall ensure all employees performing Maintenance on the System are certified and trained on the LRT Rules and Standard Operating Procedures.

E. Project Co shall ensure that all Non Revenue Vehicles and equipment are operated in accordance with the LRT Rules and Standard Operating Procedures and Good Industry Practice, and for further certainty may require prior approval for use on the System by the TOCC.

F. Project Co shall ensure Maintenance plans and services are in compliance with all regulatory requirements.

(ii) Deficiencies

A. Upon receiving notification of the Deficiency in accordance with Article 2.2(b) of Appendix A, Project Co shall promptly take steps to remedy the Deficiency as follows:

i in the event that the Deficiency constitutes an issue with respect to the Safety Management System;

ii Project Co shall remedy the Deficiency immediately if possible, but at least within 24 hours of the City's notice, notwithstanding more stringent response and / or rectification times as may be prescribed in the Attachments to Appendix A of Schedule 15-3;

iii in the event that the Deficiency does not contravene the Safety Management System, Project Co shall take corrective action to remedy the Deficiency, and / or shall submit an acceptable remediation plan to the City in respect of the Deficiency, including a deadline for rectification of the Deficiency, at the next weekly meeting occurring pursuant to Article 1.5 of Appendix A of this Schedule.

2.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime St. Avail = Captured by the Station Availability deduction regime	N/A = Not Applicable	N/A = Not Applicable ND = Correct by start of service the following day	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Application (Maximum Project Co exposure)
MAINTENANCE ACTIVITIES AND COORDINATION							
A(13)1.0(c)(i)(A)	Project Co shall coordinate and perform such Maintenance activities within the System only upon receiving prior approval from the City as required by Appendix A, Article 1.5.	QF	Major	NA	NA	PE	One QF per non-compliance

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Application (Maximum Project Co exposure)
A(13)1.0(c)(i)(B) and (D)	Project Co to ensure all Employees working on the Maintenance of the OLRT System are governed, trained and certified with the LRT Rules and Procedures prior to performing any Maintenance work on the OLRT System	QF	Major	NA	NA	PE	One QF per non-compliance
A(13)1.0(c)(i)(E)	Project Co shall ensure the use of all Non-Revenue Vehicles and equipment is in compliance with the LRT Rules and Standard Operating Procedures and Good Industry Practice.	QF	Major	NA	NA	PE	One QF per non-compliance

APPENDIX A – ATTACHMENT 14

OPERATIONS AND MAINTENANCE INTERFACE

1.0 Scope of Services

(a) Project Co, in conjunction with the City, shall develop an Integrated Management Information Reporting System that combines service delivery and maintenance performance information and update this prior to the commencement of Maintenance Services on the Stage 2 East System and Stage 2 West System to incorporate these parts of the System. The plan for developing the Integrated Management Information Reporting System shall initially be provided to the City ten (10) months prior to the Required Revenue Service Availability Date, the scheduled Stage 2 East Revenue Service Availability Date and the scheduled Stage 2 West Revenue Service Availability Date for review in accordance with the review process described in Schedule 10 – Review Procedure.

(b) Project Co shall integrate data from SCADA, ATS, Maintenance Information Systems, Help Desk, Automatic Passenger Counters and other information systems to produce a daily operating report, in accordance with the requirements set out in Article 1.0(c) and (d) below ("Daily Operating Report").

(c) Project Co and the City shall meet each morning in order to review operations and maintenance performance. The purpose of the morning business meeting shall be to coordinate operations and maintenance activities, to review the prior day(s) performance, to assign responsibility for lost service, to assess performance, to discuss current day's plans, future plans, planning for special events, weather events, and to conduct other operational business necessary for the delivery of safe, reliable and high quality passenger service. The meetings shall be attended in person (or unless mutually agreed to otherwise) by the City Representative and the Project Co Representative, or their delegates. The City and Project Co may mutually agree to cancel or postpone any morning business meeting and use subsequent meetings to catch up as required.

(d) Project Co shall produce a draft Daily Operating Report for each morning business meeting, including the information set out below. Project Co shall deliver the draft Daily Operating Report at least two (2) hours prior to the scheduled start time of the relevant morning meeting and shall indicate the time of delivery through a time stamp method or electronic delivery. The draft Daily Operating Report shall contain, at a minimum, the following information relevant to the previous day or days performance:

(i) Operations

A. Revenue Service Vehicle Kilometres delivered versus Scheduled Revenue Service Vehicle Kilometres;

B. Description of events that resulted in loss of Scheduled Revenue Service Vehicle Kilometres, indicating which are claimed by Project Co to be due to a Non-

Project Co Cause supported by a description of the event and a justification for meeting the Non Project Co Cause criteria;

C. On-time performance and schedule adherence;

D. Accidents / Injuries of Passengers and Employees;

E. Dropped trips;

F. Standing delays of over 6 minutes; and

G. Vehicle Unloads.

(ii) Ridership

A. Daily ridership totals from the Automatic Passenger Counters; and

B. Average load capacity by vehicle, by trip.

(iii) Systems Status

A. Fleet Availability (identify peak vehicles utilized for service, vehicles held for maintenance, any vehicles held out of service due to defect);

B. Non-revenue fleet availability (identify and fleet defects);

C. Station Availability (including status of all elevators and escalators), including a breakdown of Scheduled Station Hours and Station Availability Failure Hours (if any) for each station, indicating the time and duration of any such Station Availability Failure Hours;

D. Identification of any Station Related Non Project Co Cause, supported by a description of the event and a justification for meeting the Station Related Non Project Co Cause criteria;

E. Tunnel (identify status of all Fire/Life/Safety elements including emergency ventilation system, emergency lighting, emergency walkways, backup power supply, passenger address system, emergency telephones, blue light stations);

F. Track Availability (report slow orders or tracks out of service);

G. Train Control and Signalling (identify any system defects);

H. Substations and Power Distribution (identify any system defects); and

I. Maintenance and Storage Facilities (identify any defects).

(iv) Help Desk

A. Calls received versus calls cleared;

B. Status/summary of open calls.

(e) Project Co and the City shall review the draft Daily Operating Report at the morning meetings.

(f) The City shall, within twenty-four (24) hours of the delivery of the draft Daily Operating Report (as indicated by the time stamp or other method used pursuant to Article 1.0(d), above), either:

(i) Approve the draft Daily Operating Report, in which case the report shall be considered closed and shall be used as a basis for developing the Performance Monitoring Report and otherwise recording Project Co performance, subject to any errors or omissions subsequently discovered; or

(ii) Decline to approve all or part of the draft Daily Operating Report, and specify the amendments required by the City.

(g) If the City fails to respond within the relevant twenty-four (24) hour time period, then the City shall be deemed to approve the draft Daily Operating Report in accordance with Article 1.0(f)(i), above.

(h) If the City declines to approve all or part of the draft Daily Operating Report, then Project Co shall, within twenty-four (24) hours of notice by the City that it does not approve, either:

(i) Amend the draft Daily Operating Report in accordance with the amendments required by the City, subject to final review and approval by the City; or

(ii) Dispute all or part of the amendments required by the City(such dispute being a "**Maintenance Dispute**"), in which case the matter shall be referred to the Maintenance Committee for resolution ("**Maintenance Dispute Resolution Procedure**").

(i) If Project Co fails to respond within the relevant twenty-four (24) hour time period, then Project Co shall be deemed to have accepted the City's amendments to the draft Daily Operating Report and the report shall be considered closed.

(j) If Project Co disputes all or part of the amendments required by the City, as per Article 1.0(h)(ii), then:

(i) All aspects of the Daily Operating Report which are not the subject of a dispute shall be considered closed and shall be used as a basis for developing the Performance Monitoring Report and otherwise recording Project Co performance, subject to any errors or omissions subsequently discovered; and

(ii) All aspects of the Daily Operating Report which are the subject of a dispute shall be assumed, for the purposes of developing the Performance Monitoring Report and otherwise recording Project Co performance, to be resolved in favour of the City,

pending the outcome of resolution by the Maintenance Committee or additional dispute resolution processes selected by the Maintenance Committee, provided that:

A. In the case of a disputed matter which would, if resolved in favour of the City, result in Failure Points being assigned to Project Co, no Failure Points shall be assigned until resolution of the dispute; and

B. In the case of a disputed matter or matters which could result in cumulative Deductions in excess of $10,000 (Adjusted for Inflation) being assigned to Project Co related to the matter(s) in dispute, no Deductions related to such matter(s) in excess of this amount shall be applied until resolution of the dispute.

(iii) If the Maintenance Committee is unable to resolve the Maintenance Dispute, the dispute matter shall be resolved pursuant to the Dispute Resolution Procedure.

2.0 Performance Criteria

FE Type	Category	Response	Rectification / Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime St. Avail = Captured by the Station Availability deduction regime	N/A = Not Applicable	N/A = Not Applicable ND = Correct by start of service the following day	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi-Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Application (Maximum Project Co exposure)
OPERATIONS AND MAINTENANCE INTERFACE							
A(14)(c) and (d)	Project Co shall produce the Daily Operating Report in accordance with the requirements in Article 1.0(d).	QF	Major	NA	NA	PE	One QF per non-compliance

APPENDIX A – ATTACHMENT 15

MAINTENANCE RESPONSIBILITY TABLE

This Maintenance Responsibility Table sets out as a general guide, for the convenience only of the Parties to the Project Agreement, the allocation of maintenance responsibilities with respect to the OLRT System. However, this Maintenance Responsibility Table is not intended to specifically or exhaustively define the allocation of responsibilities for Maintenance on the OLRT System nor is it to be construed as a detailed or complete list of Maintenance responsibilities for the System. In the event of any conflict between the Project Agreement (including this Schedule 15-3) and Maintenance Responsibility Table the provisions of the Project Agreement including this Schedule 15-3 (excluding Attachment 15) shall prevail. For further certainty, all New System Infrastructure shall be the responsibility of Project Co, unless expressly stated otherwise in the Project Agreement.

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
LRT Systems & Power	✓	
Subsystems	✓	
LRT Vehicles	✓	
Vehicles	✓	
Non-Revenue Vehicles	✓	
Traction Power	✓	
Traction Power substations	✓	
Traction Power rectifier units	✓	
Rectifier transformer	✓	
Substation AC switchgear & protection devices	✓	
Substation DC switchgear & protection devices	✓	
HVAC	✓	
Substation Grounding System	✓	
DC feeder system	✓	
Battery subsystem	✓	
Auxiliary power equipment	✓	

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
Fire/Smoke Detection	✓	
Intrusion alarm subsystem	✓	
Lightning protection	✓	
Negative disconnect switch	✓	
Positive disconnect switch	✓	
Telephone equipment **[**Footnote 1)**]**	✓	
Protective devices and metering	✓	
Cable and raceway subsystem	✓	
Substation foundation	✓	
Negative return rail overvoltage detection	✓	
Tie in equipment to Hydro Ottawa Alignment Supply points / demarcation [Footnote 2)]	✓	
Overhead Catenary System	✓	
OCS, supporting systems and foundations	✓	
Cathodic Protection	✓	
Lightning protection	✓	
Feeder and reinforcing Cables	✓	
Pantograph	✓	
Switch heaters	✓	
Train Control and Signaling System	✓	
CBTC	✓	
Vital Microprocessor Interlocking Systems	✓	
Non-vital control logic	✓	
Vehicle location system	✓	

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
Onboard logic processor	✓	
ATP	✓	
Grounding	✓	
Fuses and electrical protection	✓	
Local control panels	✓	
Event recorders	✓	
Wayside switch indicators	✓	
Mainline switch machines	✓	
Track switch heaters	✓	
Relays	✓	
Control circuitry and software	✓	
Balise / Train position detection and associated signalling	✓	
Instrument houses, cases and junction boxes	✓	
Wayside LRT signal equipment	✓	
Batteries	✓	
Wheel detectors	✓	
Yard switch machines	✓	
Communications and Control systems	✓	
Communication Transmission System (CTS) **[**Footnote 12)**]**	✓	✓
Public address (PA)	✓	
Passenger information display system (PIDS)	✓	
Closed circuit television (CCTV)	✓	
Workstations **[**Footnote 3)**]**	✓	

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
Monitors **[**Footnote 3)**]**	✓	
Application Servers **[**Footnote 3)**]**	✓	
Database Servers **[**Footnote 3)**]**	✓	
Network Recorders **[**Footnote 3)**]**	✓	
Intrusion access control system (IAC)	✓	
Telephone and Intercom System **[**Footnote 1)**]**	✓	✓
SCADA	✓	
Train control	✓	
LRT Consoles	✓	
LRT Signaling Room	✓	
Backup & Yard Control Centre	✓	
Radio communication systems **[**Footnote 13)**]**		✓
Master clock	✓	
Cathodic Protection/Stray Current	✓	
Structures and materials	✓	
Coating systems	✓	
Cathodic protection	✓	
Stray current corrosion prevention systems	✓	
Miscellaneous System Infrastructure		
Uninterruptible power supplies and battery banks	✓	
Lighting controls	✓	
Guideway intrusion detection and monitoring system	✓	
Emergency equipment	✓	

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
Motor control centers	✓	
Emergency generators	✓	
DC power disconnects, transfer switches, and ground switches	✓	
Tunnel lighting	✓	
Tunnel ventilation systems	✓	
Tunnel pumping operation	✓	
Safety and monitoring system	✓	
Dynamic information signs	✓	
Passenger information signs	✓	
Public address system – Stations	✓	
Public address system – Vehicles	✓	
Trackwork (including Tracks):		
Track, running rails (including railhead profiling, track adjustment and levelling, and noise and vibration mitigation)	✓	
Sleepers, ties/transition ties, electrical insulation and impedance bonds	✓	
Turn outs, switches, crossovers, etc.	✓	
Track Slab	✓	
Ballast (including tamping)	✓	
Removal of debris and contaminants from switches, turnouts, and track and rail head	✓	
Maintenance of way equipment	✓	
Track heaters and controls	✓	
Noise and vibration control measures	✓	
Ice and snow removal from Tracks, switches & catenaries, and drainage structures	✓	

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
Alignment:	✓	
Guideway walkways]	✓	
Railbed	✓	
Service and Track access roads/driveways/walkways/emergency access	✓	
Grading, erosion control and ditch cleaning	✓	
Drainage control and systems for guideway and ancillary facilities including Catch Basins, Ditch Inlets, Manholes, Sewers, Swales, and Culverts (including stormwater quality and quantity management ponds) [Footnote 5]	✓	
Stormwater quantity and quality control facilities including enhanced grassed swales, bioretention swales, and infiltration trenches [Footnote 5]]	✓	✓
Woodroffe (Pinecrest Creek) Stormwater Management Facility		✓
Fencing **[**Footnote 6**]**	✓	
Noise Walls	✓	
Illumination	✓	
Signing (warning, guidance, location, identification, regulatory, operational and others)	✓	
Removal of rock fall and debris from tunnel portal structures and Guideway below portals	✓	
Custodial Maintenance Alignment:	✓	
Debris collection and disposal **[**Footnote 7**]**	✓	
Snow and ice clearing, removal, sanding and salting [Footnote 14)]	✓	
Landscaping	✓	
Vegetation control	✓	
Grass control	✓	

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
Weed Control/ Brush Cutting		✓	
Tree and shrub maintenance		✓	
Vandalism & graffiti		✓	
Pest Control		✓	
Roadways:			
Integrated retaining wall and concrete barrier, drawing 2014, 208+950 to 209+000. And drawing 2015, 209+350 to 209+400	**South of EB Track. East and West of Place D'Orleans Station**		✓
Guideway Barrier Wall [Footnote 18]	Concrete wall (jersey barrier) separating guideway and OR174		✓
Retaining Walls: [Footnote 6**]**			
Name:	**Location**		
Stage 1			
New Retaining Walls for ramps in the staging of transit movements in and around this area.	W of Tunney's Pasture Station	✓	
W Twy N Ret Wall Btwn SN 019560-1	E of Ross Av		✓
W Twy S Ret Wall Btwn SN 019560-2	E of Ross Av		✓
W Transitway Tunney's Pasture Stn Ret Wall (N) SN 019650-2	Holland Ave		✓
W Transitway Tunney's Pasture Stn Ret Wall (S) SN 019650-3	Holland Ave		✓
W Transitway Ret Wall Btwn 0623-0624 (N) SN 019550-1	Btwn Holland & Parkdale		✓
W Transitway Ret Wall Btwn 0623-0624 (S) SN 019550-2	Btwn Holland & Parkdale		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
W Transitway Ret Wall Btwn 0622-0623 (N) SN 019540-1	Btwn Parkdale & Hinchey		✓
W Transitway Ret Wall Btwn 0622-0623 (S) SN 019540-2	Btwn Parkdale Av & Hinchey St		✓
W Transitway Ret Wall Btwn 0621-0622 (N) SN 019530-1	Btwn Hinchey St & Carruthers Av		✓
W Transitway Ret Wall Btwn 621-622 (S) SN 019530-2	Btwn Hinchey St & Carruthers Av		✓
W Transitway Ret Wall E of 0621 (N) SN 019520-1	E of Carruthers Av		✓
W Transitway Ret Wall E of 0621 (S) SN 019520-2	E of Carruthers Av		✓
W Transitway Ret Wall W of 0620 (N) SN 019510-1	W of Bayview Rd.	✓	
W Transitway Ret Wall W of 0620 (S) SN 019510-2	W of Bayview Rd	✓	
W Transitway Ret Wall E of 0620 (N) SN 019500-1	E of Bayview Rd	✓	
W Transitway Ret Wall E of 0620 (S) SN 019500-2	E of Bayview Rd	✓	
New Retaining Wall South of Transitway @East Portal	East Portal to Campus Station	✓	
New Retaining Wall North of Transitway @ East Portal	East Portal to Campus Station	✓	
CA Transitway Ret Wall NW of 0604 (W) SN 019190	N of Queensway		✓
CA Transitway Ret Wall SE of 0604 (E) SN 019180	N of Queensway		✓
CA Transitway Ret Wall below SN 014010 SN 019260	Below Hwy417 IC 118 Ramp 62		✓
CA Transitway E Ret Wall Btwn 014010-016050 SN 019200	Btwn Queensway & Lees Ave		✓
CA Transitway Ret Wall Btwn 0401-0605 (W) SN 019210	W side Btwn Queensway & Lees Ave		✓
CA Transitway Ret Wall Btwn 0605-0301 (E) SN 019220	E side Btwn Lees Ave & Rideau River		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
CA Transitway Ret Wall Btwn 0605-0301 (W) SN 019230	W side Btwn Lees Ave & Rideau River		✓
Ret Wall Btwn 665-666 (N) SN 059860	Btwn Riverside Dr & Train Stn		✓
E Transitway Ret Wall E of 668 (N) SN 059490	W of Belfast Rd		✓
Belfast MSF North Portal West Retaining Wall (South Face)	Belfast Road near Hwy 417 into Train yard	✓	
Belfast MSF North Portal East Retaining Wall (South Face)	Belfast Road near Hwy 417 into Train yard	✓	
Retaining Wall between North Portal and South Portal	Train yard	✓	
Belfast MSF South Portal to Grade Retaining Walls	Belfast Road into Train yard	✓	
E Transitway Ret Wall W of Queensway (N) SN 059880	@W Entrance to Qway Tunnel		✓
E Transitway Ret Wall W of Queensway (S) SN 059870	W Entrance to Qway Tunnel		✓
St Laurent Station Ret Wall SN 056710-4	St Laurent Stn		✓
E Transitway Ret Wall NW of 674 (W) SN 059940	@St Laurent & Hwy 417		✓
E Transitway Ret Wall Btwn 0674-2671 (S) SN 059900	St Laurent & Hwy 417		✓
E Transitway Ret Wall Btwn 2672-0482 (N) SN 059920	@ St Laurent & Hwy 417		✓
E Transitway Ret Wall Btwn 2671-2672 (W) SN 229910	St Laurent & Hwy 417		✓
E Transitway Ret Wall SE of 2673 (S) SN 229930	@St Laurent & Hwy 417		✓
E Transitway Ret Wall SE of 2673 (S) SN 229960	Michael St		✓
E Transitway Ret Wall NE of 2673 (N) SN 229970	W of Cyrville Rd		✓
Blair Station S Ret Wall SN 229040-2	W of Station South Tower-adjacent to		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
	Queensway		
Blair BRT Station West Ret Wall SN 229040-6	West of Station Centre Tower		✓
Blair BRT Station East Ret Wall SN 229040-7	East of Station Centre Tower		✓
Blair BRT Station N Ret Wall SN 229040-8	East of Station North Tower		✓
Stage 2			
Trim Road interchange retaining walls (new)	Trim Rd and OR174 Interchange		✓
OR174 Flyover RSS wall (new)(SN229311 / 229312 / 229313 / 229314)	0.8km E of Blair Rd	✓	
Retaining walls required for road construction/grading not associated with the guideway (new)	Various locations		✓
New retaining walls required to support the System Infrastructure	Various locations	✓	
West Transitway South Rock Wall (SN019991)	W of Tunney's Pasture Station		✓
West Transitway North Rock Wall (SN019992)	W of Tunney's Pasture Station		✓
Retaining Wall west of Bayshore Station to Support the elevated guideway for grade separation over Holly Acres (new)	Bayshore Station	✓	
Retaining Walls Between Pinecrest Station and HWY 417 E-NS Ramp at Pinecrest Road (new)	Pinecrest Road	✓	
Retaining Walls to support elevated embankment Lincoln Fields Junction (new)	0.8km S of Lincoln Fields LRT Station	✓	
Retaining Wall at Lincoln Fields LRT Station (new)	Immediate south of station, parallel to Carling Avenue	✓	
Retaining Walls immediately north and south of New	New LRT bridge over Carling Avenue, south	✓	

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
Carling Ave Bridge (new)	of Lincoln Fields Station		
Retaining Walls immediately north and south of Iris St Bridge (new)	New Iris St bridge over LRT		✓
Retaining Walls Between Hwy 417 E-NS Ramp at Pinecrest Road and West Portal of Connaught Tunnel (new)	East and West of Queensview Station	✓	
Proposed retaining wall, Drawing GUID-2000, 157+360 to 157+400 .	2.5m south of EB Track	✓	
Proposed retaining wall, Drawing GUID-2001, 157+500 to 157+525 .	5 to 10 m north of WB Track	✓	
Proposed retaining wall, Drawing 2013, 61+250 to 61+300	South of EB Track	✓	
Lincoln Fields split wall, Drawing 2020, 63+400 to 63+450	West of Lincoln fields Flyover	✓	
Proposed Retaining wall, Drawing 2023, 64+100 to 64+150	Both sides of Track	✓	
Proposed Retaining wall, Drawing 2001, 91+450 to 91+ 750	North of Baseline Station	✓	
Retaining walls for Montreal Road Flyover, drawing 2004, 201+300 to 201+550	South of EB Track	✓	
Stillwater Creek Bridges at LMSF	Drawing SCBR-1000 and 1001		✓
Culverts / Sewers: (Culverts refers to lateral conveyance of storm water roughly perpendicular to the LRT ROW, while sewers refers to longitudinal conveyance of storm water parallel to the LRT ROW) **[**Footnote 5**]**			
Stage 1			
Merton Street Storm Regulator			✓
525 mm Storm Sewer East of Bayview Road			✓
1800 mm Storm Sewer East of Bayview Station			✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
750 mm Storm Sewer at Mann Ave			✓
1650 mm Storm Sewer at Hurdman BRT Station			✓
1200 mm Storm Sewer West of the Hurdman Pump Station			✓
1500 mm Storm Sewer East of Riverside Drive			✓
W Transitway Twin Cell Box Storm Sewer SN 018230-2	W Transitway over Box Storm Sewer **[**Footnote 5(c)(ii)**]**	✓	✓
E Twy Twin Culvert E of Hurdman Station SN 058840	0.20 km E of Hurdman Station RF Con JG Lot 12 **[**Footnote 5(c)(ii)**]**	✓	✓
E Twy S Culvert SN T051000	0.44 km E of Hurdman Stn	✓	
E Twy S Culvert SN T051020	0.6 km E of Hurdman Stn	✓	
E Transitway Culvert 1.40 Km E of St Laurent Blvd SN 228370	1.40 Km E of St Laurent Blvd OF Con 2 Lot 24	✓	
Stage 2			
Confederation Line East			
Transitway Storm Sewer (STM66813)	0.05 km W of Blair Road	✓	
Transitway Culvert (T224630)	0.25 km E of Blair Road		✓
Hwy 174 Culvert (A224700)	1.0 km E of Blair Rd		✓
Hwy 174 Culvert Median outlet (A224710)	1.15 km E of Blair Rd	✓	
Hwy 174 Culvert (A224720)	1.35 km E of Blair Rd		✓
Storm Sewer Outlet (STM80696)	1.0 km W of Montreal Road	✓	

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
Storm Sewer Outlet (new)	Under OR174 on-ramp, 0.05 km W of Montreal Road	✓	
Storm Sewer Outlet (A224735)	Under OR174 off-ramp, 0.15 km E of Montreal Road	✓	
Storm Sewer Outlet (A224740)	0.45 km E of Montreal Road	✓	
Storm Sewer Outlet (A224750)	0.55 km E of Montreal Road	✓	
Storm Sewer Outlet (A224770)	0.70 km E of Montreal Road	✓	
Storm Sewer Outlet (A224780)	0.80 km E of Montreal Road, immediately adjacent to Green's Creek culverts	✓	
Green's Creek Culvert under OR174 (SN227110)	0.4 km W of Sir George-Etienne Cartier Parkway	✓	
Storm Sewer Outlet (new)	0.3 km W of Sir George-Etienne Cartier Parkway		✓
Storm Sewer Outlet (224790)	0.2 km W of Sir George-Etienne Cartier Parkway	✓	
OR174 Culvert (A220420)	0.2 km W of Sir George-Etienne Cartier Parkway		✓
OR174 Culvert (A224810)	0.3 km E of Sir George-Etienne Cartier Parkway		✓
OR174 Culvert (A224840)	0.95 km E of Sir George-Etienne Cartier Parkway		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
OR174 Culvert (A224820)	0.95 km E of Sir George-Etienne Cartier Parkway		✓
OR174 Culvert (A224860)	1.10 km W of Jeanne D'Arc Boulevard		✓
OR174 Culvert (A224880)	1.10 km W of Jeanne D'Arc Boulevard		✓
OR174 Culvert Median outlet (A224890)	Under OR174 WB onramp, 0.25 km W of Jeanne D'Arc Boulevard	✓	
OR174 Culvert (A224900)	0.52 km from Off Ramp Hwy 174 EB to Jeanne D'arc Boulevard		✓
OR174 Culvert (A224902)	0.35 km from Hwy 174 to Jeanne D'arc Boulevard		✓
OR174 Culvert (A224908)	0.03 km from Hwy 174 to Youville Drive		✓
OR174 Culvert Median outlet (A224925)	0.05 km E of Jeanne D'Arc Boulevard	✓	
OR174 Culvert Median outlet (A224930)	0.25 km E of Jeanne D'Arc Boulevard	✓	
OR174 culvert (220660)	0.40 km E of Jeanne D'Arc Boulevard		✓
OR174 Culvert (220670-1)	0.25 km W of Orleans Boulevard		✓
OR174 Culvert (220670-2)	0.25 km W of Orleans Boulevard		✓
OR174 Culvert (A224940)	Parallel to OR174, under Orleans Boulevard		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
OR174 Culvert (A224950)	Parallel to OR174, under Orleans Boulevard		✓
Storm Sewer Outlet (STM79592)	Under Orleans Boulevard overpass		✓
OR174 Culvert (A224960)	0.4 km E of Orleans Boulevard		✓
Bilberry Creek Culvert under OR174 (SN224510)	0.5 km E of Orleans Boulevard		✓
OR174 Culvert Median outlet (A224970)	OR174 Median outlet (A224970) (discharges into Bilberry Creek)	✓	
OR174 Culvert (A224980)	0.75 km W of Champlain St		✓
OR174 Culvert (A224985)	0.60 km W of Champlain St		✓
OR174 Culvert (220690-1 and 220690-2)	0.40 km W of Champlain St		✓
Storm Sewer Outlet (STM67980)	Under Champlain St overpass		✓
OR174 Culvert Median outlet (A894610)	OR174 Median culvert under WB lanes and off-ramp	✓	
OR174 Culvert Median outlet (898505)	OR174 Median culvert under EB lanes and on-ramp	✓	
OR174 Culvert Median outlet (A894630)	0.55 km W of Tenth Line Road	✓	
OR174 Culvert (898510)	0.30 km W of Tenth Line Road		✓
OR174 Culvert (A894640)	0.20 km W of Tenth Line Road		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
OR174 Culvert (A894680)	0.20 km E of Tenth Line Road		✓
Hwy 174 BCulvert OS Con 1 Lot 33 (SN894040)	Box Culvert under OR174, 0.5 km E of Tenth Line Road		✓
OR174 Culvert Median outlet (A894690)	0.60 km E of Tenth Line Road	✓	
OR174 Culvert Median outlet (A894700)	0.90 km E of Tenth Line Road	✓	
Hwy 174 Taylor Creek BCulvert (SN894050)	Taylor Creek Box Culvert under OR174, 0.7 km W of Trim Road		✓
OR174 Culvert Median outlet (A894710)	0.6 km W of Trim Road	✓	
OR174 Culvert Median outlet (A894720)	0.15 km W of Trim Road	✓	
OR174 Culvert (A898560)	0.13 km W of Trim Road		✓
OR174 Culvert Median outlet (A894725)	0.05 km E of Trim Road	✓	
OR174 Median outlet (new)	0.25 km E of Trim Road		✓
Confederation Line West			
Ottawa River Parkway Pipe (ORPP) (to be relocated by DB Co.)	Parallel to Transitway, under Lincoln Fields BRT Station		✓
West Nepean Collector (WNC)	Runs parallel to guideway, Byron Linear Park		✓
Box Culvert under West Transitway (SN018230) [Footnote 5)]	Twin Box Culvert under West Transitway	✓	✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
	[Footnote 5(c)(ii)**]**		
Pinecrest Creek Culvert Under Iris	Pinecrest Creek Culvert Under Iris Street		✓
Pinecrest Creek Culvert Under Alignment	Pinecrest Creek Culvert Under Alignment	✓	
Southwest Transitway – Pinecrest Creek Kenson Park Culvert (SN018360)	Southwest Transitway – Pinecrest Creek Kenson Park Culvert	✓	
Southwest Transitway – Pinecrest Creek Baseline Road Culvert (SN018370)	Southwest Transitway – Pinecrest Creek Baseline Road Culvert	✓	
Existing Southwest Transitway Storm Sewer – from south of Queensway to south of Lincoln Fields Junction (STM69582)	375mm – 1050mm storm sewer under Southwest Transitway at existing Queensway Station	✓	
Existing Baseline Station Tunnel Storm Sewer	975mm storm sewer under Baseline Station Tunnel	✓	
Existing Baseline Outfall	1050mm Outfall from Baseline Rd to SN018360	✓	
New Storm Sewer connecting Baseline Station Tunnel Storm to Baseline Outfall	1050mm storm sewer from Baseline Tunnel to Baseline Road	✓	
Existing West Transitway Storm Sewer – from Pinecrest Station to Bayshore Station (STM66054)	450mm – 1200mm storm sewer under West Transtiway	✓	
New culverts required to support System Infrastructure	Various locations	✓	
Sanitary sewers along Byron Ave, from Richardson Ave to Ancaster Ave and from Compton Ave to Sherbourne Rd	SAN25945, SAN25947, SAN25957, SAN25958, SAN25959,		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
	SAN25961, SAN25974, SAN25946, SAN25948, SAN25977, SAN25949, SAN25981, SAN25982, SAN26468, SAN26469, SAN26470, SAN26477, SAN26465, SAN26464, SAN26463, SAN26462, SAN26461		
Storm sewers along Woodroffe Ave from Richmond Rd to Byron Ave	STM64871, STM65874, STM64901, STM65754		✓
Storm outfalls along the Southwest Transitway from Baseline Rd to Iris St	OUT04296, OUT12946		✓
Structures/Bridges: [Footnote 8]			
Stage 1			
New Ramps in the staging of transit movements in and around this area.	W of Tunney's Station	✓	
W Transitway U/P Tunney's Bus Access Ramp	Tunney's Ramp over W Twy	✓	
Tunney's BRT Station SN 018210	Ped Bridge	✓	
W Transitway U/P Holland Av SN 016240	Holland Av over W Transitway		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
W Transitway U/P Parkdale Av SN 016230	Parkdale Av over W Transitway		✓
W Transitway U/P Hinchey Av SN 016220	Hinchey Av over W Transitway		✓
W Transitway U/P Carruthers Av SN 016210	Carruthers Av over W Transitway		✓
W Transitway O/P Bayview Rd SN 016200	Bayview Rd under W Transitway	✓	
W Transitway O/P O-Train Line SN 015040	0.30 km E of Bayview Rd	✓	
Broad St Bridge SN 017040	Lebreton Flats W of Booth, OF Con A Lot 39/40	✓	
Booth St Bridge O/P Open Aqueduct SN 017030	Booth St over Open Aqueduct		✓
Campus BRT Station – CA Twy O/P Ped Tunnel SN 018160	Ped Subway at Univ of Ottawa Campus Station	✓	
CA Transitway O/P Mann Av SN 016950	Mann Av under CA Transitway	✓	
CA Transitway Hwy 417 Nicholas Ramp O/P Transitway SN 016040	Nicholas St off ramp over CA Transitway		✓
CA Transitway U/P Queensway SN 014010	CA Transitway under Queensway		✓
CA Transitway Lees Av O/P Transitway SN 016050	Lees Av over CA Transitway		✓
CA Transitway O/P Rideau River SN 013010	CA Transitway over Rideau River	✓	
Hurdman Stn W Bridge		✓	
Hurdman Stn E Bridge		✓	

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
E Transitway O/P Riverside Dr SN 056650	Riverside Dr under E Transitway	✓	
E Transitway U/P W Train Station Access Rd SN 056660	W Access Rd over E Transitway		✓
New Ering Rd Bridge		✓	
E Transitway U/P E Train Station Access Rd SN 056670	E Access Rd over E Transitway		✓
E Transitway U/P Tremblay Rd SN 056680	Tremblay Rd over E Transitway		✓
E Transitway U/P Belfast Rd SN 056690	Belfast Rd over E Transitway		✓
E Transitway U/P Queensway EB & WB SN 056700	EB Queensway over E Transitway		✓
St Laurent BRT Station – Tunnels SN 056710-1,-2,-3	St Laurent Stn Tunnels – connects Centre Tunnel to 056700 E Tway		✓
St Laurent BRT Station – Ped Bridge O/P E Transitway SN 056710-5	Ped Bridge		✓
E Twy U/P WB Queensway On-Ramp SN 056720	Queensway NW Ramp over E Transitway		✓
E Transitway U/P St Laurent Blvd SN 056730	St Laurent Blvd over E Transitway		✓
E Transitway U/P Trumpet Ramp W SN 056740	Queensway Off Ramp over E Transitway		✓
E Transitway U/P Trumpet Ramp C SN 226710	W/Ramp from St Laurent SB		✓
E Transitway U/P Trumpet Ramp E SN 226720	W/Ramp from St Laurent S/B over T/Way		✓
E Transitway U/P WB Queensway Exit Ramp SN 226730	Exit Ramp over T/Way		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
	@ St Laurent		
E Transitway U/P Cyrville Rd SN 226740	E Transitway under Cyrville Rd		✓
E Transitway U/P Aviation Pkwy SBL **[**W Bridge**]** SN 226750	E Transitway @ Aviation Pkwy SBL		✓
E Transitway U/P Aviation Pkwy NBL **[**E Bridge**]** SN 226760	E Transitway @ Aviation Pkwy NBL		✓
E Transitway Cyrville Drain SN 226770–	E Transitway over Cyrville Drain	✓	
Blair BRT Station Ped Bridge Over Tway SN 229040-1	Ped Bridge Over Tway	✓	
Blair BRT Station Ped Subway SN 229040-3	Ped Subway	✓	
Blair BRT Station Ped Bridge Over Hwy 174 SN 229040-4	Ped Bridge Over Hwy 174 – 0.35 Km W of Blair Rd		✓
E Twy – Blair Rd O/P Transitway SN 226780	E Transitway under Blair Rd		✓
Stage 2			
Confederation Line East			
Green's Creek Pedestrian Bridge (SN221250)	0.4km W of Sir George-Etienne Cartier Parkway N of Green's Creek Culvert		✓
E Twy - Blair Rd O/P Transitway (SN226780)	Blair Road Bridge over Transitway (0.20 km E of Blair Station)		✓
E Transitway - Hwy 174 WB Blair Rd Off-Ramp O/P Tway (SN226790)	Highway 174 NW off-ramp Bridge to Blair over Transitway		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
OR174 Flyover Structure (SN224980) and associated retaining walls (SN's 224311, 224312, 224313, 224314)	Flyover to carry tracks over the westbound OR174 to the OR174 median	✓	
Montreal Road Station Bridge (SN224855)	Between existing Westbound and Eastbound OR174 Bridges over Montreal Road	✓	
Hwy 174 WBL O/P Montreal Rd (SN224850)	Replacement Westbound OR174 Bridge over Montreal Road		✓
Hwy 174 EBL O/P Montreal Rd] (SN224851)	Replacement Eastbound OR174 Bridge over Montreal Road		✓
Sir George-Etienne Cartier Parkway O/P Hwy 174 (SN224860)	Sir George-Etienne Cartier Parkway Bridge over OR174		✓
Jeanne D'arc Blvd O/P Hwy 174 (SN224870)	Jeanne D'Arc Blvd Bridge over OR174		✓
Orleans Blvd O/P Hwy 174 (SN224240)	Orleans Boulevard Bridge over OR174		✓
Champlain St O/P Hwy 174 (SN224890)	Champlain St. Bridge over OR174		✓
Tenth Line Rd O/P Hwy 174 (SN894010)	Tenth Line Road Bridge over OR174		✓
Trim Road Bridge over OR174 (SN894050)new)	Trim Road Bridge over OR174		✓
Confederation Line West			
Highway 417 Westbound Off-ramp at Pinecrest (SN015160)	Highway 417 Westbound Off-Ramp at Pinecrest		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
Goldenrod Bridge Structure at Tunney's Pasture (SN016255)	0.15km W of Tunney's Pasture Station		✓
W Twy - Ross Av O/P Transitway (SN016260)	Ross Avenue Bridge over Transitway		✓
W Twy - Northwestern Av O/P (SN016270)	Northwestern Avenue Bridge over Transitway		✓
W Twy - Carleton Av O/P (SN016330)	Carleton Avenue Bridge over Transitway		✓
W Twy - Roosevelt Av Ped Bridge O/P W Tway (SN018220)	Pedestrian Bridge over Transitway		✓
W Twy - Island Park Dr O/P (SN016280)	Island Park Drive Bridge over Transitway		✓
W Twy - Lanark AV O/P Transitway (SN016290)	Lanark Avenue Bridge over Transitway		✓
Utility [Hydro] Bridge @ McRae over W Transitway (SN019890)	Hydro Utility Bridge, 90m E of Tweedsmuir Avenue		✓
W Twy - Tweedsmuir Av O/P Transitway (SN016300)	Tweedsmuir Avenue Bridge over Transitway		✓
W Twy - Athlone Av O/P Transitway (SN016310)	Athlone Avenue Bridge over Transitway		✓
W Twy - Churchill Av O/P (SN016320)	Churchill Avenue Bridge over Transitway		✓
SJAM Parkway at Carleton Avenue Pedestrian Overpass (North/South bridges) (SN018620 / 018621)(349969)	Pedestrian underpass under SJAM Parkway		✓
SJAM Parkway at Lanark Avenue Pedestrian Overpass (North/South bridges) (SN018610 / 018611)(349972)	Pedestrian underpass under SJAM Parkway		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
U Approach – Depressed Guideway Parkway East Portal (SN019212)	Parkway Tunnel - East Portal	✓	
U Approach – Depressed Guideway West Portal (SN019213)	Parkway Tunnel - West Portal	✓	
SJAM Parkway at Churchill Avenue Pedestrian Overpass (SN018920)	0.5km W of Island Park Drive		✓
SJAM Parkway at Cleary Avenue Pedestrian Overpass (SN018910)	Link pathway system on north and south sides of SJAM Parkway		✓
Carling Avenue Bridge at Lincoln Fields Station (SN016070)	Approx. 80m E of existing Carling Ave Bridge		✓
Pedestrian Bridge at Woodroffe High School (SN018470)	Pedestrian Bridge at Woodroffe High School		✓
Lincoln Fields Split Structure (SN015050)	Lincoln Fields Split Structure	✓	
U Approach – Depressed Guideway Connaught East Portal (SN015130)	Tunnel under Connaught Avenue	✓	
U Approach – Depressed Guideway Connaught West Portal (SN 015140)	Tunnel under Connaught Avenue	✓	
Highway 417 Westbound On-Ramp at Pinecrest Road (SN015170)	Highway 417 Westbound On-Ramp at Pinecrest Road		✓
Pinecrest Road Overhead (SN015180)	Immediately adjacent to Pinecrest Station		✓
W Twy - Bayshore Dr 417 WB Off Ramp O/P (SN116410)	Highway 417 Westbound Off-Ramp at Richmond Road		✓
W Twy (Ext) - Richmond Rd (West Section) O/P (SN116420)	Richmond Road Overhead		✓
W Twy (Ext) - Richmond Rd On Ramp O/P (SN116430)	Highway 417 On-Ramp at Richmond		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
	Road		
SW Transitway U/P Queensway (SN014490)	Queensway (Hwy 417) Bridge over Southwest Transitway		✓
Iris Street Bridge (SN 015210)	Iris Street Bridge over LRT		✓
SW Twy - Baseline Rd O/P Transitway (SN016080)	Baseline Road Bridge over Southwest Transitway		✓
Graham Creek Culvert (SN117440)	Culvert under Queensway (Hwy 417) 100m WestEast of Holly Acres Road		✓
Holly Acres Rd Bridge (SN115320)	LRT Bridge over Holly Acres Road	✓	
Stillwater Creek Culvert (SN110180)	Culvert under proposed Moodie LMSF Culvert under Queensway (Hwy 417) 0.6km West of Moodie Drive	✓	✓
Stillwater Creek Culvert 1 (SN117440) Stillwater Creek Culvert 2 (SN117450)	Culverts under Queensway (Hwy 417) 0.6km West of Moodie Drive		✓
Stillwater Creek Bridges at LMSF	**Drawing SCBR-1000 and 1001**	✓	
Highway 417 S-W On Ramp at Moodie Drive (SN116370)	Highway 417 S-W On Ramp at Moodie Drive		✓
Highway 417 E-N/S Ramp at Moodie Drive (SN116390)	Highway 417 E-N/S Ramp at Moodie Drive		✓
Moodie Drive Bridge (SN116350)	Moodie Drive at Hwy		✓

MAINTENANCE RESPONSIBILITY TABLE		**Project Co**	**City / Other**
	417		
Highway 417 N-W On-Ramp at Moodie Drive (SN116330)	Highway 417 N-W On-Ramp at Moodie Drive		✓
Maintenance and Storage Facilities:		✓	
Service and access roads/driveways		✓	
Paving, parking lots and signing		✓	
Entrances, Pedestrian walkways and sidewalks		✓	
Stairways, elevators & escalators		✓	
Grading and erosion control		✓	
Drainage control		✓	
Stormwater Management (SWM) Pond (if applicable)		✓	
Fencing		✓	
Illumination		✓	
Noise control measures and noise walls		✓	
Signing (warning, guidance, location, identification, regulatory, operational, etc.)		✓	
Structural- footings, floors, walls, ceilings, chimneys, beams, columns, roof, insulation, overhead walkways, etc.		✓	
Wall components, doors, frames, windows, glazing systems, entry systems, finishes, etc.		✓	
Washrooms, locker rooms, offices, storage space, etc.		✓	
Interior finishes – floor & wall coverings, painting and finishes		✓	
Plumbing – Water & sewer services, waste water		✓	
Electrical – wiring, service, conduits, illumination, etc.		✓	
MSFs Mechanical systems:			

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
Telephone and radio communications system wiring within complex [Footnote 1]	✓	✓
Utility services (Hydro, water, sewer, heating and any others) including service invoices [Footnote 1]		✓
Heating Ventilating and Air Conditioning (HVAC) system and air filtration.	✓	
Automatic door systems for vehicle entry and exit	✓	
Waterproofing and building drainage control	✓	
Security – locks, guards, CCTV, alarms, monitoring, intrusion detection, video recording and others.	✓	
Fire Protection and safety measures (includes standpipes)	✓	
Office furniture and equipment	✓	
Emergency Generators and UPS	✓	
Automotive service vehicles	✓	
Custodial Maintenance – Maintenance and Storage Facilities:	✓	
Debris collection and disposal	✓	
Snow and ice clearing, removal, sanding and de-icing	✓	
Oil and grit separator	✓	
Landscaping	✓	
Vegetation control	✓	
Grass control	✓	
Weed Control/ Brush Cutting	✓	
Tree and shrub maintenance	✓	
Vandalism & graffiti	✓	
Pest Control	✓	
Daily Washroom cleaning and supplies	✓	

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
Cleaning of offices, furniture, walls, floors, windows, maintenance and general purpose areas	✓	
Maintenance Building:	✓	
Monthly telephone service charges [Footnote 1]		✓
Vehicle and System maintenance equipment including hydraulic lifts, forklifts and other specialized equipment	✓	
Workshop equipment including lubrication systems, compressors, air dryers, vacuum systems, sumps, etc.	✓	
Hi rail and recovery vehicles	✓	
Vehicle wash systems	✓	
Vehicle paint booth	✓	
Storage Yard and Shed:	✓	
System: Track, catenaries, switches, etc.	✓	
Waste removal and recycling, such as wheel swarf, coolant disposal, oil recycling	✓	
Service and access roads/driveways	✓	
Snow and ice clearing of Track, catenaries, switches, etc.	✓	
Transit Operations Control Centre:		
Telephone and communication system [Footnote 1]	✓	✓
Monthly telephone service charges	✓	✓
Furniture and layout	✓	
Hardware and software [Footnote 3]	✓	✓
Cooling or heating for Project Co installed equipment	✓	
Communications between equipment and backbone communications modem	✓	
Custodial building responsibilities		✓

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
HVAC and utility services		✓
Stations		
Structural, including the following pedestrian bridge connections:	✓	
Baseline Station - Algonquin College Pedestrian Bridge (pedestrian connection to existing building) [Footnote 17](SN118415)		✓
Dominion Station (including Plaza) [Footnote 17]	✓	✓
Pedestrian Bridge at Queensview Station [Footnote 17] (SN018460)	✓	✓
Lincoln Fields BRT Station NW Ped Bridge (SN018400)		✓
Bayshore Station Pedestrian bridge (118400-1)	✓	
Bayshore Station Pedestrian bridge (118400-2)		✓
Bayshore Station Pedestrian bridge (118400-3)		✓
Bayshore Pedestrian bridge (new)		✓
Place D'Orleans BRT Stn Ped Bridge O/P Hwy 174 (SN228030)		✓
Place D'Orleans LRT Stn Ped Bridge (new structure) [Footnote 17] (SN228025)	✓	
Trim Road Pedestrian Bridge over EB OR174 (new structure) [Footnote 17] (SN898515)	✓	
Westboro Station Pedestrian Bridge (SN018240)	✓	
Plumbing [Footnote 1]	✓	
Electrical [Footnote 1]	✓	
HVAC	✓	
Shelter	✓	
Station furnishings, including passenger benches, refuse containers, cabinets, sign boards, bike racks and others.	✓	
Entry systems: doors & windows[Footnote 11]	✓	

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
Roof and water protection	✓	
Platform: Stairs, floors, walls, furniture and finishes	✓	
Passenger Information Systems [Footnote 16]	✓	✓
Signing (warning, guidance, location, identification, regulatory, operational, and others)	✓	
Utilities [Footnote 1]	✓	✓
Advertising [Footnote 9]		✓
Advertising frames, hardware and fixed assets [Footnote 9]	✓	
Illumination – poles and fixtures	✓	
Storm water drainage [Footnote 5]	✓	
Elevators	✓	
Escalators	✓	
Roof, including Green Roof	✓	
Custodial maintenance of Stations:		
Fare collection **[**Footnote 4)**]**	✓	✓
Debris collection and disposal [Footnote 7]	✓	
Snow and ice clearing, removal, sanding and de-icing [Footnote 8]	✓	
Cleaning – floors, walls, windows, vandalism & graffiti, etc.	✓	
Elevators	✓	
Escalators	✓	
Washroom cleaning and supplies	✓	

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
Illumination – cleaning & bulb replacement	✓	
Landscaping including planters		✓
Vegetation control		✓
Grass control		✓
Weed Control/ Brush Cutting		✓
Tree and shrub maintenance		✓
Graffiti and vandalism	✓	
Pest Control	✓	
Bus Rapid Transit System [Footnote 10)]		
Tunney's Pasture		✓
Hurdman, including bus staging area **[**Footnote 10**]**		✓
St. Laurent		✓
Blair, including bus staging area **[**Footnote 10**]**		✓
Bus Operator Facilities		✓
Westboro Station		✓
Bayshore Station		✓
Baseline Station		✓
Lincoln Fields Station		✓
Place D'Orleans Station		✓
Trim Station		✓
Passenger Pickup and Drop Off		✓
Bus Terminals		✓
Illumination		✓

MAINTENANCE RESPONSIBILITY TABLE	**Project Co**	**City / Other**
Miscellaneous:		
Public Telephones		✓
Salt Storage Boxes	✓	
Artwork	✓	✓
Advertising (Hard surface / integrated) [Footnote9)	✓	
Station Identification Signage	✓	
Security Enclosures / Gates at Station Entry Points	✓	
Retail Facilities [Footnote 9]	✓	✓
Entrance connections to the System [Footnote 11)]	✓	

[Footnotes:]

1) City shall be responsible for the service / usage charges related to all utilities during the Maintenance Term. Project Co shall be responsible for all infrastructure required up to the demarcation point established pursuant to the Expanded Design and Construction Specifications and / or as may be agreed to with the utility service provider.
2) Regarding City of Ottawa Corporate Radio System, Project Co shall enter into maintenance and licensing agreements with the Radio Supplier and install radio equipment into the OLRT System. The Radio Supplier shall be responsible for the communication of the radio signal under all operating scenarios. For further certainty, the Radio Supplier shall be responsible for all City of Ottawa Corporate Radio System Infrastructure located within the Lands, Any additional maintenance access, licensing or joint agreements shall be formalized in a separate contract outside of the OLRT contract. "Hydro Ottawa Limited (HOL) will operate up to the customer's ownership demarcation point and may operate the customer's first protective device in from Hydro Ottawa's distribution system. HOL clarifies the customer's interface responsibilities with each connection agreement. HOL defines three areas of responsibility between itself and the customer's interface: ownership demarcation ('O'), electrical control authority ('C'), and maintenance authority ('M'). All electrical devices and support structures on HOL's distribution system receive unique identifying nomenclature with the required 'OCM' suffix" indicating the defined roles. For example, an OCM suffix of "HHH" indicates Hydro Ottawa owned, controlled, and maintained device. Where the nomenclature suffix is 'CHZ', Project Co customer owns the device, Hydro Ottawa controls the device, and Project Co's qualified contractor maintains the device.
3) Software and Hardware Upgrades, Project Co shall coordinate with OC Transpo for the upgrade of software and hardware with respect to non-essential systems within the equipment room at 875

Belfast. OC Transpo may retain non-essential software and / or hardware exclusive for their use. 24/7 maintenance of the equipment room will be supplied by OC Transpo. Project Co shall provide suitable expertise to diagnose and replace equipment to maintain operational efficiency.

4) Project Co shall be responsible for the Custodial Maintenance of the Fare Collection Equipment. The City shall be responsible for all Preventive and Corrective Maintenance along with all Life Cycle Preservation and Rehabilitation of all of the Fare Collection Equipment.
5) City / Municipal Services
   a) Sanitary – All existing and new works to be maintained by the City, with the exception of the infrastructure integral within the facilities up to the demarcation in which the sanitary becomes New or Existing Municipal Infrastructure.
   b) Watermain – All works to be maintained by the City, with the exception of the infrastructure integral within the facilities up to the demarcation in which the watermain becomes New or Existing Municipal Infrastructure.
   c) Storm sewers within the Lands - Pursuant to the Expanded Design and Construction Specifications, Project Co (or for Stage 2, DB Co) shall review and determine if the existing storm sewers and / or culverts are suitable and sufficient for the requirements of the OLRT System. If Project Co (or for Stage 2, DB Co) elects to reuse an existing storm sewer that remains within the lands, then Project Co shall be responsible for the requirements set out in Schedule 15-3, including Appendix A, B, and C, notwithstanding the following exemptions.
      i) At the BRT-LRT transfer stations, all storm sewers installed in the BRT defined area will be maintained by the City.
      ii) The west Transitway storm sewer (Twin Box) will be maintained hydraulically by the City but structurally by Project Co, and for further clarity the requirements of Schedule 15-3, Appendix A, B, and C shall apply. [NTD: Hydraulic maintenance scope to be reconciled as part of Schedule 46]
6) Project Co shall be responsible for maintenance of the fencing installed throughout the Lands, with the exception of the fencing that falls beyond the maintenance demarcation of the existing retaining walls of which the City remains responsible for maintenance.
7) Debris / Rubbish / Garbage Cleanup, Project Co shall not use the tunnel as a means of storing and / or transporting any debris / rubbish / garbage. Project Co shall be responsible for performing Custodial Maintenance responsibilities such as removing debris / rubbish / garbage from within the Tunnel pursuant to Appendix A, Attachment 8.
8) Surface Maintenance,
   a) "Surface" means the part of the municipal road, street, or pathway required for the passage of vehicles / pedestrians within the Municipal ROW intended for Public use and includes: the travelled lanes and shoulders whether they are paved or not, a boulevard, sidewalk or median and any appurtenances necessary for the illumination and drainage of the municipal road, street or pathway surface and the conveyance and safety of the motorists / pedestrians.
   b) The Maintenance and Repair of the Surface, in addition to the requirements provide in Schedule 15-3 Appendix A, B, and C, includes all summer operations, such as pothole repairs / patching, crack sealing, depression / settlement repairs, sidewalk patching, catch basin and storm sewer cleanout, and all winter operations such as plowing, snow removal, sanding, spring cleanup, and bridge deck washing.

c) See Schedule 1, Appendix 2 which includes Property Request Plans illustrating the Lands and New Municipal Infrastructure.

d) Generally, Project Co shall be responsible for the Maintenance and Repair of the Surface in the Lands, with exception:

i) of surfaces that are clearly demarcated as the City's Maintenance responsibilities;

ii) New Municipal Infrastructure upon the completion of the design, construction, and maintenance term as provided in Schedule 15-2, Part 1, Article 23;

iii) of bridge overpasses which are a continuation of the existing or new Municipal Infrastructure which the City is responsible for the Maintenance, and for further certainty, surface maintenance activities as provided in bullet b) above.

9) City shall be responsible for the sale of the advertising and / or retail space. Project Co shall be responsible for the infrastructure that supports the advertising and / or retail space as defined in the Expanded Design and Construction Specifications.

10) City shall be responsible for Custodial Maintenance of areas designated exclusively for OC Transpo staff use such as washrooms and lunch rooms pursuant to the Expanded Design and Construction Specifications and for further clarity not including OC Transpo designated areas at the MSFs.

11) Maintenance of Entrance Connections,

a) Within Private Developments, Project Co shall be responsible for maintaining entrance connections to grade that are constructed as part of the project. The maintenance of entrance connections shall include the following entrance connection components:

i) Doors into private developments;

ii) Any vestibules (finishes, walls, floors, ceilings);

iii) Joints/waterproofing;

iv) Utilities;

v) Light fixtures/emergency lighting;

vi) Fire control systems to exterior doors;

vii) Cleaning to inside face of exterior doors/developer to clean exterior face of exterior doors

Project Co shall be responsible for locking and unlocking of any doors into private developments.

12) CTS Connections

a) The CTS will be co-located with other City optical fibre services. Project Co shall not be responsible for the maintenance of these additional optical fibre services. If any maintenance responsibility is requested this will be subject to a Variation as per the Project Agreement.

13) Radio – Project Co shall provide access and training to the Radio System Supplier's maintainers or enter into a supplementary agreement outside of the OLRT contract for the responsibility of maintenance. The Radio System Supplier shall maintain the radio system to provide radio coverage and enable safe operations of the OLRT.

14) During snow-clearing of the OR174 median LRT alignment, Project Co shall not transfer snow directly onto the adjacent EB and WB lanes of OR174. Similarly, the City shall not transfer snow to the LRT alignment during snow-clearing of the OR174.

15) Project Co shall be responsible for the operation and maintenance of SWM facilities within the Lands, including Low Impact Development facilities such as bioretention swales and infiltration trenches. Operation and maintenance shall be completed in accordance with the requirements of the

Expanded Design and Construction Specifications, and in accordance with the facilities' Operation and Maintenance manuals to be developed as part of the project.

16) Passenger Information Display Systems (PIDs) – Project Co shall be responsible for the maintenance of PIDs on LRT platforms and concourses; the City shall be responsible for the maintenance of PIDs at bus terminal stations and at nexus points between modes at transfer stations.

17) Station-Specific Maintenance Responsibilities

    a) At Queensview Station, Project Co shall be responsible for structural maintenance of the pedestrian bridge structural elements that are integral with the Queensview Station, such as shared foundations, shared abutments, shared bearings, and shared expansion joints. Project Co shall be responsible for all maintenance associated with the elevators connecting the mezzanine and pedestrian bridge levels. The City shall be responsible for the Pedestrian Bridge including MUP connections and structural elements that are not part of the System Infrastructure.

    b) At Dominion Station, the City shall be responsible for the custodial maintenance of the area outside the fare-paid zone of the station. Project Co shall be responsible for the structural maintenance of the station structure.

    c) At Montreal Station, the City shall be responsible for the custodial maintenance of the area outside of the fare-paid zone; Project Co shall be responsible for the structural maintenance of the station structure, up to the expansion joints that separate the station structure from the adjacent OR174 bridges (eastbound and westbound).

    d) At Place D'Orleans Station, the City will continue to provide structural and custodial maintenance of the existing pedestrian bridge connection to the Place D'Orleans Shopping Centre. Project Co shall be responsible for structural and custodial maintenance of any new proposed pedestrian connection.

    e) At Trim Station, Project Co shall be responsible for the structural and custodial maintenance of the proposed pedestrian connection bridge over the eastbound OR174.

18) Project Co shall maintain the guideway emergency egress and access, up to the point of intersection with the public right-of-way, including custodial maintenance (snow and ice control).

APPENDIX A – ATTACHMENT 16
VANDALISM AND GRAFFITI

1.0 General

(a) This Attachment 16 sets out the Parties' respective roles and responsibilities in respect of Response to and Rectification of incidents of Vandalism.

2.0 Definitions

(a) The following capitalized terms shall have the meanings ascribed to them below:

(i) "**Event of Vandalism**" means any incident of Vandalism occurring on the System.

(ii) "**Graffiti**" means the visual or physical defacement of any component of the System by drawing, painting, spraying, scratching or inscribing.

(iii) "**Physical Damage**" means damage deliberately caused to the structure or physical integrity of any component of the System that requires repair or replacement, and includes breakage and cracking, indentations, impacts to a structure which disable the functionality of a component, dislocation of a component, or other similar forms of harm which would commonly be understood as physical damage.

(iv) "**Vandalism**" means the deliberate destruction, defacement, or damage of any component of the System, and includes Graffiti, Physical Damage, and any other form of deliberate destruction, defacement, or damage.

(v) "**Vandalism Matrix**" means the responsibility matrix defining specific categories of Vandalism, set out in Article 6.0 of this Attachment.

(vi) "**Vandalism Repair Costs**" are determined in accordance with Article 4.0 of this Attachment.

3.0 Response and Rectification of Vandalism

(a) Project Co shall be solely responsible for all Response and Rectification in respect of all Events of Vandalism occurring on the Stage 1 System at all times and occurring on the Stage 2 System during the Maintenance Term in accordance with the requirements of Schedule 15-3. Any Events of Vandalism occurring on any component of the Stage 2 System prior to the start of the Maintenance Term in respect of that component pursuant to Article 1.1(b) of Part 1 shall not be governed by this Schedule 15-3.

4.0 Determination of Vandalism Repair Costs

(a) Project Co's Vandalism Repair Costs shall be limited to the following items:

(i) Project Co's Direct Costs (as such term is defined in Appendix A of Schedule 22 to the Project Agreement) for Response and Rectification of any Event of Vandalism; and

(ii) Project Co's Applicable Margins, determined in accordance with Appendix B of Schedule 22 to the Project Agreement.

(b) Project Co's Vandalism Repair Costs shall be exclusive of any insurance proceeds due to Project Co, or to which Project Co would have been entitled had insurance been maintained in accordance with the requirements of the Project Agreement, which are payable in respect of the relevant Event of Vandalism. For clarity, any such insurance proceeds shall be subtracted from the amount calculated in Section 4.0(a), above, to determine the total Vandalism Repair Costs.

(c) Project Co's Vandalism Repair Costs shall not include any Deductions applied under the Payment Mechanism in relation to an Event of Vandalism.

5.0 Responsibility for Vandalism Repair Costs

(a) Project Co shall be wholly responsible for all Vandalism Repair Costs, as well as any other associated costs, which result from an Event of Vandalism that is denoted as "Project Co Cost" under the column titled "Cost Risk" in the Vandalism Matrix.

(b) Project Co shall be reimbursed by the City for 100% of the Vandalism Repair Costs which result from an Event of Vandalism that is denoted as "City Cost" under the column titled "Cost Risk" in the Vandalism Matrix.

6.0 Vandalism Matrix

Project Period	Description of Vandalism Event	Responsibility for Response/ Rectification	Relief from deductions under the Payment Mechanism (Non Project Co Cause or Station-Related Non Project Co Cause)?	Cost Risk	Application Guidance
Pre-Revenue Service Availability Date **(Stage 1 System)**	Vandalism in respect of any part of the Works (subject to the other provisions of the Project Agreement, including Section 30, 41, 43 and 44)	Project Co	N/A	Project Co	N/A
Post-Revenue Service Availability Date	Graffiti – interior or exterior of Vehicles	Project Co	No	City Cost	N/A

Project Period	Description of Vandalism Event	Responsibility for Response/ Rectification	Relief from deductions under the Payment Mechanism (Non Project Co Cause or Station-Related Non Project Co Cause)?	Cost Risk	Application Guidance
Post-Revenue Service Availability Date	Graffiti –Stations and Alignment	Project Co	No	City Cost	N/A
Post-Revenue Service Availability Date	Graffiti – interior or exterior of MSFs	Project Co	No	Project Co Cost	N/A
Post-Revenue Service Availability Date	Physical Damage to Vehicle, or Graffiti on Vehicles that necessitates structural repairs. Applies to vehicles vandalized while in Revenue Service.	Project Co	A Non-Project Co Cause is applicable under the Payment Mechanism where Vandalism is severe enough that Vehicle is taken out of Revenue Service as a result. The Non-Project Co Cause shall be limited to losses of service caused by the requirement to remove the affected Vehicle from service and enter spare Vehicle into service.	City Cost	Vandalism must occur while Vehicle is in Revenue Service. Project Co maintenance records (pre-service and end-of-service inspection) may be relied upon to demonstrate timing of Vandalism. Example: Project Co pre-departure inspection records show no vandalism, following return from Revenue Service Project Co maintenance records show that vandalism is noted/reported.
Post-Revenue Service Availability Date	Physical Damage to Vehicles, or Graffiti that necessitates structural repairs. Applies to vehicles vandalized while out of Revenue Service, i.e. stored at the Maintenance and Storage Facilities.	Project Co	Only where Vandalism is caused by an Excusing Cause or Force Majeure event. In this case, as per provisions of Project Agreement governing Excusing Causes and Force Majeure.	Project Co Cost	N/A

Project Period	Description of Vandalism Event	Responsibility for Response/ Rectification	Relief from deductions under the Payment Mechanism (Non Project Co Cause or Station-Related Non Project Co Cause)?	Cost Risk	Application Guidance
Post-Revenue Service Availability Date	Physical Damage to Stations and Alignment	Project Co	Only where Vandalism is severe enough that it disables E&M, blocks the Guideway, or causes Station(s) to fail to meet the Station Access Standard.	City Cost	N/A
Post-Revenue Service Availability Date	All Physical Damage to the MSF Facilities	Project Co	No	Project Co Cost	N/A
Post-Revenue Service Availability Date	Any Vandalism committed by City employee while in course of employment	Project Co	Only where Vandalism is severe enough that: (a) Vehicle is taken out of Revenue Service as a result. Relief shall be limited to losses of service caused by requirement to remove affected Vehicle from service and enter spare Vehicle into service; (b) it disables E&M; (c) blocks the Guideway; or (d) causes Station(s) to fail to meet the Station Access Standard.	City Cost	This category overrides all others specified above.

7.0 Process for Reimbursement

(a) Upon Project Co becoming aware of the occurrence of an Event of Vandalism, Project Co shall promptly notify the City of the Event of Vandalism and document what remedial action will be taken to restore or repair the System.

(b) No longer than 60 days following completion of the required restoration or repair by Project Co in respect of the Event of Vandalism, Project Co shall submit to the City a request for

reimbursement for associated Vandalism Repair Costs, calculated in accordance with Article 4.0 of Attachment 16. The request for reimbursement shall provide a comprehensive breakdown of the nature of work completed to restore the System, the hours worked and any insurance proceeds that have been paid or are payable in relation to the Event of Vandalism.

(c) The City will notify Project Co of any issues or disputes in respect of Project Co's calculation of the Vandalism Repair Costs within 10 Business Days of receipt of the request for reimbursement. If the City does not dispute Project Co's claimed Vandalism Repair Costs, then the City shall confirm its approval. The City's failure to respond within 10 Business Days shall constitute approval.

(d) If the City and Project Co are unable to resolve such issues or disputes within a further 10 Business Days, then either Party may refer the issue or dispute for resolution pursuant to the Dispute Resolution Procedure. Where the dispute involves only a portion of the claimed Vandalism Repair Costs, then the undisputed portion shall be deemed to be approved and eligible for payment in accordance with 7.0(e) of this Attachment 16, below.

(e) Upon receipt by Project Co of the City's approval in accordance with 7.0(c) or (d) of this Attachment 16, above, of the content and amount set out in Project Co's request for reimbursement, Project Co shall include as part of the next invoice issued to the City and prepared in accordance with Section 34.6 of the Project Agreement the approved Vandalism Repair Cost and shall also append the final approved request for reimbursement in respect of the Vandalism Repair Cost. The City shall make payment in accordance with Section 34 of the Project Agreement.

APPENDIX B
ASSET PRESERVATION

1.0 Introduction

(a) This Appendix outlines the requirements for the System asset preservation activities required pursuant to this Project Agreement. Project Co is responsible for meeting the performance outcomes and objectives outlined in this Appendix which include:

(i) Achieving defined service levels;

(ii) Limiting System consumption;

(iii) Ensuring safety of System is a continual and ongoing focus;

(iv) Achieving Design Life expectations; and

(v) Providing a sound Asset Management Plan to maintain long-term serviceability and structural integrity of the System.

2.0 Scope

(a) Project Co is solely responsible for the provision of products and services associated with the planning, management and delivery of System asset preservation activities to meet the Project Agreement requirements and in accordance with Good Industry Practice. The System asset preservation process is described as follows:

(i) Project Co develops an Asset Management Plan that meets the Project Agreement requirements and delivers the required Asset Preservation Performance Measures;

(ii) Project Co implements the Asset Management Plan;

(iii) Project Co continually monitors System condition and reports achievements; and

(iv) Project Co adjusts the Asset Management Plan as required to achieve the desired outcomes.

3.0 References

(a) Reference Documents are noted elsewhere in this Project Agreement. Accordingly, the following is a partial listing of Reference Documents:

(i) City of Ottawa's Asset Management Plan provides an Overall Condition of City Assets.

4.0 Performance Outcomes

(a) General

(i) Project Co shall develop and implement an Asset Management Plan that limits the extent of consumption of individual asset categories comprising the System by maintaining and preserving the performance and operational integrity and safety on an ongoing basis throughout the Maintenance Term.

(ii) Details of routine maintenance requirements applicable to the System and their relevant Outcome Target indicators and consequences of Non-Conformance are noted in Appendix A – Maintenance Performance Requirements) to this Schedule, and the Expiry Date Requirements are noted in Appendix C to this Schedule and are not repeated here. Project Co's Asset Management Plan shall address those requirements and the key outcome objectives described in these Appendices. The subsequent sections provide the key outcome objectives for the asset categories.

(b) Guideway Elements

TABLE 4.2
Guideway Elements

Item	Outcome Objectives
a. Civil / Drainage / Utilities	• Ensure that track subbase, grading, and drainage provide a high quality track foundation • Convey surface and groundwater within and across the ROW in compliance with environmental requirements • Ensure that OLRT patrons and infrastructure are not at risk from flood, groundwater, scour and/or drainage system failures • Ensure that all surfaces remain free draining without ponding • Ensure utilities crossing or occupying the ROW are properly protected/isolated to provide their intended public service and do not pose a safety hazard to the System and its occupants
b. Track / Trackwork	• Provide high quality track and special trackwork within specified tolerances to the design geometry • Provide a high ride comfort to OLRT passengers • Minimize track-generated noise and vibration to within acceptable levels • Minimize wear and tear to vehicles, rail and other track components through active management of rail-wheel interface • Minimize the probability and consequence of train derailments

TABLE 4.2
Guideway Elements

Item	Outcome Objectives
c. LRT Bridges	• Ensure that all LRT Bridges remain safe and functional at all times for OLRT operation • Ensure that track/guardrail fastening systems, OCS foundations/attachments, walkways, platform/canopies and other elements attached to, or supported by LRT bridges remain in good condition providing their intended function • Ensure there are no load limitations or speed reductions to OLRT operation • Ensure that there are no hazards to undergrade roadways, walkways, trails, or other facilities
d. Non LRT Bridges	• Ensure that there are no load limitations to Roadway Bridges so that passage of legal vehicles is maintained in accordance with local and provincial requirements • Ensure all Bridges including for Roadways, Trails, and Pedestrian facilities remain safe and functional at all times • Ensure that barriers and other protective elements minimizing contact to the OCS system by overhead users are appropriately positioned and maintained • Ensure that OCS attachments and electrical isolation elements are well maintained and provide the intended protection to structures and the public
e. Retaining Walls	• Ensure Retaining walls remain safe and functional at all times • Ensure that there are no impediments to the passage of OLRT vehicles adjacent to retaining walls • Ensure that there are no impediments to the passage of roadway vehicles or other users adjacent to retaining walls on facilities crossing or paralleling the OLRT ROW • Ensure that retaining wall drainage systems are functional and well maintained
f. Management	• Meet the design requirements noted in this Project Agreement • Manage the probability and consequence of system failures throughout the OLRT, and develop recovery and reactivation plans • Ensure inspections, condition surveys and documentation are carried out according to Asset Management Plan requirements • Ensure programming of the Maintenance Services is complete, performed with sufficient lead time, and based upon a long-term focus • Ensure Good Industry Practice and continual improvements are applied to Maintenance Services

(c) Tunnels

TABLE 4.3
Tunnels

Item	Outcome Objectives
a. Tunnel Structures	• Ensure that the Tunnels and the structures and all associated elements are safe and functional for passage of OLRT vehicles at all times • Ensure that the tunnel structure is sound and serves its intended function in providing structural support and/or protection to all adjacent and overhead facilities such as buildings, utilities, roadways, etc. • Ensure that the tunnel walls/ceilings and/or tunnel liner are well maintained and in good condition minimizing water infiltration, spalling or other cosmetic defects • Ensure that catwalks and cross passages are well maintained, functional and available for the use in case of an emergency • Ensure that the tunnel drainage system including pumps are well maintained and functional at all times • Ensure that tunnel portal structures are well maintained and provide for safe passage of OLRT vehicles
b. Tunnel Equipment and Systems	• Ensure safe, efficient and fully functional tunnel lighting in accordance with applicable standards as identified in the design and construction requirements • Maintain and update tunnel lighting system and fixtures to minimize energy consumption in keeping with ongoing technological advancement and compliance with federal and provincial requirements • Ensure that emergency communication / blue light systems , exit signage, escape routes are well maintained and provide their intended function • Ensure drainage pumping systems are fully functional, in good repair, have advance warning and backup systems • Ensure that the tunnel emergency ventilation systems including fans, power/control systems and ventilation shafts are fully functional, in good repair and in compliance with applicable codes and standards • Ensure that tunnel power backup systems are fully functional and in good repair
c. Management	• Meet the design requirements noted in this Project Agreement • Manage the probability and consequence of system failures, and develop recovery and reactivation plans • Ensure inspections, condition surveys and documentation are carried out according to Asset Management Plan requirements • Ensure programming of the Maintenance Services is complete, performed with sufficient lead time, and based upon a long-term focus • Ensure Good Industry Practice and continual improvements are applied to Maintenance Services

(d) Systems Elements

TABLE 4.4
Systems Elements

Item	Outcome Objectives
a. Traction Power System	• Ensure a safe, efficient and reliable traction power system • Ensure that traction power substations, substation feeders, and traction power distribution systems are well maintained, updated as necessary to support the required OLRT operation without reduction in train performance
b. Overhead Catenary System	• Ensure that the OCS, including poles, foundations, messenger and contact wires and all associated hardware are properly maintained and in good condition • Ensure safe and reliable OLRT operations by maintaining optimal OCS alignment under varied temperature conditions • Ensure that contact wire wear is properly monitored and that replacement, as necessary, is programmed and staged well in advance to support ongoing operations during replacement and minimize the potential for reaching OCS conditions that impede or slow OLRT operations
c. Corrosion Control	• Ensure a safe and fully functional corrosion control system. • Ensure that the system and all associated infrastructure including electrical isolation of track and other components are maintained to minimize stray current and corrosion in accordance with the design and construction requirements of Schedule 15.
d. Train Control / Signal System	• Ensure a safe, efficient, and reliable train control system • Ensure that the system provides for failsafe operations and complies with applicable regulatory requirements and the approved System Safety Management System • Ensure that the system is fully functional at all times and supports the required OLRT operations and system capacity/throughput requirements • Ensure that the train control system is refined and updated as may be necessary in keeping with life cycle considerations, wear and tear, technological advancements, component obsolescence, equipment suppliers and industry requirements
e. Communications	• Ensure safe, efficient and fully functional communication system • Ensure that communication system reliably supports all intended functions including provision of passenger information, as well as all control and monitoring interfaces among train control, power, security, and other systems, and for management and communication among operating and maintenance staff. • Ensure that communication system components are updated, or replaced, as may be necessary in keeping with life cycle considerations, technological advancements, equipment suppliers and industry requirements

TABLE 4.4
Systems Elements

Item	Outcome Objectives
f. Management	• Meet the design requirements noted in this Project Agreement • Manage the probability and consequence of system failures throughout the OLRT, and develop a recovery and reactivation plans • Ensure inspections, testing, condition surveys, certifications and documentation are carried out according to Asset Management Plan requirements • Ensure programming of the Maintenance Services is complete and based upon long-term focus • Ensure Good Industry Practice and continual improvements are applied to Maintenance Services

(e) Stations

TABLE 4.5
Stations

Item	Performance Outcomes
a. Fixed Facilities including Platforms, Ramps, Stairs, Walkways, Bridges, Canopies	• Ensure that all fixed facilities remain structurally sound, safe and available for patrons • Ensure that the condition of the fixed facilities including all surfaces and finishes are well maintained, facilitate effective custodial maintenance and provide a high quality and comfortable passenger environment • Ensure that all fixed facilities comply with applicable codes and regulations for safety and accessibility
b. Escalators / Elevators	• Ensure that all escalators and elevators are well maintained, functional and serviceable • Ensure compliance with all federal, provincial and municipal safety requirements • Ensure that escalators and elevators support future operations and capacity requirements as provided by Schedule 10 - Preliminary Service Plan's Service Level 9. • Ensure that escalators and elevators maintain a high degree of reliability in accordance with industry standards
c. Passenger Amenities / Station Furniture / Signs & Graphics	• Provide a high quality, comfortable, and safe passenger environment • Ensure all components are well maintained, functional, and updated, • Ensure all signage and other graphics are clear, provide their intended function, and are updated, as may be necessary due to physical or operational modifications of the system
d. Lighting, Electrical & Mechanical Equipment, and Janitorial Facilities	• Provide a high quality, comfortable and safe passenger environment • Ensure all lighting and equipment is well maintained and functional • Ensure facilities support serviceability of each station • Ensure compliance with all applicable codes and regulations

TABLE 4.5
Stations

Item	Performance Outcomes
e. Management	• Meet the design requirements noted in this Project Agreement • Manage the probability and consequence of system failures throughout the OLRT, and develop a recovery and reactivation plans • Ensure inspections, condition surveys and documentation are carried out according to Asset Management Plan requirements • Ensure programming of the Maintenance Services is complete and based upon long-term focus • Ensure Good Industry Practice and continual improvements are applied to Maintenance Services

(f) Maintenance and Storage Facilities

TABLE 4.6
Maintenance and Storage Facilities

Item	Outcome Objectives
a. LRV Maintenance Shop	• Ensure that all fixed facilities and systems (HVAC, etc.) are safe, well maintained and fully functional • Ensure the maintenance shop complies with all applicable regulatory requirements • Ensure that the facility continues to support ongoing vehicle maintenance requirements • Provide for updates to employee facilities, as may be warranted to maintain an effective and serviceable environment
b. MOW Facility/Area	• Ensure the facility and systems are safe, well maintained and fully functional • Ensure facility supports ongoing MOW activities • Adequately provides for storage of MOW materials and equipment
c. Shop and MOW Equipment	• Ensure that LRV Shop and MOW equipment is well maintained, fully functional and safe for use • Supports all necessary maintenance and rehabilitation functions • Ensure that upgrades are made as may be necessary or appropriate due to wear out or obsolescence.
d. LRV Storage Area / Yard Tracks	• Ensure that the LRV Storage area/building and other yard tracks and facilities are safe, well maintained and fully functional • Ensure that there is no degradation in train speeds or flexibility of train movements • Ensure adequate storage capacity is maintained for ongoing fleet requirements

TABLE 4.6
Maintenance and Storage Facilities

Item	Outcome Objectives
e. Operations Crew Facility	• Ensure facility and systems are safe for use and well maintained • Ensure that facility supports the various City activities and functions • Provide for updates, as may be warranted to maintain an effective and serviceable staff environment
f. Management	• Meet the design requirements noted in this Project Agreement • Manage the probability and consequence of system failures throughout the OLRT, and develop a recovery and reactivation plans • Ensure inspections, condition surveys and documentation are carried out according to Asset Management Plan requirements • Ensure programming of the Maintenance Services is complete and based upon long-term focus • Ensure Good Industry Practice and continual improvements are applied to Maintenance Services

(g) Other Infrastructure

TABLE 4.7
Other Infrastructure

Item	Outcome Objectives
a. General	• Ensure that all infrastructure and components are well maintained and in a state of good repair • Attain full compliance with municipal, provincial, and federal safety standards • Ensure safe, efficient, and fully functional systems and Infrastructure • Ensure ongoing maintenance can be effectively and efficiently performed • Minimize the potential for chronic reliability issues
b. Management	• Meet the design requirements noted in this Project Agreement • Manage the probability and consequence of system failures throughout the OLRT, and develop a recovery and reactivation plans • Ensure inspections, condition surveys and documentation are carried out according to Asset Management Plan requirements • Ensure programming of the Maintenance Services is complete and based upon long-term focus • Ensure Good Industry Practice and continual improvements are applied to Maintenance Services

(h) Revenue Service Vehicles

TABLE 4.8
Revenue Service Vehicles

Item	Outcome Objectives
a. General	• Ensure that Revenue Service Vehicles are safe, fully functional, and serviceable throughout Maintenance Term • Sustain high levels of in-service reliability • Ensure compliance with all applicable standards and regulations
b. Interior	• Ensure interior components are safe, comfortable, and of high quality for passenger use • Ensure that interior remains serviceable and can be maintained effectively and efficiently • Ensure HVAC systems continue to meet the design requirements for a comfortable passenger environment • Provide for updates, to interior components (such as seats, flooring, finishes, etc.) and systems (HVAC, passenger information, etc.), as may be necessary due to wear out and obsolescence
c. Exterior	• Ensure vehicle exterior remains appealing, structurally sound, free of rust/corrosion and other defects/deformities • Ensure vehicle exterior remains serviceable and can be cleaned and maintained in a cost effective and efficient manner
d. Doors	• Ensure safe, fully functional and serviceable doors that can be effectively maintained • Provide for a high level of reliability and support short headways as required to meet the operational service requirements
e. Onboard Control Systems / ATO	• Ensure onboard train control systems are fully functional, support the required operational service requirements and ensure safe operations • Ensure that onboard train control systems are refined and updated as may be necessary in keeping with life cycle considerations, technological advancements, equipment suppliers and industry requirements
f. Propulsion	• Ensure propulsion system is highly reliable and can be maintained effectively and efficiently • Minimize degradation in vehicle performance and ensure full compliance with operational service requirements
g. Suspension/Bogies/ Articulation	• Ensure that these elements are safe, highly reliable and serviceable • Provide for a high level of passenger comfort and minimize wear and tear on LRV and track
h. Braking	• Ensure that braking system including all associated components are safe, highly reliable, and can be effectively and efficiently maintained • Ensure that vehicle performance requirements continue to be met

TABLE 4.8
Revenue Service Vehicles

Item	Outcome Objectives
i. Management	• Meet the design requirements noted in this Project Agreement • Manage the probability and consequence of system failures throughout the OLRT, and develop a recovery and reactivation plans • Ensure inspections, condition surveys and documentation are carried out according to Asset Management Plan requirements • Ensure programming of the Maintenance Services is complete and based upon long-term focus • Ensure Good Industry Practice and continual improvements are applied to Maintenance Services

Non-Revenue Service Vehicles

TABLE 4.9
Non-Revenue Service Vehicles

Item	Outcome Objectives
a. General	• Ensure that Non-Revenue Service Vehicles are safe, fully functional, and serviceable throughout Maintenance Term • Sustain high levels of in-service reliability • Ensure compliance with all applicable standards and regulations

5.0 Documentation and Reporting

(a) General Requirements

(i) This Article describes the plans and reports that Project Co is required to submit to the City. The general purpose of the plans and the reports are for Project Co to provide documentation that demonstrates to the City:

A. An understanding of the Asset Management requirements;

B. An Asset Management strategy that is based upon rationalized knowledge of System asset inventory, condition, and performance;

C. Logical and up-to-date reporting on the condition of System assets and meeting Operational Performance Requirements;

D. Asset preservation and rehabilitation work undertaken during the previous 12 months and work planned for the upcoming 12 months;

E. Long-term asset preservation strategy and plans;

F. A robust and up-to-date Quality Management System and reporting;

G. Compliance with environmental requirements and permitting;

H. Reporting of results of meeting the Asset Preservation Performance Measures, which would include compliance and non-compliance reporting; and

I. Compliance with this Project Agreement.

(ii) The system developed by Project Co shall be dynamic, easily auditable by the City, and kept up-to-date so that Project Co can regularly and readily provide information to the City, and be compatible with the City's corporate Asset Management information systems.

(b) Plans and Reports

(i) Table 5.2 provides a summarized schedule of the plans and reports required for submission by Project Co to the City for review and input.

(ii) Project Co shall be assigned a Medium Quality Failure for each instance of failing to provide the City with any plan or report listed below in Table 5.2, in compliance with the requirements for such plan or report as set out in this Appendix B, by the relevant Due Date. Additionally, if Project Co does not provide the required, compliant plan or report within one Contract Month following the required Due Date, Project Co shall be assigned a further Major Quality Failure. Project Co shall be assigned a Major Quality Failure for each subsequent Contract Month it fails to provide the required, compliant documentation.

TABLE 5.2
Schedule of Deliverable Reports and Records – Response Time Measures

Performance Measure	Deliverable Name	Specification Reference	Due Date	Submitted under the Schedule 10 – Review Procedure
PREP1	Initial Asset Management Plan (including initial five (5)-year asset preservation schedule)	5.0(d)	60 days prior to the Revenue Service Availability Date	Yes
PREP2	Asset Management Plan Updates (including updated five (5)-year asset preservation schedule, and As-Built Drawings)	5.0(d)	December 31 annually (updated annually)	Yes
PREP3	Annual APPM Achievement Report	5.0(e), 6.0	November 30 annually (updated annually)	Yes

TABLE 5.2
Schedule of Deliverable Reports and Records – Response Time Measures

Performance Measure	Deliverable Name	Specification Reference	Due Date	Submitted under the Schedule 10 – Review Procedure
PREP4	Structures Condition Data	5.0(f), 6.0(c)	September 30 annually (updated annual data delivered not more than 60 days following inspection)	Yes
PREP5	Tunnel Condition Data	5.0(g), 6.0(d)	September 30 annually (updated annually)	Yes
PREP6	Track Condition Data	5.0(h), 6.0(e)	September 30 annually (updated annually)	Yes
PREP7	Vehicles and Systems Data	5.0(i), 6.0(f)	September 30 annually (updated annually)	Yes
PREP8	Facilities Condition Data	5.0(j), 6.0(g)	September 30 annually (updated annually)	Yes
PREP9	Other Asset Classes Condition Data	5.0(k), 6.0(h)	September 30 annually (updated annually)	Yes
PREP10	System Asset Inventory	5.0(l)	September 30 annually (updated annual data delivered not more than 60 days following survey)	Yes
PREP11	As Built Drawings	5.0(m)	September 30 annually (updated annual data delivered not more than 60 days following survey)	Yes

(iii) The documents noted above shall include the submission of relevant reports in Appendix A – Operation and Maintenance Performance Requirements, which shall be submitted in accordance with the Schedule 10 – Review Procedure.

(c) File Formats

(i) Unless specified otherwise, electronic files shall be compatible with the most recent version of Microsoft Office and be editable. All supplied electronic files shall be on CD or DVD and be clearly labelled as to the content. Storage media shall be scanned for viruses (using an industry recognized product with appropriate updates) prior to submission to the City. In addition, all electronic files shall be made available on a secured web based website managed by Project Co.

(d) Asset Management Plan

(i) Purpose

A. Project Co shall provide to the City a written plan (the "Asset Management Plan"), which describes the procedures for achieving the specified Performance Measures (see Article 5.0 of this Appendix B) to be attained during the Maintenance Term.

(ii) Details

A. The initial Asset Management Plan and all subsequent annual updates to the plan must, as a minimum:

i Address all System;

ii Include a description of and the manner in which the overall performance management reporting will be achieved;

iii Be aligned with the scope of obligations under Appendices A, B, and C of the Maintenance Specifications (Maintenance and Rehabilitation Requirement, Asset Preservation, and the Expiry Date Requirements);

iv Meet the quality management and environmental management requirements in this Project Agreement;

v Be consistent with other obligations in this Project Agreement;

vi Identify the intervention criteria for each APPM as well as achieve the requirements set out in Appendix C, the Expiry Date Requirements to this Schedule;

vii Describe the approach for Infrastructure condition inspection;

viii Describe the approach for assessing the manner in which the APPMs will be achieved;

ix Identify the deterioration rate and factors affecting the APPMs;

x Describe the process for asset preservation work identification, programming and prioritization in terms of developing the Asset Management Plan and the five-year asset preservation schedule, and addressing any APPM non-compliance;

xi Identify and describe the Asset Management approach with respect to integrating and aligning routine maintenance activities (as described in Appendix A to this Schedule) and asset preservation work;

xii Identify any areas of risk and describe mitigation measures;

xiii Describe the approach for completing the annual Maintenance Services schedule including the resources employed, plant, materials, and facilities associated therewith;

xiv Describe any processes and innovations to improve performance and performance reporting process;

xv Provide an indication of the expected condition performance of the asset over the remainder of the Maintenance Term and how Project Co is ensuring full contractual compliance will be achieved, including providing details of the method used to establish the predicted condition (it is anticipated that some form of asset performance modelling will be required) and in graphical format, the current, worst case, the Expiry Date hand back and target condition of the Infrastructure; and

xvi Include a five-year asset preservation schedule consisting of a rolling, forward Maintenance Services program that describes the planned preventative maintenance and asset preservation works (excluding minor routine maintenance) that Project Co is planning to undertake over the following five (5)-year period, and provide specific details regarding planned asset preservation works including but not limited to:

1. planned asset preservation works for both the year and each quarter within the first two years, and only for the year thereafter;

2. advanced technical evaluations completed;

3. field investigations completed;

4. updated asset preservation treatment; and

5. design documentation:

- In respect of preparation of the five-year asset preservation schedule:

  – It is recognized that the timing of rehabilitation and other projects and activities in the future is less certain that those in the current year; and

  – Project Co has the right to perform activities that deviate from the schedule, so long as performance the System meets Project Agreement requirements.

- The five-year asset preservation schedule shall be in the following format:
  - For linear Infrastructure (track, special trackwork, OCS, tunnel etc.):
    - The plan should be produced to clearly identify the start and end locations and cross-sectional position of all Maintenance Services. Where Maintenance Services is to be undertaken on only part of the cross section then the plan should be formatted to clearly indicate this;
    - Indicate the timing and nature of the Maintenance Services to be undertaken; and
    - Have some indication (code or otherwise) of the level of the priority of the Maintenance Services.
  - For point Infrastructure (such as Bridges, Stations, Facilities, Sewers, etc.):
    - Infrastructure should be grouped firstly by type, then by location along the OLRT;
    - Indicate the timing and nature of the Maintenance Services to be undertaken; and
    - Have some indication (code or otherwise) of the level of priority and certainty of the Maintenance Services occurring.
  - For Vehicles and Equipment (such as LRVs, Non-Revenue vehicles, etc.):
    - Vehicles and equipment should be grouped firstly by type, then by the identification number of each particular vehicle/asset

- Indicate the timing and nature of the Maintenance Services to be undertaken; and
- Have some indication (code or otherwise) of the level of priority and certainty of the Maintenance Services occurring.

B. All plans shall address the operational impact and mitigation measures;

C. Include Project Co's, Maintenance and Rehabilitation Quality Management Plan and provide a description of the process for reporting of audits and Nonconformity Reports in accordance with Schedule 11 – Quality Management;

D. Include Project Co's reporting for its environmental management activities;

E. Provide an update on the status of Project permitting.

(e) Annual Asset Preservation and Performance Measures (APPM) Achievement Report

(i) Purpose

A. The Annual APPM Achievement Report documents the routine maintenance, preventative maintenance, rehabilitation, and asset preservation work completed in the previous year; reports the results from Infrastructure condition and inventory surveys and provides a summary of achievement compared to the APPM requirements; and outlines activities anticipated in the coming year.

(ii) Details

A. The Annual APPM Achievement Report must include the following as a minimum:

i An annual summary of the Maintenance Services (including routine, preventive, and corrective maintenance, rehabilitation and asset preservation activities) performed in the preceding year;

ii Methodologies for calculating the Asset Preservation Performance Measures;

iii Analysis and presentation of the results from the annual data collection program for the Asset Preservation Performance Measures for all System assets as defined in the Asset Management Plan;

iv Reporting of the results of surveys; and

v Reports of the compliance and non-compliances with the APPM, and corrective actions.

(f) Structure Condition Data

(i) Project Co is responsible for collecting, maintaining, reporting, and updating Structures Condition data for the purposes of Asset Management and for evaluating the APPM achievements. The requirements for such data are detailed in Table 5.6.

TABLE 5.6	
Asset Class Condition Group	**Condition Data Delivery Requirements**
Structures – Bridges, Recreational Trail Bridges, Retaining Walls, and Structural Culverts	• All condition data collection and reporting on an annual basis in accordance with Table 5.2 • Project Co is to provide to the City a condition data information system (to be agreed between the City and Project Co) for delivering condition information for Structures • Project Co is to provide to the City all asset condition inspection reports in a digital "pdf" format.
	• Project Co is to provide to the City all asset condition assessments and BCI in a digital "pdf" and Microsoft Excel format. • Project Co is to provide to the City all drawings in a digital "pdf" and "Microstation" format as well as printed / plotted hardcopy.

(g) Tunnel Structures Condition Data

(i) Project Co is responsible for collecting, maintaining, reporting, and updating Tunnel Structures Condition data for the purposes of Asset Management and for evaluating the APPM achievements. The requirements for such data in respect of each Phase are detailed in Table 5.7.

TABLE 5.7	
Asset Class Condition Group	**Condition Data Delivery Requirements**
Tunnel Structures	• All condition data collection and reporting on an annual basis in accordance with Table 5.2 • Project Co is to provide to the City a condition data information system (to be agreed between the City and Project Co) for delivering condition information for Structures

(h) Track Condition Data

(i) Project Co is responsible for collecting, maintaining, reporting, and updating Track Condition data for the purposes of Asset Management and for evaluating the APPM

achievements. The requirements for such data in respect of each Phase are detailed in Table 5.8.

TABLE 5.8	
Asset Class Condition Group	**Condition Data Delivery Requirements**
Mainline Track, Special Trackwork, Turnouts, Crossovers, Yard Leads, Yard Track	• All condition data collection and reporting on an annual basis in accordance with Table 5.2 • Project Co is to provide to the City a condition data information system (to be agreed between the City and Project Co) for delivering condition information for Structures

(i) Vehicles and Systems Condition Data

(i) Project Co is responsible for collecting, maintaining, reporting, and updating Vehicles and Systems Condition data for the purposes of Asset Management and for evaluating the APPM achievements. The requirements for such data in respect of each Phase are detailed in Table 5.9.

TABLE 5.9	
Asset Class Condition Group	**Condition Data Delivery Requirements**
Vehicles, includes vehicles and maintenance of way equipment	• All condition data collection and reporting on an annual basis in accordance with Table 5.2 • Project Co is to provide to the City a condition data information system (to be agreed between the City and Project Co) for delivering condition information for Vehicles
Systems Components, includes, Communication Systems, Traction Power, Signals and Train Controls, TOCC/BCC, Corrosion Control	• All condition data collection and reporting on an annual basis in accordance with Table 5.2 • Project Co is to provide to the City a condition data information system (to be agreed between the City and Project Co) for delivering condition information for Systems

(j) Facility Condition Data

(i) Project Co is responsible for collecting, maintaining, reporting, and updating Facilities Condition data for the purposes of Asset Management and for evaluating the APPM achievements. The requirements for such data in respect of each Phase are detailed in Table 5.10.

TABLE 5.10	
Asset Class Condition Group	**Condition Data Delivery Requirements**
Facilities, includes Maintenance and Storage Facilities and Stations	• All condition data collection and reporting on an annual basis in accordance with Table 5.2 • Project Co is to provide to the City a condition data information system (to be agreed between the City and Project Co) for delivering condition information for Facilities

(k) Other Asset Classes Condition Data

(i) Project Co is responsible for collecting, maintaining, reporting and updating condition data for the purposes of proper asset management and for ensuring adequate serviceability. The requirements for such data are detailed in Table 5.11.

TABLE 5.11	
Asset Class Condition Group	**Condition Data Delivery Requirements**
Other Structures—Retaining walls, Culverts (Span less than 3.0 m) and Noise Barriers	• All condition data collection and reporting on an annual basis in accordance with Table 5.2 • Maintenance inspection reports as outlined in Asset Management Plan, to this Schedule
Drainage and Sedimentation Control Structures—including curb and gutters, catch basins, ditch inlets, gutter outlets, grates, storm sewers with utility holes and outlet structures, and pump stations.	• All condition data collection and reporting on an annual basis in accordance with Table 5.2 • Maintenance inspection reports as outlined in Asset Management Plan, to this Schedule
Signs—including all regulatory, warning, guide, informational, advisory, construction and maintenance and route markers	• All condition data collection and reporting on an annual basis in accordance with Table 5.2 • Maintenance inspection reports as outlined in Asset Management Plan, to this Schedule
Electrical Components—including lighting, signals and control boxes, and electrical components associated with fire, life, and safety equipment.	• All condition data collection and reporting on an annual basis in accordance with Table 5.2 • Maintenance inspection reports as outlined in Asset Management Plan, to this Schedule
Mechanical Components—including systems for drainage, pumps, fire, life and safety	• All condition data collection and reporting on an annual basis in accordance with Table 5.2 • Maintenance inspection reports as outlined in Asset Management Plan, to this Schedule
Recreational Trails and Sidewalks (excluding Recreational Trail Bridges)	• All condition data collection and reporting on an annual basis in accordance with Table 5.2

	• Maintenance inspection reports as outlined in Asset Management Plan, to this Schedule

(l) System Inventory Data

(i) The electronic Infrastructure inventory records of Project Co shall be accurate and up-to-date. Project Co is responsible for collecting and maintaining the data.

(ii) Project Co shall assign each asset a unique number, and name the asset consistent with the terminology used in the Expanded Design and Construction Specifications, or reference documents, or Good Industry Practice or as agreed to by the City.

(m) As Built Drawings (Record Drawings)

(i) Project Co is responsible for the production of As Built Drawings including all shop fabrication drawings. The production of the drawings shall generally take the form of the design drawings with addendums showing changes and signed by a Professional Engineer, where applicable. These are to be submitted, as applicable, with the annual Asset Management Plans noted in Table 5.2 of this Appendix.

6.0 Asset Preservation Performance Measures (APPMs)

(a) General

(i) APPMs reflect the condition in which Project Co shall maintain the System. Project Co must comply with these measures at all times throughout the Maintenance Term. Appendix A of this Schedule outlines routine maintenance requirements of which are not repeated here. An integral part of the Asset Preservation is gathering and maintaining reliable inventory and condition assessment data, which are Project Co's responsibility.

(ii) The Asset Preservation Performance Measures (APPMs) are based on the levels of service established by the City, as determined from System condition assessments, performance monitoring, delivery methodologies, and management functions within Infrastructure management systems.

(iii) APPMs have been developed for each Asset Category based on the specific requirements associated with each asset type. A standardized format for the measures has been adopted for consistency and presentation purposes. Elements of the measures include:

A. Feature;

B. Performance measures;

C. minimum condition;

D. Maximum Response Time; and

E. The basis of measure and any associated response parameters required to be met.

(iv) Project Co is responsible for the asset preservation of all System and ensuring that it is managed in a safe and operable condition and are preserved in accordance with the requirements of this Project Agreement and Good Industry Practice.

(b) Performance Measures

(i) Asset Preservation Performance Measures (APPM) provide the ability to monitor and maintain the desired System asset condition over the Maintenance Term. Project Co is required to report actual APPM achievement as part of the Annual Asset Preservation Performance Measure (APPM) Achievement Report. The achievements are measured in terms of meeting the requirements of the Asset Preservation Performance Measures and reporting requirements detailed in Article 5. Achieving the APPM noted in this Appendix includes meeting the operations and maintenance requirements noted in Appendix A of this Schedule.

(ii) Project Co must demonstrate through its Quality Management System the processes to achieve the APPM specified in this Appendix.

(iii) A summary of the Asset Preservation Performance Measure and the consequences of Non-conformity – with the requirements are noted in the following Table 6.2. The composition of the APPMs is subject to review by the City during the Maintenance Term.

TABLE 6.2
Asset Preservation Performance Measures

Article Reference	Performance Requirement	APPM Measure Reference
5.0(d)	Initial Asset Management Plan	PREP1
5.0(d)	Asset Management Plan Updates	PREP2
5.0(e)	Annual APPM Achievement Report	PREP3
5.0(f)	Structures Condition Data	PREP4
5.0(g)	Tunnel Structures Condition Data	PREP5
5.0(h)	Track Condition Data	PREP6
5.0(i)	Vehicles and Systems Condition Data	PREP7
5.0(j)	Facilities Condition Data	PREP8
5.0(k)	Other Asset Classes and Condition Data	PREP9
5.0(l)	System Inventory	PREP10
5.0(m)	As Built Drawings	PREP11

(c) Structures

(i) General

A. The APPM for Structures are targeted to ensure:

i OLRT User and structure safety;

ii Structure functionality is at an acceptable level; and

iii Structure asset consumption is limited.

B. Using these factors as the basis, standards and performance measures are set to ensure sound Asset Management practices are applied for Structures.

C. The APPMs developed specifically for Structures are based upon the City's bridge condition rating procedures, which has adopted the MTO's method of determining a Bridge Condition Index, based on bridge inspection methods and criteria provided in OSIM, and which provides the input to these APPMs.

D. Elements of the Structures asset management cycle include:

i Inspection at the specified interval;

ii Rating the condition of the Structure Components;

iii Inventory updating;

iv Programming correction of deficiencies;

v Undertaking maintenance and asset preservation works; and

vi Reporting achievements.

E. The delivery of services is based upon:

i Emphasis on OLRT Operations and Structure safety for the Project;

ii Outcome-based specification with Project Co given the latitude for treatment selection to control/correct defective conditions as per the Project Agreement requirements;

iii A life-cycle approach to maintenance and asset preservation in conformance with the performance measures;

iv A preventative rather than reactive maintenance/repair strategy is encouraged to limit asset consumption with inspections recommended to facilitate this strategy;

v Emphasis on meeting the prescribed standards and APPMs on an ongoing basis;

vi There being a Bridge Structural Engineer and Qualified Inspector as defined in Article 6.0(c)(ii) of this Appendix nominated to take ownership for the Structures and the Structure management cycle;

vii A mechanism for the City to correct default if Project Co fails to meet the condition criteria on an ongoing basis;

viii An effective Quality Management System; and

ix Compliance with the Project Agreement requirements.

F. Project Co has full responsibility for all the asset preservation activities, including Structure replacement, should that be required.

G. Operational standards are detailed in Appendix A to this Schedule.

(ii) Structural Inspections

A. Structure inspection management involves field inspections that identify and monitor Structure condition. Any observed defects are to be addressed in relevant asset preservation strategies and subsequently programmed for asset preservation (including preventative maintenance and replacement). Project Co shall respond to and rectify any urgent items identified during inspections. The asset preservation of all Structures includes performing Structural Inspections in accordance with OSIM and City of Ottawa practices, condition assessments, inventory updates, and reporting of structure condition achievements, as well as the identification of appropriate condition preservation and restoration strategies in accordance with the requirements set out in this Project Agreement. Project Co shall use Qualified Inspectors, defined as individuals with at least five (5) years of experience in structure inspections who maintain their knowledge of inspection through participation in biennial inspection courses offered by Ministry of Transportation of Ontario.

B. The program of Structure inspections must be managed by a suitably qualified Bridge Structural Engineer, who:

i Is a Professional Engineer with a background in inspection, design, and construction of bridges;

ii Has extensive experience in supervising Structure design, evaluation, construction, inspection, maintenance, rehabilitation and asset preservation;

iii Maintains overall management and technical supervision of the Structure inspection and Maintenance/asset preservation program;

iv Accepts responsibility for the technical competence of all personnel involved in Structures inspection and reporting;

v Accepts responsibility for the structural safety of all Structures;

vi Consults with other specialist professionals when necessary; and

vii Has the overall responsibility for assessing the structure functionality/safety, Structure risks, and potential risks to OLRT Users, and to determine an appropriate asset preservation strategy.

C. While the Qualified Inspector is tasked with identifying defects, it is the Bridge Structural Engineer who is required to interpret the observations and implement appropriate structure asset preservation strategies to meet the Project Agreement performance requirements.

D. There are three types of Structure inspections required as indicated in Table 6.4.2.

TABLE 6.3.2
Inspection Types

Type	Description	Maximum Inspection Frequencies
Superficial (maintenance)	Focus on OLRT Passenger safety and Structure functionality; refer to Appendix A **[**Operation and Maintenance Performance Requirements**]** to this Schedule	These are as part of routine OLRT management and operations.
Detailed	Focus on a general assessment of condition and developing an annual, five (5)-year and ten-year asset preservation programs (including Preventative Maintenance and replacement)	Once every two (2) years
Condition Surveys	Focus on producing a comprehensive assessment of condition, including undertaking physical testing, in order to develop an appropriate asset preservation program (including preventative maintenance, rehabilitation and replacement)	As required or if BCI is below 70

E. Structures exhibiting significant displacement, deterioration, defects or damage are required to be inspected and assessed more frequently with the intervals determined by the Bridge Structural Engineer to meet the performance requirements of this Project Agreement and Good Industry Practice.

F. Structure condition inspection is required to be undertaken using format and detail consistent with that specified in the Ontario Structure Inspection Manual (OSIM), the Structure Rehabilitation Manual, the Retaining Wall Inspection Guidelines (RWIG) and the Sign Support Inspection Guidelines (SSIG). The work shall also be conducted with reference to the practice and approach of the City of Ottawa inspection and recording system. It is the responsibility of the

Inspector and Bridge Engineer of the Project Co to continuously liaise with engineers of the City of Ottawa to ensure the inspection and evaluation information can be readily assimilated into the Ottawa system.

G. Project Co is required to retain files of Structure inspection records and asset preservation plans so that a continuous history of each Structure is available throughout the Maintenance Term.

H. Inspections of Structures shall commence following the Revenue Service Commencement Date and continue throughout the Maintenance Term.

(iii) Key Performance Measures

A. Project Co shall perform Structure inspections and calculate the BCI for all Structures at least once every two years, in accordance with the requirements of this Schedule. Project Co shall report on all BCI, BCI-C, BCI-RW and BCI-SS as indicated in this Schedule.

B. In addition, all inspections must identify undue movements, damages or deteriorations of key structural members, if any, which, in the opinion of the Bridge Structural Engineer, may cause instability of distress of individual structures and pose immediate danger to the public and the LRT system.

(iv) Submissions to the City

A. Structure Condition Data

i Project Co shall submit to the City as noted in Table 5.2 of this Appendix, by September 30 of each year in which measurements are taken in accordance with Article 6.0 of this Appendix B, an updated copy of the following:

1. All Inspections in electronic format;

2. All the Inspection Reports in hard copy format; and

3. All BCI, BCI-C, BCI-RW, and BCI-SS calculations and values.

ii This information shall be submitted to the City, in the format prescribed and/or referenced in this schedule.

B. System Inventory (for Structures)

i Project Co shall submit to the City, before September 30 of each year, an updated copy of the following:

1. Structure inventory list; and

2. List of Structures that may be structurally unstable, or deficient for load carrying capacity.

C. Asset Management Plan (Initial and Updates)

i Project Co shall submit to the City its Asset Management Plan in accordance with Article 5.0 of this Appendix B which at a minimum shall include: a copy of Project Co's list of structure asset preservation and repair accomplishments over the previous 12 months; Structure condition preservation and restoration strategies; annual plan for upcoming 12 months; achievements report based on previous plans; a copy of Project Co's structure asset preservation list and program for the next five (5) years.

D. As Built Drawings—Structural drawings and As Built Drawings for the original construction, asset preservation, and repair work.

(v) Additional Structure Inspections

A. Project Co is required to undertake additional Structure inspection by a Qualified Inspector under the supervision of a Bridge Structural Engineer under the following circumstances which include, but not limited to:

i Accident or vehicle collision with a structure;

ii Unusual/severe weather conditions or natural disasters;

iii Where a perceived problem exists;

iv Flooding/ice jams; and

v Vandalism or terrorism.

B. Project Co shall report the inspections and findings within seven days of a significant event potentially impacting structures' integrity and safety, which includes events noted above. Meeting the APPMs is in addition to the submission of complete and satisfactory inspection reports and findings following a significant event as described earlier.

C. At each occurrence of Project Co failing to undertake a Structure inspection within the required time period, Project Co shall be assigned a Major Quality Failure. Project Co shall be assigned an additional Major Quality Failure for each subsequent day of non-compliance until the failure is rectified.

(vi) Asset Preservation Performance Measures

A. Project Co is required to comply with APPMs as set forth in Table 6.3.6.

B. The APPMs presented are in addition to the operational condition requirements as set by Appendix A (Operation and Maintenance Performance Requirements) to this Schedule.

C. Project Co must demonstrate through its Quality Management System the process to achieve the specified outcomes.

D. The method for assessing the performance measure achievement is based on the definitions given in the Ontario Structure Inspection Manual.

E. The intervention criteria to be undertaken by Project Co to meet the APPMs also reinforce the 'whole of life' approach, encourage proactive preventative maintenance and asset preservation strategies and require Project Co to monitor the management of the Structures.

TABLE 6.3.6
Structures

Asset Preservation Performance Measure	Structure Type	Intervention Criteria	Action	Maximum Response Time	Quality Failure*
PSTR1	Bridges, Recreational Trail Bridges	• When BCI <70 • When 10% of any Key Structural Members is in Poor condition	Undertake Structure Rehabilitation or repair works to address deterioration and defects	12 months	Major
PSTR2	Structural Culverts (including submerged Culverts)	• Structural Culverts with a BCI-C <70	Undertake Structure Rehabilitation or repair works to address deterioration and defects	12 months	Major
PSTR3	Retaining Walls	• Retaining Walls with a BCI-RW <70	Undertake Structure Rehabilitation or repair works to address deterioration and defects	12 months	Major

* At each occurrence of Project Co failing to meet the Asset Preservation Performance Measure by the expiry of the Maximum Response Time, Project Co shall be assigned a relevant Quality Failure (Major, Medium, or Minor) each week beyond the Maximum Response Time until the failure has been either rectified or a disposition has been accepted by the City in accordance with Schedule 11 – Quality Management.

"Key Structural Members" means elements that are considered critical and should not be allowed to drop below a certain condition. This includes Deck top, Deck soffit, Expansion Joint, Bearings, Barriers, Substructure and Embankment, Girder and Coating.

Notwithstanding the above, if in the opinion of the Bridge Structural Engineer upon discovery of undue movements, damages or deterioration of key structural members that may cause structural instability or distress, the Project Co shall provide action plan within seven days to rectify the situation. This may include immediate temporary supports and longer term rehabilitation and repair works.

(d) Tunnel Structures

(i) General

A. The APPM for Tunnels are targeted to ensure:

i OLRT Passenger and Tunnel safety;

ii Tunnels functionality is at an acceptable level; and

iii Tunnels asset consumption is limited.

B. Using these factors as the basis, standards and performance measures are set to ensure sound Asset Management practices are applied for Structures.

C. The APPMs developed specifically for Tunnels are based upon FHA's Highway and Rail Transit Inspection Manual-2005 (HRTTIM) for various Tunnels, which provides the input to these APPMs.

D. The delivery of services is based upon:

i Emphasis on OLRT Operations and Tunnels safety for the Project;

ii Outcome-based specification with Project Co given the latitude for treatment selection to control/correct defective conditions as per the Project Agreement requirements;

iii A life-cycle approach to maintenance and asset preservation in conformance with the performance measures;

iv A preventative rather than reactive maintenance/repair strategy is encouraged to limit asset consumption with inspections recommended to facilitate this strategy;

v Emphasis on meeting the prescribed standards and APPMs on an ongoing basis;

vi There being a Tunnel / Structural Engineer and Qualified Inspector as defined in Article 6(d)(ii) of this Appendix nominated to take ownership for the Structures and the Structure management cycle;

vii A mechanism for the City to correct default if Project Co fails to meet the condition criteria on an ongoing basis;

viii An effective Quality Management System; and

ix Compliance with the Project Agreement requirements.

E. Project Co has full responsibility for all the asset preservation activities, that should that be required.

F. Operational standards are detailed in Appendix A to this Schedule.

(ii) Tunnel Inspections

A. Tunnel inspection management involves field inspections that identify and monitor Tunnel condition. Any observed defects are to be addressed in relevant asset preservation strategies and subsequently programmed for asset preservation (including preventative maintenance and replacement). Project Co shall respond to and rectify any urgent items identified during inspections. The asset preservation of all Tunnels includes performing Tunnel Inspections (as defined in and in accordance with HRTTIM), condition assessments, inventory updates, and reporting of structure condition achievements, as well as the identification of appropriate condition preservation and restoration strategies in accordance with the requirements set out in this Project Agreement. Project Co shall use Qualified Inspectors, defined as individuals with at least five (5) years of experience in Tunnel inspections.

B. The program of Tunnel inspections must be managed by a suitably qualified Tunnel Engineer, who:

i Is a Professional Engineer with a background in inspection, design, and construction of Tunnels;

ii Has extensive experience in supervising Tunnel design, construction, inspection, maintenance, and asset preservation;

iii Maintains overall management and technical supervision of the Tunnel inspection and Maintenance/asset preservation program;

iv Accepts responsibility for the technical competence of all personnel involved in Tunnels inspection and reporting;

v Accepts responsibility for the structural safety of all Tunnels;

vi Consults with other specialist professionals when necessary; and

vii Has the overall responsibility for assessing the Tunnel functionality/safety, Tunnel risks, and potential risks to OLRT Passengers, and to determine an appropriate asset preservation strategy.

C. While the Qualified Inspector is tasked with identifying defects, it is the Tunnel Engineer who is required to interpret the observations and implement appropriate structure asset preservation strategies to meet the Project Agreement performance requirements.

D. There are three types of Tunnel inspections required as indicated in Table 6.4.2.

TABLE 6.4.2
Inspection Types

Type	Description	Maximum Inspection Frequencies
Superficial (maintenance)	Focus on OLRT Passenger safety and Tunnel functionality; refer to Appendix A **[**Operation and Maintenance Performance Requirements**]** to this Schedule	These are as part of routine OLRT management and operations.
Detailed	Focus on a general assessment of condition and developing an annual, five (5)-year and ten-year asset preservation programs (including Preventative Maintenance and replacement)	Once every two (2) years
Condition Surveys	Focus on producing a comprehensive assessment of condition, including undertaking physical testing, in order to develop an appropriate asset preservation program (including preventative maintenance, rehabilitation and replacement)	As required by Tunnel Engineer

E. Tunnels exhibiting significant displacement, deterioration, defects or damage are required to be inspected and assessed more frequently with the intervals determined by the Tunnel Engineer to meet the performance requirements of this Project Agreement and Good Industry Practice.

F. Tunnel condition inspection is required to be undertaken using format and detail consistent with that specified in the HRTTIM. The inspection data is to be provided to the City in a format acceptable and pursuant to Table 5.2.

G. Project Co is required to retain files of Tunnel inspection records and asset preservation plans so that a continuous history of each Tunnel is available throughout the Project Term.

H. Inspections of Structures shall commence following the Revenue Service Commencement Date.

(iii) Key Performance Measures

A. Project Co shall perform Tunnel inspections and calculate the Tunnel condition rating for all Tunnels at least once every two years, in accordance with the procedures shown in the HRTTIM.

B. Project Co shall maintain the Tunnel at a condition rating of at least 6 or higher. Project Co shall implement a rehabilitation program when the condition rating falls below 6, which shall be implemented within 12 months of when condition rating falls below a 6.

C. Project Co shall identify any safety critical repairs deemed necessary to address any severe defects that may pose danger to the Passenger and Tunnel safety. Project Co shall categorize the "Critical Repair" in accordance with the HRTTIM, and coordinate the action to be taken with the TOCC.

(iv) Submissions to the City

A. Tunnel Condition Rating Data

i Project Co shall submit to the City as noted in Table 5.2 of this Appendix B, by September 30 of each year in which measurements are taken in accordance with Article 6.0 of this Appendix B, an updated copy of the following:

1. All Inspections in electronic format;

2. All the Inspection Reports in hard copy format; and

3. All Tunnel condition ratings, calculations and values.

B. OLRT System Inventory (for Tunnels)

i Project Co shall submit to the City, before September 30 of each year, an updated copy of the following:

1. Tunnel inventory list; and

2. List of Tunnels that may be structurally deficient for load carrying capacity.

C. Asset Management Plan (Initial and Updates)

i Project Co shall submit to the City its Asset Management Plan in accordance with Article 5.0 of this Appendix B which at a minimum shall include: a copy of Project Co's list of tunnel asset preservation and repair accomplishments over the previous 12 months; Tunnel condition preservation and restoration strategies; annual plan for upcoming 12 months; achievements report based on previous plans; a copy of Project

Co's tunnel asset preservation list and program for the next five (5) years.

D. As Built Drawings – Tunnel drawings and As Built Drawings for the original construction, asset preservation, and repair work.

(v) Additional Tunnel Inspections

A. Project Co is required to undertake additional Tunnel inspection by a Qualified Inspector under the supervision of a Tunnel Engineer under the following circumstances which include, but are not limited to:

i Accident or vehicle collision with a Tunnel;

ii Unusual/severe weather conditions or natural disasters;

iii Where a perceived problem exists;

iv Flooding; and

v Vandalism or terrorism.

B. Project Co shall report the inspections and findings within seven days of a significant event potentially impacting the Tunnels' integrity and safety, which includes events noted above. Meeting the APPMs is in addition to the submission of complete and satisfactory inspection reports and findings following a significant event as described earlier.

C. At each occurrence of Project Co failing to undertake a Tunnel inspection within the required time period, Project Co shall be assigned five QF Points each day until the failure is rectified.

(vi) Asset Preservation Performance Measures

A. Project Co is required to comply with APPMs as set forth in Table 6.4.6.

B. The APPMs presented are in addition to the operational condition requirements as set by Appendix A (Operation and Maintenance Performance Requirements) to this Schedule.

C. Project Co must demonstrate through its Quality Management System the process to achieve the specified outcomes.

D. The method for assessing the performance measure achievement is based on the definitions given in the HRTTIM.

E. The intervention criteria to be undertaken by Project Co to meet the APPMs also reinforce the 'whole of life' approach, encourage proactive preventative

maintenance and asset preservation strategies and require Project Co to monitor the management of the Tunnels.

TABLE 6.4.6
Tunnels

Asset Preservation Performance Measure	Tunnel	Intervention Criteria	Action	Maximum Response Time	Penalty*
PTUN1	Tunnel	• When Tunnel condition rating is less than 6	Undertake Tunnel Maintenance and Rehabilitation to correct defects	12 months	Major
PTUN2	Safety Critical Repairs	• Coordinate access and mitigation measures to maintain Passenger and Tunnel Safety with TOCC	Undertake repair works to address safety critical deterioration and defects	Immediate, as coordinated with TOCC	Major

At each occurrence of Project Co failing to meet the Asset Preservation Performance Measure by the expiry of the Maximum Response Time, Project Co shall be assigned a relevant Quality Failure (Major, Medium, or Minor) each week beyond the Maximum Response Time until the failure has been either rectified or a disposition has been accepted by the City in accordance with Schedule 11 – Quality Management. "Safety – Critical Repairs" means repairs to tunnel elements that are considered critical for the safety of the Passengers and / or Tunnel which may pose a danger if not repaired.

(e) Track

(i) General

A. The APPM are set to ensure the application of sound asset preservation practices. Asset Preservation Performance Measures are targeted to ensure:

i Track Access and functionality;

ii Structurally sound and safe track condition; and

iii Limited consumption, over time, of the Track.

B. The APPMs specified herein for track provide the outcome emphasis required and focus on four (4) key measures:

i Track Alignment (Geometry);

ii Rail Condition including Rail wear and Rail defects;

iii Rail Structure; and

iv Special Track work.

C. Project Co is responsible for monitoring, maintaining, and reporting Infrastructure performance. The measures are consistent with regulatory requirements and industry standards. Asset condition and inventory data obtained from the required track inspections provides the basis for the APPM criteria.

D. The APPMs are applied to the following Track Sections, which include;

i Mainline track and special trackwork (crossovers) used for regularly scheduled revenue service;

ii All special trackwork, pocket tracks and emergency crossovers used occasionally for revenue service;

iii Tail tracks beyond terminal stations; and

iv Yard lead tracks from the MFSs up to, and including the mainline yard lead connections and associated crossovers

E. The Track Asset Management cycle includes:

i Inspection at the specified interval;

ii Rating the condition of track and special trackwork;

iii Programming treatments/rehabilitation;

iv Undertaking physical remedial works;

v Inventory and condition updating; and

vi Reporting achievements.

F. These phases are fundamental to maintaining the Infrastructure and are consistent with industry practice and regulatory track safety requirements.

G. Project Co's delivery of services must be based upon:

i Emphasis on the availability of track and special trackwork across a range of relevant conditions;

ii Outcome-based specifications, with Project Co given the latitude for treatment selection to control/correct defective conditions as per the material requirements defined in this Project Agreement;

iii A life-cycle approach to maintenance and asset preservation that is in conformance with sound industry practices and with the APPMs;

iv Emphasis on meeting the prescribed standards and APPMs on an ongoing basis;

v A mechanism for the City to correct non-compliance if Project Co fails to meet the APPMs; and

vi Quality management and environmental management processes underpinning the delivery of services.

(ii) Infrastructure Condition Data Collection

A. Project Co is responsible for collecting Track Condition data for the purposes of Asset Management and measuring performance achievement based on the requirements of this Appendix, and Appendices A and C of this Schedule, as required under Article 5.0 of this Appendix B. The collection of Track condition data shall occur as part of Project Co's ongoing track inspection and monitoring activities as required by regulation, industry guidance, and as necessary for Project Co to execute its maintenance obligations as specified in Project Co's Maintenance Plans. Inspections to be used for data collection include weekly track inspections by qualified track inspectors, ultrasonic rail flaw detection to be performed at least once per year, geometry inspections using an automated track inspection and measurement vehicle to be performed at least once per year, and special inspections including CWR inspections during extreme temperatures and temperature fluctuations; and other inspections precipitated due to events potentially resulting in damage to track.

(iii) Asset Preservation Performance Measures

A. Project Co is required to comply with the APPMs noted in Tables 6.5.3 A, B, C, and D of this Appendix and the following criteria:

i The combination of multiple single conditions requiring remedial actions occurring at the same point or over the same section as identified in the APPMs shall require a more immediate response; and

ii All other regulatory or safety requirements applicable to track for the safe operation of Trains on the System.

B. Project Co must demonstrate through its Quality Management the process to achieve the specified outcome.

Table 6.5.3A

Track Geometry

Asset Preservation Performance Measure	**Intervention Criteria**	**Action**	**Maximum Response Time**	**Basis of Measure**	**Penalty***
Geometry	Where any Track Geometry condition including gauge, horizontal alignment (line), track surface (vertical alignment, cross level, and superelevation):			Track Geometry measurements by automated geometry vehicle and manual field measurements	
	violates the APTA or Transport Canada standards (whichever is more stringent) for Class 5 track	Undertake asset preservation works to address non-compliance .	6 months		Medium
	violates the APTA or Transport Canada standards (whichever is more stringent) for Class 4 track	Undertake asset preservation works to address non-compliance	3 months		Medium
	violates the APTA or Transport Canada standards (whichever is more stringent) for Class 3 track	Undertake asset preservation works to address non-compliance	Immediately		Major

* At each occurrence of Project Co failing to meet the Asset Preservation Performance Measure by the expiry of the Maximum Response Time, Project Co shall be assigned a relevant Quality Failure (Major, Medium, or Minor). Project Co shall be assigned a further relevant Quality Failure for each subsequent week of non-conformance until the failure has been either rectified or a disposition has been accepted by the City in accordance with of Schedule 11 – Quality Management.

Table 6.5.3B

Rail Condition

Asset Preservation Performance Measure	**Intervention Criteria**	**Action**	**Maximum Response Time**	**Basis of Measure**	**Penalty***
Rail General	Where any Rail condition violates APTA or Transport Canada standards (whichever is more stringent) for Class 4 track	Undertake asset preservation works to address non-compliance.	Within 1 month	Rail inspection measurements from Geometry Vehicle, field measurements, or from ultrasonic rail inspection	Major
Rail Wear	Where • vertical running rail wear is greater than or equal to ½ inch, or • horizontal running rail (side) wear is greater than or equal to 3/8 inch, or • Guard rail side wear is greater than or equal to ¼ inch	Monitor rail wear and program asset preservation works for rail replacement based on observed rail wear rates	Asset preservation activity plan within 1 month; implementation according to plan	Field measurements or automated measurements from appropriate inspection vehicle/ equipment	Major

Table 6.5.3B

Rail Condition

Asset Preservation Performance Measure	**Intervention Criteria**	**Action**	**Maximum Response Time**	**Basis of Measure**	**Penalty***
	Where • vertical running rail wear is greater than or equal to 5/8 inch, or • horizontal running rail (side) wear is greater than or equal to 5/8 inch, or • Guard rail side wear is greater than or equal to 7/16 inch	Undertake asset preservation works to address non-compliance	Immediately		Major
Rail Defects	Where track defects are identified in accordance with APTA Standards and/or Transport Canada Track Safety requirements	Perform immediate remedial actions as specified in the referenced standard. Perform asset preservation activities to fully remedy any temporary remedial actions	Immediate actions per standard. Full repair within 3 months or per the safety standard, whichever is less	Defect identification and measurement from field inspection or ultrasonic rail inspection	Major

Table 6.5.3B

Rail Condition

Asset Preservation Performance Measure	**Intervention Criteria**	**Action**	**Maximum Response Time**	**Basis of Measure**	**Penalty***
Rail Corrugation	Where short wave rail corrugation exceeds 1/8 inch depth and/or rail corrugation results in track-based noise and / or vibration exceeding the limits imposed by City Bylaws or Schedule 17 of this Agreement	Perform asset preservation works to address non-compliance	1 month	Field measurements, Automatic rail inspection vehicle measurements, and noise and vibration measurements	Medium

* At each occurrence of Project Co failing to meet the Asset Preservation Performance Measure by the expiry of the Maximum Response Time, Project Co shall be assigned a relevant Quality Failure (Major, Medium, or Minor). Project Co shall be assigned a further relevant Quality Failure for each subsequent week of non-conformance until the failure has been either rectified or a disposition has been accepted by the City in accordance with Schedule 11 – Quality Management.

Table 6.5.3C

Track Structure

Asset Preservation Performance Measure	**Intervention Criteria**	**Action**	**Maximum Response Time**	**Basis of Measure**	**Penalty***
General	Where any Track structure condition including ballast, ties, rail violate the APTA or Transport Canada Standards	Undertake asset preservation works to address non-complian ce.	6 month	Observations from field inspection or other automated vehicle-mounted inspection equipment	Medium

Table 6.5.3C Track Structure					
	(whichever is more stringent) for Class 5 track				
	Where any Track structure condition including ballast, ties, rail violate the APTA or Transport Canada Standards (whichever is more stringent) for Class 4 track	Undertake asset preservation works to address non-complian ce.	Immediately	Observations from field inspection or other automated vehicle-mounted inspection equipment	Major

* At each occurrence of Project Co failing to meet the Asset Preservation Performance Measure by the expiry of the Maximum Response Time, Project Co shall be assigned a relevant Quality Failure (Major, Medium, or Minor). Project Co shall be assigned a further relevant Quality Failure for each subsequent week of non-conformance until the failure has been either rectified or a disposition has been accepted by the City in accordance with Schedule 11 – Quality Management.

Table 6.5.3D

Special Trackwork

Asset Preservation Performance Measure	Intervention Criteria	Action	Maximum Response Time	Basis of Measure	Penalty*
General	Where any Special Trackwork condition including switches, frogs, restraining rail violate the APTA or Transport Canada Standards (whichever is more stringent) for Class 5 track	Undertake asset preservation works to address non-compliance.	6 month	Observations from field inspection or other automated vehicle-mounted inspection equipment	Medium
	Where any Special Trackwork condition including switches, frogs, restraining rail violate the APTA or Transport Canada Standards (whichever is more stringent) for Class 4 track	Undertake asset preservation works to address non-compliance.	Immediately	Observations from field inspection or other automated vehicle-mounted inspection equipment	Major

* At each occurrence of Project Co failing to meet the Asset Preservation Performance Measure by the expiry of the Maximum Response Time, Project Co shall be assigned a relevant Quality Failure (Major, Medium, or Minor). Project Co shall be assigned a further relevant Quality Failure for each subsequent week of non-conformance until the failure has been either rectified or a disposition has been accepted by the City in accordance with Schedule 11 – Quality Management.

(iv) References and Clarifications

A. APTA standards as referenced in this Article refer to the "Standard for Rail Transit Track Inspection and Maintenance" (APTA ART-S-FS-002) as updated from time to time.

B. Transport Canada Standards as referenced in this Article refer to "Rules Respecting Track Safety" (Transport Canada TC E-31) as updated from time to time.

C. Appendix A (Operation and Maintenance Performance Requirements) to this Schedule and the provisions of the Expanded Design and Construction Specifications related to Track apply in full to the requirements of this Appendix.

(f) Vehicles and Systems

(i) General

A. Vehicles and Systems elements shall meet the provisions of the Expanded Design and Construction Specifications related to Vehicles and Systems, and meet the requirements of Appendix A and Appendix C to this Schedule. Systems elements as discussed in this Article include all systems related to the operation, control, and monitoring of the System including but not limited to traction power, OCS, Corrosion Control, Train Control/Signals, SCADA and communication systems.

B. Project Co is fully responsible for keeping all Vehicles and Systems assets safe, functional, reliable, maintainable and to develop an asset preservation strategy (including preventative and corrective maintenance and replacement) based on continual monitoring and assessment of the condition, functionality and reliability of Vehicles and Systems Elements.

C. Project Co is responsible for monitoring, maintaining, and reporting the performance of Vehicle and Systems Elements.

D. The Asset Management cycle for Vehicles and Systems includes:

i Inspection at appropriate intervals for each system and subsystem components according to regulatory requirements, industry standard or recommended practices, and as defined in Project Co's Maintenance and Rehabilitation Plan;

ii Rating the condition of each Vehicle and System asset;

iii Annual inspection, certification, and reporting of Systems related to EMI, EMC, and Corrosion Control are performing as designed;

iv Programming treatments/rehabilitation;

v Undertaking remedial works;

vi Inventory and condition updating; and

vii Reporting achievements.

E. Project Co's delivery of services must be based upon:

i Emphasis on the availability of Vehicles and Systems across a range of physical and operating conditions to comply with the Operational Performance Requirements and in accordance with the requirements of Appendix A;

ii Outcome-based specification, with Project Co given the latitude for treatment selection to control/correct defective conditions as per the material requirements defined in this Project Agreement;

iii A life-cycle approach to maintenance and asset preservation that is in conformance with sound industry practices;

iv A preventative rather than a reactive maintenance/repair strategy to limit asset consumption with inspection and monitoring actions to facilitate this strategy; and

v Compliance with regulatory and safety requirements as applicable to Vehicles and Systems.

(ii) Vehicles and Systems Condition Data Collection and Reporting

A. Project Co is responsible for collecting Vehicle and Systems condition data for the purposes of Asset Management and measuring performance achievement based on the requirements of Appendices A and C of this Schedule. The collection of Vehicle and Systems condition data shall occur as part of Project Co's ongoing inspection, testing, and monitoring activities as required and specified for vehicle and systems assets and their subcomponents by regulation, industry standards and practices, and/or as necessary for Project Co to execute its maintenance obligations as specified in Project Co's maintenance plans.

B. Project Co shall utilize inspection, testing and monitoring data including, but not limited to, the information required for reporting per Appendix A, Article 1.8 to assess the condition of vehicle and systems assets and their subcomponents, to monitor trends, and proactively program asset management actions. Such data, trends, and programmed asset management activities shall be included in the annual reports as required in accordance with Article 5 of this Appendix.

(iii) Performance Measures

A. Project Co is required to comply with the Expanded Design and Construction Specifications and Appendices A and C to this Schedule as relevant to Vehicles and Systems and meet the reporting requirements of this Appendix.

(g) Facilities (Stations / MSFs)

(i) General

A. Systems elements as discussed in this Article include those Facilities related to the operation, maintenance, and preservation of the OLRT System and include Stations and Maintenance and Storage Facilities (MSFs).

B. Project Co is fully responsible for keeping all Facilities assets safe, functional, reliable, maintainable and to develop an asset preservation strategy (including preventative maintenance and replacement) by focusing on general assessment of the condition of all Facility assets. The target condition for all Facility assets is a condition rating of "Good" or better, as defined in 6.7.4 below, at all times.

C. Routine maintenance of the OLRT System is addressed in Appendix A to this Schedule. The performance requirements noted in Appendix A to the M&R Specifications supersede the requirements noted here.

D. Project Co is responsible for monitoring, maintaining, and reporting Facilities assets performance.

(ii) The Facility Asset Management cycle includes:

A. Inspection at appropriate intervals for each Facility according to regulatory requirements, industry standard or recommended practices, as referenced in CSA S448.1 – Repair of Reinforced Concrete in Buildings, CSA S478 – Guideline on Durability in Buildings, CSA S413 – Parking Structures (as it may be applicable to building structures), the Ontario Structure Inspection Manual (OSIM), and MTO's Structure Rehabilitation Manual (as it may be applicable to building structures), and as defined in Project Co's Maintenance and Rehabilitation Plan;

B. Rating the condition of each Facility and Facility Elements (meaning those elements as defined in the National Institute of Standards Technology's "Uniformat II Elemental Classification of Building Specifications, Cost Estimating, and Cost Analysis");

C. Programming treatments/rehabilitation;

D. Undertaking remedial works;

E. Inventory and condition updating; and

F. Reporting achievements.

(iii) Project Co's delivery of services must be based upon:

A. Emphasis on the availability of each Facility across a range of physical and operating conditions;

B. Outcome-based specifications, with Project Co given the latitude for treatment selection to control/correct defective conditions as per the material requirements defined in this Project Agreement;

C. A life-cycle approach to maintenance and asset preservation that is in conformance with good industry practices and with the APPMs;

D. Emphasis on meeting the prescribed standards and APPMs on an ongoing basis;

E. A mechanism for the City to correct non-compliance if Project Co fails to meet the APPMs; and

F. Quality management and environmental management processes underpinning the delivery of services.

(iv) Facilities Condition Data Collection

A. Project Co is responsible for collecting Facilities condition data for the purposes of Asset Management and measuring performance achievement based on the requirements of this Appendix, and Appendices A and C of this Schedule, as required under Article 5.0 of this Appendix. The collection of Facilities condition data shall occur as part of Project Co's ongoing inspection, testing, and monitoring activities as required and specified for each Facility and/or Facility component by regulation, good industry standards and practices, and as necessary for Project Co to execute its maintenance obligations as specified in Project Co's maintenance plans.

B. Facilities Inspections

i Project Co shall use Qualified Inspectors, defined as individuals with at least five (5) years of experience in Facilities inspections.

C. The program of Facilities inspections must be managed by a suitably qualified Buildings Structural Engineer, who:

i Is a Professional Engineer with a background in inspection, design, construction, maintenance, and rehabilitation of buildings;

ii Has extensive experience in supervising buildings design, construction, inspection, maintenance, and asset preservation;

iii Maintains overall management and technical supervision of the buildings inspection and Maintenance/asset preservation program;

iv Accepts responsibility for the technical competence of all personnel involved in Facilities inspection and reporting;

v Accepts responsibility for the structural safety of all buildings;

vi Has the overall responsibility for assessing the buildings functionality/safety, buildings risks, and potential risks to OLRT Passengers, and to determine an appropriate asset preservation strategy.

D. While the Qualified Inspector is tasked with identifying defects, it is the Buildings Structural Engineer who is required to interpret the observations and implement appropriate structure asset preservation strategies to meet the Project Agreement performance requirements.

E. The types of buildings inspections required are as indicated in Table 6.7.4.

TABLE 6.7.4
Inspection Types

Type	Description	Maximum Inspection Frequencies
Superficial (maintenance)	Focus on OLRT Passenger safety and Facilities functionality; refer to Appendix A **[**Operation and Maintenance Performance Requirements**]** to this Schedule	These are as part of routine OLRT management and operations.
Detailed	Focus on a general assessment of condition and developing an annual, five (5)-year and ten-year asset preservation programs (including Preventative Maintenance and replacement)	Once every two (2) years
Condition Surveys	Focus on producing a comprehensive assessment of condition, including undertaking physical testing, in order to develop an appropriate asset preservation program (including preventative maintenance, rehabilitation and replacement)	As required by Tunnel Engineer

F. Facilities exhibiting significant displacement, deterioration, defects or damage are required to be inspected and assessed more frequently with the intervals determined by the Buildings Structural Engineer to meet the performance requirements of this Project Agreement and Good Industry Practice.

G. Facilities condition inspection is required to be undertaken using format and detail consistent with that specified reference documents. The inspection data is to be provided to the City in a format acceptable and pursuant to Table 5.2.

H. Project Co is required to retain files of Facilities inspection records and asset preservation plans so that a continuous history of each Facility is available throughout the Project Term.

I. Inspections of Facilities shall commence following the Revenue Service Commencement Date.

(v) Performance Measures

A. Project Co shall utilize data from its routine inspections, testing and monitoring activities as described in this Article to prepare a condition assessment for each Facility according to the rating methodology in Table 6.7.4 for annual condition reporting per Article 5.0 of this Appendix. In addition, a five-year detailed rating condition assessment of each system shall be undertaken to obtain the current condition and inventory of each system and subsystem based on the rating methodology described in Table 6.7.5. Non-Conformance applies to each system and subsystem component that does not meet the maximum response time noted below.

B. At each occurrence of Project Co failing to meet the Asset Preservation Performance Measure by the expiry of the Maximum Response Time, Project Co shall be assigned a relevant Quality Failure (Major, Medium, or Minor). Project Co shall be assigned a further relevant Quality Failure for each subsequent week of non-conformance until the failure has been either rectified or a disposition has been accepted by the City in accordance with Schedule 11 – Quality Management."

TABLE 6.7.5
Facilities Condition Rating

Label	Description	Maintenance or Repair	Maximum Response Time
Excellent	New or as good as new, fully functional, high reliability, Facility components are fully supported	None	None
Good	Normal aging, fully functional, reliability meeting industry targets, Facilities are available and can be used, failures can be remedied with normal maintenance actions without significant disruption	Conduct Maintenance only	12 months
Fair	Substantial aging/wear approaching end of useful life, functional but reliability below minimum industry targets, diminishing or more costly maintenance of Facility components, requires more substantial maintenance and monitoring	Conduct Maintenance and undertake asset preservation work to correct deficiency up to and including replacement of component	12 months

Poor	Exceeds useful life, reliability well below acceptable industry targets, frequent systemic failures, Facility components unavailable, maintenance and monitoring efforts are excessive and disruptive to system operation and to other maintenance activities	Conduct Maintenance and undertake asset preservation work to correct deficiencies up to and including system or subsystem replacement	Three (3) months, with plan of action due within two (2) weeks

C. Repairs and asset preservation are to be completed within the maximum response times in Table 6.7.5. Any safety hazards and/or conditions preventing the operation of the OLRT service shall be remedied immediately.

(h) Drainage and Sedimentation Control Structures

(i) General

A. Drainage and sedimentation control structures, other than those defined as part of Structures, shall meet the provisions of the Expanded Design and Construction Specifications related to drainage and sedimentation control structures, and continually meet the requirements of Appendix A and Appendix C to this Schedule. The drainage structures and sedimentation control structures are targeted to ensure:

i System safety;

ii That functionality is at an acceptable level; and

iii Asset consumption is limited.

B. The drainage structures and sedimentation control structures Asset Management cycle includes, in addition to routine inspection and maintenance as addressed in Appendix A to this Schedule:

i Inspection ;

ii Rating the condition of the structure and its elements;

iii Programming correction of deficiency;

iv Undertaking remedial works;

v Inventory updating; and

vi Reporting achievements.

C. The required delivery of services is to be based upon:

i Emphasis on System safety;

ii Outcome based specification with Project Co given the latitude for treatment selection to control/correct defective condition as per the requirements of this Project Agreement;

iii A life-cycle approach to maintenance and asset preservation; and

iv A preventative rather than reactive maintenance/repair strategy to limit asset consumption with inspections recommended to facilitate this strategy.

(ii) Drainage and Sedimentation Control Structures Inspection Management

A. In this Project Agreement the maximum duration between inspections for the drainage and sediment control structures is:

i Superficial—refer to the response times in Appendix A (Maintenance and Rehabilitation Requirements) to this Schedule;

ii Routine structure condition inspection—annual condition assessments focused on developing an annual asset preservation program; and

iii Detailed structure condition assessment—five (5)-yearly detailed inspections focused on producing a comprehensive assessment of condition and if necessary undertaking physical testing in order to develop an appropriate asset preservation program.

B. Structures exhibiting significant deterioration, defects, or damage are to be inspected more frequently with the intervals determined by experienced Professional Engineers.

C. Project Co shall develop and report Culvert treatment recommendations based on the annual Culvert assessment findings.

D. In general, the treatment recommendations for Culverts shall generally be developed and applied as follows (based on defined terms in the Culvert Assessment Guide):

i An imminent danger of failure shall be replaced immediately;

ii A **Remaining Life or Material Rating** in either the Poor or Below Minimum Tolerable condition category at the time of construction shall be considered for replacement or lining;

iii A **Shape Rating** in either the Poor or Below Minimum Tolerable condition category shall be considered for remedial action and only where the distortion to the shape of the Culvert is adversely affecting

capacity or there is a reasonable expectation the distortion will continue to progress and adversely affect road performance;

iv A **Capacity Rating** in either the Poor or Below Minimum Tolerable condition category shall be considered for cleanout, ditching, or other remediation, and only when surface drainage is being adversely impacted;

v An **Invert, Scour, or Slope Erosion Rating** in either the Poor or Below Minimum Tolerable condition category shall be considered for remedial action, and only where there is a reasonable expectation that the condition may progress to undermining and failure of the Culvert invert, and adversely affect road performance;

vi A **Settlement Rating** in either the Poor or Below Minimum Tolerable condition category should be identified for a Pavement engineering investigation.

E. Each annual assessment shall be completed and a Culvert condition assessment report including general details, condition ratings, treatment recommendations and the treatment priorities for the recommended Culvert replacements shall be completed for each Culvert within the Lands, notwithstanding the Culverts which remain the City's responsibility as indicated in Appendix A of this schedule. The Culvert general details shall, at minimum, include the date of inspection, municipality, Asset Inventory number, location within the Lands, type, shape, length (m), size (mm) and fill (depth and type), condition ratings, treatment recommendation, treatment priority and accomplishment.

(iii) Culvert Assessment Guide

Remaining Life Span Rating Criteria	
Category	**Description**
Very Good (VG)	Has more than 15 years remaining in life
Good (G)	Has Between 10 to 15 years remaining
Fair (F)	Has between five (5) to 10 years remaining
Poor (P)	Has less than five (5) years remaining
Below Minimum Tolerable (BMT)	Has less than one (1) year remaining
Imminent Danger of Failure (IDF)	Failure is about to happen

Note:

Use an understanding of Culvert condition performance gained through years of engineering experience, or general maintenance activities, or equivalent, to determine the remaining life span of the Culvert and to recognize if there is an

imminent danger of failure.

(iv) Material Rating Criteria

Material Rating Criteria – Corrugated Metal Culverts	
Category	**Description**
Very Good	New condition, may also exhibit slight discolouration of surface, galvanizing partially gone along invert.
Good	Discolouration of surface, galvanizing completely gone along invert but no layers of rust. Minor pinholes in pipe material located at end of pipe but not located beneath Roadway.
Fair	Layers of rust forming. Sporadic pitting of invert, minor pinholes forming throughout pipe.
Poor	Heavy rust, thick scaling throughout pipe. Deep pitting, perforations throughout in invert.
Below Minimum Tolerable	Extensive heavy rust, extensive perforations throughout pipe. End sections corroded away. Bottom portion completely corroded exposing underlying granular. Partially to fully collapsed.

VERY GOOD

GOOD

FAIR

POOR

BELOW MINIMUM TOLERABLE

Material Rating Criteria – Concrete Culverts	
Category	**Description**
Very Good	New Condition, hairline cracking without rust staining or delaminations, surface in good condition, isolated damage from construction.
Good	Hairline cracking parallel to the direction of traffic with no crack greater than 1mm and without rust staining. Light scaling on less than 10% of the exposed surface area and greater than 3 mm deep. Delaminated/spalled area less than 1% of surface area.
Fair	Map cracking. Cracks parallel to traffic no greater than 4 mm, cracks transverse to traffic no greater than 2 mm. Rust staining and leakage occurring. Scaling on less than 30% of exposed area and less than 5 mm deep. Spalled areas with exposed reinforcing less than 10%.
Poor	Transverse cracks greater than 3 mm wide with extensive rust staining. Spalling at numerous locations, extensive surface scaling on invert greater than 15 mm Extensive cracking with cracked open more than 4 mm. Spalling has caused exposure of heavily corroded reinforcing steel in bottom or top slab. Extensive surface scaling on invert greater than 25 mm.
Below Minimum Tolerable	Full depth holes. Extensive cracking greater than 15 mm. Spalled areas with exposed reinforcing greater than 25%. Total delaminated, spalled and punky concrete areas are greater than 50% of surface area. Perimeter of reinforcing bars is completely exposed.

VERY GOOD

GOOD

FAIR

POOR

BELOW MINIMUM TOLERABLE

Material Rating Criteria – Plastic Culverts	
Category	**Description**
Very Good	Minor isolated rip caused by floating Debris or construction. Minor discolouration.
Good	Slit no longer than 150 mm and no wider than 10 mm at two or three locations. Damage (cuts, gouges or distortions) to ends sections from construction or maintenance. Perforations caused by abrasion located within 1.5 m of outlet and not under Roadway.
Fair	Slit longer than 150 mm and wider than 10 mm at two or three locations.
Poor	Slit longer than 150 mm and wider than 10 mm at several locations. Perforations throughout the pipe.
Below Minimum Tolerable	Slits in pipe causing the loss of backfill. Section loses throughout the pipe caused by abrasion. Invert eroded away. Partially collapsed.

Note:

This type of material has not been in service for a sufficient period of time to obtain accurate pictures to show the various stages of deterioration.

(v) Shape Rating Criteria

Shape Rating Criteria	
Category	**Description**
Very Good	Smooth curvature in barrel. Span dimension within 3% of design.
Good	Smooth curvature in top half of barrel with flattening on bottom portion. Span dimension up to 5% greater than design.
Fair	Slight distortion in one location on the top portion. Bottom has slight reverse curvature in one location. Span dimension up to 10% greater than design. Non-symmetrical shape.

Shape Rating Criteria	
Category	**Description**
Poor	Significant distortion throughout length. Lower 1/3 may be kinked. Span dimension up to 15% greater than design.
Below Minimum Tolerable	Extreme deflection at isolated locations. Flattening at top of arch or crown. Bottom has reverse curvature throughout. Span dimension greater than 15% of design. Extremely non-symmetrical.

VERY GOOD

GOOD

FAIR

POOR

BELOW MINIMUM TOLERABLE

(vi) Capacity Rating Criteria

Capacity Rating Criteria	
Category	**Description**
Very Good	Little to no sediment build-up in pipe. Culvert ends are undamaged. Little to no Debris blocking flow.

Capacity Rating Criteria	
Category	**Description**
Good	Original Culvert capacity diminished by 5% or less.
Fair	Original Culvert capacity diminished by less than 15%.
Poor	Original Culvert capacity diminished by less than 25%.
Below Minimum Tolerable	Original Culvert capacity diminished by more than 25%.

VERY GOOD

GOOD

FAIR

POOR

BELOW MINIMUM TOLERABLE

(vii) Invert Rating Criteria

Inverting Rating Guideline	
Category	**Description**
Very Good	Invert slightly below the ditch elevation approximately 50 mm.
Good	Invert 50 mm higher than the ditch elevation.
Fair	Invert less than 150 mm higher or lower than the ditch elevation.

Poor	Invert greater than 150 mm higher or lower than the ditch elevation.
Below Minimum Tolerable	Invert greater than 300 mm higher or lower than the ditch elevation.

VERY GOOD

GOOD

FAIR

POOR

BELOW MINIMUM TOLERABLE

(viii) Scour Rating Criteria

Scour Rating Criteria	
Category	**Description**
Very Good	Minor Scour holes at inlet and outlet.
Good	Minor scour holes developing at inlet or outlet. Top of footing is exposed. Probing indicates soft material in scour hole.
Fair	Scour holes developing at inlet or outlet that are 300 mm or less in depth. Footings along sides are exposed.
Poor	Sour holes at inlet or outlet that are 600 mm or less in depth. Bottom of footing exposed.
Below Minimum Tolerable	Scour holes at inlet or outlet that are in excess of 600 mm in depth. Erosion occurring behind headwall that threatens to undermine Culvert.

VERY GOOD

GOOD

FAIR

POOR

BELOW MINIMUM TOLERABLE

(ix) Slope Erosion Rating Criteria

Slope Erosion Rating Criteria	
Category	**Description**
Very Good	No slope erosion.
Good	Slope erosion around Culvert ends is less than 50 mm.
Fair	Slope erosion around Culvert end is less than 150 mm.
Poor	Slope erosion around Culvert end is greater than 150 mm.
Below Minimum Tolerable	Slope erosion around Culvert end is greater than 300 mm.

VERY GOOD

GOOD

FAIR

POOR

BELOW MINIMUM TOLERABLE

(x) Settlement Rating Criteria

Settlement Rating Criteria	
Category	**Description**
Very Good	No noticeable deflection in rail profile
Good	Less than 9mm deflection in rail profile.
Poor	10mm to 15mm deflection in track.
Below Minimum Tolerable	deflection in track is 16 mm or more.

(xi) Asset Preservation Performance Measure

A. Project Co is required to comply with the Expanded Design and Construction Specifications and Appendices A and C to this Schedule as relevant to drainage and sedimentation control structures.

Table 6.6.11

Culverts

Asset Preservation Performance Measure	**Performance Measure**	**Intervention Criteria**	**Action**	**Maximum Response Time**	**Penalty***
PCUL1	Remaining Life Span Rating	Project Co fails to meet all requirements that are specified to be taken when Project Co Detects or was Made Aware of, an imminent danger of a Culvert failure	Immediate	24 hours	Major
PCUL2	Remaining Life Span Rating	Project Co fails to maintain a Non-Structural Culvert at a Remaining Life Span Rating of at least "Good" or better	Consider Asset Preservation or Replacement	12 months	Major

* At each occurrence of Project Co failing to meet the Asset Preservation Performance Measure by the expiry of the Maximum Response Time, Project Co shall be assigned a relevant Quality Failure (Major, Medium, or Minor). Project Co shall be assigned a further relevant Quality Failure for each subsequent week of non-conformance until the failure has been either rectified or a disposition has been accepted by the City in accordance with Schedule 11 – Quality Management.

(i) Other Asset Classes

(i) General

A. This Article relates to all other assets and asset classes for which specific APPMs have not been identified in the previous Articles.

B. Project Co is fully responsible for keeping all System assets safe, clean, tidy, functional, and maintainable to develop an asset preservation strategy (including preventative maintenance and replacement) by focusing on general assessment of condition of all System assets. The target condition for all other assets is a condition rating of "Good" or better, as defined in 6.9.2 below, at all times.

C. Routine maintenance and operation of the System are addressed in Appendix A to this Schedule. The performance requirements noted in Appendix A to the Maintenance Specifications supersede the requirements noted here.

(ii) Performance Measures

A. Project Co shall utilize data from its routine inspections, testing, and monitoring activities to prepare a condition assessment for asset according to the rating methodology in Table 6.9.2 for annual condition reporting per Article 5.0 of this Appendix. Additionally, Project Co shall conduct a five-year detailed rating condition assessment of other assets and asset classes to obtain the current inventory and condition based on the rating methodology described in Table 6.9.2. Non-Conformance applies to each asset component that requires Asset Preservation works due to one or more of the conditions below and for which the maximum response time is exceeded.

TABLE 6.9.2
Other Asset Classes Condition Rating

Label	Description	Maintenance or Repair	Maximum Response Time
Excellent	New or as good as new	None	None
Good	Normal wear and tear, asset performs as intended, asset is maintainable using normal maintenance efforts and practices, no requirement for repair or replacement parts and services are readily available	Maintenance only	12 months
Fair	Minor defects present, asset performs as intended, increasing effort is required to maintain asset, no major repairs are imminent, parts and service availability is limited.	Maintenance and asset preservation	12 months
Poor	Advanced defect(s), asset performance frequently impaired or diminished, extensive maintenance, monitoring and/or frequent repairs are required, major repairs may be imminent, parts and/or services are unavailable	Maintenance and/or asset preservation	Three (3) months, with plan of action due within two (2) weeks
Very Poor	Advanced defect(s)—Requires immediate maintenance/repair. An imminent safety Hazard	Maintenance and/or asset preservation	Immediate

At each occurrence of Project Co failing to meet the Asset Preservation Performance Measure by the expiry of the Maximum Response Time, Project Co shall be assigned a relevant Quality Failure (Major,

Medium, or Minor) each week beyond the Maximum Response Time until the failure has been either rectified or a disposition has been accepted by the City in accordance with Schedule 11 – Quality Management.

B. Repairs and asset preservation are to be completed within the maximum response times in Table 6.9.2. Any safety hazards and/or conditions preventing the operation of the OLRT shall be remedied immediately.

(iii) Performance Measures

A. In addition to the items noted in the above table, Project Co is required to comply with the measures, minimum condition and response times applicable to System as defined in Appendix A to this Schedule.

(j) Additional Inspection of the OLRT

(i) Project Co is required to undertake additional inspection of the System assets under circumstances that affect the integrity of System which include, but are not limited to:

i Accident or LRV collision;

ii Vehicle collision with a structure;

iii Unusual/severe weather conditions or natural disasters;

iv Where a perceived problem exists; and

v Flooding/ice jams.

(ii) Project Co shall undertake inspection and report the inspection results within seven (7) days of any significant natural event or other events impacting the integrity of System assets or the safety of the System and Passengers. The reporting format shall be consistent with the requirements of the Operation and Maintenance Performance Requirements and Article 5 of this appendix. The APPM indicated is applicable to the submission of complete and satisfactory inspection report for each event.

(iii) At each occurrence of Project Co failing to meet the Asset Preservation Performance Measure by the expiry of the Maximum Response Time, Project Co shall be assigned a relevant Quality Failure (Major, Medium, or Minor). Project Co shall be assigned a further relevant Quality Failure for each subsequent week of non-conformance until the failure has been either rectified or a disposition has been accepted by the City in accordance with Schedule 11 – Quality Management.

APPENDIX C
EXPIRY DATE REQUIREMENTS

1.0 Introduction

(a) General

(i) This Appendix sets forth the requirements for the condition of the System when it is returned to the City at the Expiry Date. The objectives of these requirements are to:

A. Define minimum required condition levels at the Expiry Date;

B. Ensure a suitable distribution of remaining life expectancy;

C. Achieve Remaining Service Life expectations;

D. Ensure all documentation (Design Data, Maintenance Services records and reports, Permits, Licences and Approvals, etc.) for all Infrastructure is up-to-date and submitted to the City;

E. Ensure all System assets are fully operational and functional;

F. Ensure a current and complete inventory of spare parts and supplies is provided; and

G. Ensure no outstanding safety issues exist.

(ii) The procedures for meeting the Expiry Date requirements are outlined in Schedule 24 – Expiry Transition Procedure of this Project Agreement.

(b) Objective

(i) At the Expiry Date, the condition of the System must meet the minimum standards defined in this Appendix in addition to having met requirements stated elsewhere in this Project Agreement that include, but are not limited to, the Expanded Design and Construction Specifications and the remainder of the Maintenance Specifications. The requirements set out in this Appendix are intended to protect the City from excessive asset consumption during the Maintenance Term, to facilitate hand over of the System to the City at the Expiry Date in a condition that reflects proactive maintenance and rehabilitation during the Maintenance Term, and to ensure that the System has sufficient Remaining Service Life as defined in this Appendix. Additionally, at the Expiry Date the System shall have no material deficiencies and shall require no urgent maintenance shortly after the Expiry Date.

(ii) Article 1.1 (Responsibility for Maintenance and Rehabilitation) of Part 1 (Introduction) to the Maintenance Specifications discusses applicability of Expiry Date requirements set forth in this Appendix to the New Municipal Infrastructure at such time when such Infrastructure is handed back to the relevant municipality in accordance with Part 1, Article 3 of the Design and Construction Specifications.

(c) Performance Measures

(i) In addition to the requirements set out in this Appendix, at the Expiry Date, the System condition must also satisfy the requirements of Appendices A and B to this Schedule 15-3 and the performance measures set forth in each such Appendix.

2.0 Determination of Remaining Service Life

(a) Remaining Service Life

(i) The Remaining Service Life for the purposes of this Appendix shall be the service life that remains for each component of the System measured in years taking into account the historic performance of the System of similar construction used under similar conditions. At the Expiry Date, the System shall meet the performance levels noted in the Project Agreement, and the Remaining Service Life will be determined to have been achieved only if there is no need for any repairs or rehabilitation in respect of the System at such time (other than custodial, preventative and handover maintenance of any component of the System which will be required during the anticipated Remaining Service Life).

TABLE 2.1
Remaining Service Life

System Element	Remaining Service Life (years)	Percentage of System Element (Minimum Requirement)
New Structure	BCI > 70	100
Existing Structure	BCI > 70	100
Elevated Guideway	BCI > 70	100
Stations	>10	100
Tunnel – Structure	>70	100
Tunnel – Fit Out	>10	100
Track – Ballast	>10	100
Track – Fixed	>10	100
Ties	>10	100
Switches and Cross-Overs	>10	100
Maintenance Building	>10	100

TABLE 2.1
Remaining Service Life

System Element	Remaining Service Life (years)	Percentage of System Element (Minimum Requirement)
Communications	>10	100
Vehicles' Carbody	>10	100
Catenary	>10	100
Traction Power Equipment	>10	100

(b) Measuring and Establishing Remaining Service Life

(i) Project Co shall measure and establish the Remaining Service Life for each OLRT System Element included in Table 2.1, by measuring the condition of each OLRT System Element for;

A. Compliance with the standards and / or requirements of Design and Construction in the Expanded Design and Construction Specifications;

B. Compliance with the standards and / or requirements defined in the Maintenance and Rehabilitation in Schedule 15-3, Appendix A and Appendix B;

C. Compliance with the standards and / or requirements as proposed by Project Co and approved by the City, which resulted from Project Co's (or DB Co's, in relation to the Stage 2 System) choices during the performance of the Expanded Design and Construction Specifications and Schedule 15-3; and

D. Compliance with all regulatory and code requirements.

(ii) The program of measuring the Remaining Service Life and associated inspections must be managed by a suitably qualified Professional Engineer, who:

A. Is a Professional Engineer with a background in inspection, design, construction, and maintenance of the respective OLRT System Element;

B. Has extensive experience in supervising the respective OLRT System Element design, construction, inspection, maintenance, and asset preservation;

C. Evaluates the overall management and technical supervision of the respective OLRT System Element inspection and Maintenance/asset preservation programs conducted pursuant to Appendix B of Schedule 15-3;

D. Accepts responsibility for the technical competence of all personnel involved in inspection and reporting when measuring and establishing the Remaining Service Life of the respective OLRT System Element;

E. Consults with other specialist professionals when necessary; and

F. Has the overall responsibility for establishing the Remaining Service Life of the respective OLRT System Elements.

(c) While the Qualified Inspector is tasked with measuring, testing, and making observations, pursuant to Article 2.0(b)(i) of Appendix C with respect to OLRT System Element, it is the Professional Engineer who is required to interpret the measurements, testing, and observations and establish an appropriate Remaining Service Life.

3.0 General Requirements

(a) Operations and Maintenance Manual

(i) Project Co shall prepare an Operations and Maintenance Manual (OMM), the requirements of which are set forth in this Article 3.0, for each System Element provided in Table 2.1 such that the asset can be operated and maintained by the City after the Expiry Date;

(ii) Each OMM shall be provided to the City no later than six (6) months prior to the Expiry Date and shall be sufficiently detailed to enable a person unfamiliar with the relevant System Element to efficiently maintain and operate it;

(iii) Each OMM shall include comprehensive instructions to operate and maintain all aspects of the relevant Infrastructure including at a minimum the following content:

A. the purpose and functional objectives of the System Element;

B. all necessary steps to safely operate and maintain such System Element;

C. any hazards to avoid while operating and maintaining such System Element;

D. clear diagrams and/or photographs to illustrate the operational / functional process; and

E. any separate component maintenance, installation and instruction manuals from the manufacturer.

(iv) Each OMM shall identify all activities required to maintain the relevant System Element in prescribed condition including inspections, proactive component replacements, and Preventive Maintenance, with specific instructions for:

A. daily requirements;

B. weekly requirements;

C. monthly requirements;

D. annual requirements; and

E. history of maintenance services.

(b) Handover of System

(i) Upon the Termination Date, Project Co shall transfer control of and responsibility for the Maintenance of the System, including all Fixed Equipment, Vehicles and Fixed Facilities which Project Co has supplied, Designed, Constructed and Maintained, to the City.

(c) Handover Maintenance Requirements

(i) Project Co shall develop and submit a Handover Maintenance Plan which includes but not limited to the requirements of this schedule and the Project Agreement. The Handover Maintenance Plan shall be submitted 6 months prior to the commencement of the Handover Maintenance Period.

(ii) Project Co shall cause Handover Maintenance to be effected within the Handover Maintenance Period in accordance with Article 3.0(c), and prior to the expiry of the Maintenance Term, without limiting the provisions otherwise contained in this Schedule 15-3 respecting obligations which include obligations for Handover Maintenance.

(iii) Project Co shall ensure that at the Termination Date, the System, including all Fixed Equipment, Vehicles and Fixed Facilities which Project Co has supplied, Designed, Constructed and Maintained are in a good state of repair and good working order, and in a state which complies with the Project Scope, Design and Construction Requirements, the Standard, the Design and Construction Performance Requirements and with all other standards to which Project Co is required to Maintain the System under the Project Agreement, taking into account the age of the System but without derogation from any of the Maintenance obligations of Project Co (including all of the foregoing obligations set out in this Article 3.0(c)) and subject always to compliance with the obligations of Project Co for performance of the Maintenance Services during the Maintenance Term (including the Termination Date). On the Termination Date, Project Co shall submit to the City a report confirming that the System meets the Standard as of the Termination Date.

(iv) Project Co shall ensure that each Fixed Component and Vehicle Component and each of their components and subsystems transferred to the City upon the Termination Date:

A. shall achieve its minimum Remaining Service Life, to the extent that the asset(s) comprising such Fixed Component or Vehicle Component have a specified Design Life, if the asset continues to be operated and maintained in an appropriate manner after the Termination Date;

B. shall submit the Remaining Service Life assessments as determined pursuant to Article 2.0 of this Appendix.

(v) For further certainty, Project Co's obligations pursuant to Article 3.0(c)(iii) do not include any obligation to provide Maintenance following the Termination Date.

(vi) Project Co shall perform all Handover Maintenance required to comply with Article 3.0(c)(ii), including all Corrective Maintenance required to remedy all Defects identified by the Pre-Handover Inspections, or otherwise identified by Project Co or the City, within the Handover Maintenance Period.

(d) Inspection Prior to Handover

(i) Prior to the Termination Date, the City and Project Co shall jointly perform three (3) inspections of the System (the **"Pre-Handover Inspections"**), which shall consist of the examination and testing which is required of each Fixed Component and Vehicle Component so as to determine its state of repair and operation.

(ii) The Pre-Handover Inspections shall occur as follows:

A. the first Pre-Handover Inspection shall take place no earlier than 60 calendar months and no later than 54 calendar months prior to the Termination Date;

B. the second Pre-Handover Inspection shall take place no earlier than 24 calendar months and no later than 18 calendar months prior to the Termination Date;

C. the final Pre-Handover Inspection shall take place no later than 2 calendar months prior to the Termination Date.

(iii) The failure of the City to request a Handover Maintenance requirement on any Pre-Handover Inspection or a repair made by Project Co following any Pre-Handover Inspection shall not constitute a waiver of or derogate from the Handover Maintenance obligations of Project Co contained in this Schedule 15-3.

(e) Remedial Action

(i) Project Co shall perform the necessary Handover Maintenance to remedy any Defects in the System identified by the Pre-Handover Inspection, so as to meet the standard set out in Article 3.0(c)(ii).

(ii) Following each Pre-Handover Inspection, Project Co shall prepare a handover Maintenance Services plan detailing the Handover Maintenance required to remedy all identified Defects in the System, which shall include a schedule for the performance of such Handover Maintenance (the **"Handover Maintenance Services Plan"**). The following are the deadlines by which Project Co is required to submit a Handover Maintenance Services Plan to the City for review:

A. within two (2) calendar months of the conclusion of the first Pre-Handover Inspection;

B. within one (1) calendar month of the conclusion of the first Pre-Handover Inspection;

C. within one (1) week of the conclusion of the final Pre-Handover Inspection.

(iii) The City shall review each Handover Maintenance Services Plan in consultation with Project Co to verify that the Handover Maintenance Services Plan complies with the Handover Maintenance Plan. Upon the City's confirmation to Project Co that the Handover Maintenance Services Plan complies with the Handover Maintenance Plan, Project Co shall undertake the work set out therein, which must be completed prior to the Termination Date. Project Co shall keep a record of all work performed in accordance with the Handover Maintenance Services Plan and shall advise the City, at regular intervals, of its progress toward completing the Handover Maintenance Services Plan.

(iv) In the event that Project Co fails to perform the Handover Maintenance in accordance with the Handover Maintenance Services Plan, the City may, in addition to any other rights or remedies of the City pursuant to the Project Agreement, undertake remedial action in accordance with provisions included in Appendix A. In addition, in the event that Project Co is in breach of any of its obligations to perform Handover Maintenance pursuant to this Schedule 15-3, the City shall be entitled to take security provided to the City in accordance with any remedial action to rectify the breach under any other provision of the Project Agreement.

(f) Turnover of Replacement Parts

(i) On the Termination Date, Project Co shall transfer to the City all spare Fixed Components and Vehicle Component replacement parts (the "**Replacement Parts**") that it has in its inventory and possession for purposes of the Maintenance of the System. For further certainty, at the Termination Date Project Co shall have an inventory of Replacement Parts which is reasonably in accordance with the amount and type of inventory maintained throughout the Maintenance Term in compliance with the provisions included in Appendix A. The City reserves the right not to accept obsolete, damaged or any other Replacement Parts from Project Co's inventory the use of which the City deems not to be in the best interest of the City or the System. Project Co shall ensure that all Replacement Parts are stored on the premises of the Maintenance and Storage Facilities at the Termination Date. On the occurrence of the Termination Date, Project Co shall be deemed to have released and transferred to the City all its right, title and interest in any and all such Replacement Parts. Project Co shall, at the City's request, provide a Bill of Sale to the City itemizing all the Replacement Parts which are required to be turned over to the City pursuant to this Appendix.

(ii) The City shall deliver payment to Project Co on account of the Replacement Parts which the City has agreed to purchase, such payment to be equivalent to a Cost Recovery calculation with respect to the Replacement Parts.

(g) Status and Components

(i) All System, including both hardware and software, must be in proper working order, and must meet all applicable requirements of the Project Agreement;

(ii) No hardware or software components shall be incompatible with the System at the Expiry Date and all third party software shall be the latest full release version with similar compatibility; and

(iii) Corrective and Preventative maintenance shall have been carried out throughout the Maintenance Term on all System assets in accordance with Project Co's Maintenance and Rehabilitation Plan, applicable manufacturers' requirements, and Good Industry Practice.

(h) Inventory and Verification of Inventory

(i) Project Co shall provide an updated System Inventory report, in accordance with the requirements of Article 5.0 of Appendix B, plus a basic inventory of other Infrastructure and spare parts to be handed over to the City at the Expiry Date, within 30 days prior to the Expiry Date.

(i) As Built Drawings

(i) The most current and up-to-date versions of all As-Built Drawings prepared in connection with the Project shall be submitted to the City at Expiry Date.

SCHEDULE 15-4

REGULATORY STANDARDS

1. General Requirements

(a) Project Co acknowledges that the City has the authority under the Delegation Agreement to regulate any matters covered by Parts III and IV of the Canada Transportation Act (CTA) and by the Railway Safety Act (RSA) relating to the design, construction, operation, maintenance, safety and security, as well as the rates and conditions of service of the System.

(b) As a component of the Project Scope, Project Co shall assist the City in the development of the OLRT Regulations and the supporting policies, procedure manuals, guidelines, and related administrative documentation required to facilitate the timely and efficient adoption of the OLRT Regulations by the City, including the related administrative and enforcement procedures and policies (collectively the "**Support Documentation**").

(c) Project Co, in consultation with the City, shall investigate and consider appropriate regulatory standards and supporting documentation for the System having regard to its technical features and operating environment. The City, as the regulating body under the Delegation Agreement, will have final approval of the OLRT Regulations and Support Documentation before any or all of it is adopted.

(d) Project Co acknowledges that the OLRT Regulations will become part of the definition of Applicable Laws in this Project Agreement when adopted by the City.

(e) Project Co and the City acknowledge that the OLRT Regulations and Support Documentation may not be required to support or facilitate all aspects of, or all activities comprising, the Work, the Maintenance Services or the System. The appropriate scope, detail and timetable for adoption of the OLRT Regulations over time shall be based on the City's intention to regulate the design, construction, operation, maintenance, safety and security of the System in a prudent and timely manner generally consistent with other regulatory authorities of municipal light rail transit systems in Canada and elsewhere, having regard to; the Delegation Agreement; the design, technical features and anticipated operating conditions of the System; and the safety and security of the public.

2. Scope of Service

(a) The OLRT Regulations and Support Documentation will be comprehensive in nature, consistent with the requirements of the Delegation Agreement and this

Project Agreement, and based on generally recognized and/or adopted codes, standards, practices, design references, safety and security principles and guidelines for other light rail transit systems operating in comparable conditions to those contemplated for the System.

(b) The OLRT Regulations and Support Documentation will include, at a minimum, the following elements:

(i) Safety Management System (SMS);

(ii) Security Management System (SeMS);

(iii) Threat and Vulnerability Assessment System(TVA);

(iv) Standard Operating Procedures (SOP);

(v) LRT Operating Rules and Procedures; and

(vi) Monitoring and Enforcement Procedures and/or Manuals

(c) Project Co shall ensure that individuals with appropriate competencies and demonstrated experience undertake the development and completion of the elements of work listed in this Section 2.0.

(d) Project Co shall submit for approval by the City the draft OLRT Regulations and Support Documentation or portions thereof, including the elements listed in Section 2.0(b), on a schedule and timetable that is aligned to the Works Schedule and which is developed by Project Co in consultation with the City ("**Regulations Timetable**").

(e) Subject to Section **Error! Reference source not found.**, Project Co shall work with the City in a cooperative and collaborative manner in the ongoing development of the OLRT Regulations and Support Documentation, including the elements in Section 2(b) throughout the Maintenance Term, including the identification and adoption of such changes as the City may, in its discretion, but with the input of Project Co, deem advisable.

(f) With respect to the Stage 2 System, the City acknowledges that Project Co's obligation in Section 2(e) above shall be limited to such input as can reasonably be expected from Project Co in its capacity as the provider of the Maintenance Services to the Stage 2 System.

3. Timing and Protocol for Approval

(a) Project Co shall develop the OLRT Regulations and Support Documentation and submit the same to the City for approval according to the Regulations Timetable and according to the following process:

Submission Requirements and Timing

(i) from time to time during the Construction Period, Project Co shall submit for timely approval by the City the OLRT Regulations and related Support Documentation that may be appropriate to support the commencement and completion of scheduled work packages, programs or delineated work or service activities;

(ii) all other proposed OLRT Regulations and related Support Documentation that are planned or scheduled to be adopted prior to the commencement of transit services on the Stage 1 System shall be submitted by Project Co for approval by the City in a manner consistent with the Regulations Timetable and in any event no later than 90 days prior to the Revenue Service Availability Date;

(iii) modified or supplemental OLRT Regulations and related Support Documentation that may be proposed for adoption following the commencement of transit services on the System, shall be submitted by Project Co to the City for approval no later than 60 days prior to the required or recommended implementation date; and

(iv) all submissions shall be in writing setting out the full text of the proposed OLRT Regulation and related Support Documentation together with a brief explanatory note setting out the reason or purpose for the proposed regulation;

City Response and Timing

(v) the City shall initially respond to each proposed OLRT Regulation and related Support Documentation submission within 14 Business Days of receipt of Project Co's written submission confirming either its approval or rejection (with reasons) of the proposed OLRT Regulation, the extent to which the City requires further information from or consultation with, or training services from Project Co, if any, and the timetable in which the City requires this to occur;

(vi) the City shall endeavour to complete its review of all submissions made by Project Co in accordance with the foregoing submission requirements by the later of: (A) the date mutually agreed to by City and Project Co for

each submission; and (B) the date that falls 30 days following the City's receipt of the submission from Project Co;

(vii) if the City should fail to respond to Project Co within the stipulated time period described in the foregoing paragraph (vi) Project Co may claim that a Compensation Event, Delay Event or Excusing Cause (as applicable) has occurred; and

(viii) if the City's request for information and follow up consultation from Project Co provided for in subparagraph (v) will most likely result in Project Co having to utilize more than 8,000 cumulative aggregate hours of Project Co staff resource time for all submissions made to that date and all forecasted submissions planned to be completed prior to the Revenue Service Availability Date for consultation with and reporting to the City, then Project Co may treat this City request as a Variation in accordance with Schedule 22.

(b) To the extent applicable to the Project Scope, Project Co shall not commence or carry out any construction activity comprising any portion of the Work or Project Scope unless the OLRT Regulations or Support Documentation that may be appropriately required to support or facilitate that particular portion of the Work or Project Scope have been adopted by the City, or alternatively the City has confirmed in writing to Project Co that there are no OLRT Regulations that are required by the City to apply to such activity.

4. Relief for Project Co

(a) If the City does not approve any of the Project Co proposed OLRT Regulations or Support Documentation, Project Co may claim a Compensation Event, Delay Event, or Excusing Cause, as applicable, in accordance with the terms of this Agreement where Project Co demonstrates:

(i) the proposed OLRT Regulation(s) or Support Documentation is consistent with the requirements of Section 2.0(a); and

(ii) the City's refusal to approve the OLRT Regulation(s) or Support Documentation has resulted or will result in a delay or incremental expense or liability to Project Co in the performance of Project Scope that cannot be reasonably mitigated by Project Co.

SCHEDULE 16

TITLE ENCUMBRANCES

For purposes of this Schedule, the defined term "**Lands**" shall include any portion of the Lands.

For the avoidance of doubt, this Schedule 16 – Title Encumbrances shall be interpreted in accordance with the Timing Principle set out in Section 1.5(c) of this Agreement.

General Title Encumbrances

Any of the following in existence (i) as of the date of the Project Agreement (in relation to the Stage 1 Lands); or (ii) as of the date of the DB Co Works Agreement (in relation to the Stage 2 Lands):

1. Liens, charges or prior claims for taxes (which term includes charges, rates and assessments) or utilities (including levies or imposts for sewers and other municipal utility services) not yet due or if due, the validity of which is being contested in good faith, and liens or charges for the excess of the amount of any past due taxes or utilities charges for which a final assessment or account has not been received over the amount of such taxes or utilities charges as estimated and paid by the City.

2. Inchoate liens incidental to construction, renovations or current operations, a claim for which shall not at the time have been registered against the Lands or of which notice in writing shall not at the time have been given to the City pursuant to the CLA or otherwise or any lien or charge, a claim for which, although registered, or notice of which, although given, relates to obligations not overdue or delinquent and in respect of any of the foregoing cases, the City has, where applicable, complied with the holdback or other similar provisions or requirements of the relevant construction contracts.

3. The rights reserved to or vested in the public or any municipality or governmental or other public authority by any statutory provision.

4. Any subsisting reservations, limitations, provisions and conditions contained in any grants from the Crown of any land or interests therein, including without limitation, reservations of under-surface rights to mines and minerals of any kind including rights to enter, prospect and remove the same.

5. Zoning (including, without limitation, airport zoning regulations), use and building by-laws and ordinances, and federal, provincial or municipal by-laws and regulations.

6. Intentionally deleted.

7. Any encroachments, easements, rights of way, rights to use or similar interests revealed by any survey of the Lands or which would be revealed by an up-to-date survey of the Lands.

8. The Project Agreement, any Ancillary Documents and other agreements relating thereto approved or agreed to by Project Co or entered into pursuant to the Project Agreement, and any interests thereunder.

9. Any rights in favour of or accruing to holders of under-surface rights which could be ascertained by a review of registered title or other public records, or which do not materially interfere with the use of the Lands for the purposes of carrying out the Project Scope.

10. Agreements with any municipal, provincial or federal governments or authorities and any public utilities or private suppliers of services, provided such agreements have been complied with or if not complied with, that any non-compliance does not materially interfere with the use of the Lands for the purposes of carrying out the Project Scope.

11. Unregistered agreements, authorizations, consents, postponements, subordinations, licences or instruments entered into provided that they have been complied with or if not complied with, that any non-compliance does not materially interfere with the use of the Lands for the purposes of carrying out the Project Scope.

12. Easements, rights of way, rights to use, restrictions, restrictive covenants and similar rights in real property or any interest therein which do not materially interfere with the use of the Lands for the purposes of carrying out the Project Scope.

13. Minor imperfections of title.

14. Statutory exceptions to title and any rights reserved to or vested in any person by any statutory provision.

15. The right of any prior owner, occupant or tenant of any portion of the Lands to occupy any portion of the Lands or to remove buildings, fixed machinery, equipment, fittings or other fixtures located on such portion of the Lands.

16. The rights of any person entitled to any portion of the Lands through length of adverse possession or prescription.

Title Encumbrances shall also include any Encumbrances or other matters described in paragraphs 5, 7, 9-13, 15 and 16 above, which arise (i) after the date of the Project Agreement (in relation to the Stage 1 Lands); or (ii) after the date of the DB Co Works Agreement (in relation to the Stage 2 Lands), in each case, provided that they do not materially interfere with the use of the Lands for the purposes of carrying out the Project Scope.

Title Encumbrances shall also include any Encumbrances or other matters described in paragraphs 1-4, 6, 8 and 14, which arise (i) after the date of the Project Agreement (in relation to the Stage 1 Lands); or (ii) after the date of the DB Co Works Agreement (in relation to the Stage 2 Lands).

Specific Title Encumbrances

(a) All Encumbrances relating to the title to the Stage 1 Lands disclosed or noted on the land registry office parcel registers or abstract indices for the Stage 1 Lands from time to time, including those Encumbrances included in the Background Information as of the date of the Project Agreement and including those Encumbrances referred to in the legal descriptions for the Stage 1 Lands available in the applicable land registry office, in each case as assigned, amended, extended, supplemented, substituted and replaced from time to time.

(b) All Encumbrances relating to the title to the Stage 2 Lands disclosed or noted on the land registry office parcel registers or abstract indices for the Stage 2 Lands from time to time, including those Encumbrances included in the Stage 2 Background Information as of the date of the DB Co Works Agreement and including those Encumbrances referred to in the legal descriptions for the Stage 2 Lands available in the applicable land registry office, in each case as assigned, amended, extended, supplemented, substituted and replaced from time to time.

(c) Notwithstanding paragraphs (a) and (b), any Encumbrances referred to in that sentence which are registered after the date of the Project Agreement in the case of the Stage 1 Lands or after the date of the DB Co Works Agreement in the case of the Stage 2 Lands will not be Title Encumbrances if they:

(i) materially interfere with the use of the Lands for the purposes of carrying out the Project Scope;

(ii) have not been consented to by the City (and the City will only consent to new Encumbrances on the Stage 2 Lands pursuant to the Stage 2 Interface and Design Management Variation); or

(iii) are Encumbrances which Project Co is obliged to remove, vacate or discharge under the Project Agreement or that DB Co is obliged to remove, vacate or discharge under the DB Co Works Agreement.

SCHEDULE 17

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PART 1
DEFINITIONS

"Acoustical Engineer" means an engineer who is eligible to be a licensed Professional Engineer in the province of Ontario with a minimum of 10 years experience in the field of acoustical engineering with proven experience in the acoustical assessment of rail transit projects.

"CEAA" means the Canadian Environmental Assessment Act.

"Complaint Protocol" means the protocol described in Schedule 17, Section 3.7(k) and further described in Schedule 18, Section 3.2(e).

"Dust Control Plan" means the plan to be prepared, submitted and implemented by Project Co in accordance with Section 3.7(l) of Schedule 17 – Environmental Obligations.

"Environmental and Sustainability Director" has the meaning given in Section 3.1 of Schedule 17 – Environmental Obligations.

"Environmental and Sustainability Manager" has the meaning given in Section 3.2 of Schedule 17 – Environmental Obligations.

"Environmental Management Plan" has the meaning given in Section 3.8 of Schedule 17 – Environmental Obligations.

"Excavated Material Management Plan" means the plan to be prepared, submitted and implemented by Project Co in accordance with Section 5.4 of Schedule 17 – Environmental Obligations.

"OESA" means the Ontario Endangered Species Act (2007).

"Qualified Person" when used in Schedule 17 – Environmental Obligations, has the meaning given in the "Guide to Permit to Take Water (PTTW) Application Form (September 2007)", PIBS 5046e published by MOE.

"SARA" means Canada's Species at Risk Act (2002).

"Sensitive Receiver" means the National Arts Centre building at 53 Elgin Street, the Canadian Broadcasting Corporation building at 181 Queen Street and the Government Conference Centre at 2 Rideau Street, as well as any other location where sensitivity to ground borne noise and vibration are determined to be high in accordance with Section 8.6(a).

"Sustainability Plan" has the meaning as given in Section 3.10 of Schedule 17 – Environmental Obligations.

"Stakeholders" means all parties who have an interest in the implementation of the OLRT project excluding the City. Stakeholders include groups such as the general public, businesses, community associations, educational institutions, approval agencies and other governmental agencies.

PART 2
GENERAL PROVISIONS

2.0 Timing Principle

For the avoidance of doubt, this Schedule 17 – Environmental Obligations shall be interpreted in accordance with the Timing Principle set out in Section 1.5(c) of this Agreement.

2.1 Environmental Reference Documents

(a) Project Co shall ensure that all of the Works and the Maintenance at all times during the Project Term, comply with all Environmental Approvals, standards, regulations, guidelines, policies, practices, and Environmental Laws applicable to the Project, the Works and the Maintenance issued by or on behalf of the City or the federal government, including but not limited to each of the following reference documents, in a manner such that if there is any conflict between criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply (provided that, in relation to the Stage 2 System, Project Co shall not be required to comply with any of the following reference documents to the extent that doing so would require Project Co to maintain the Stage 2 System at a higher standard than that which was required of the DB Co Works under the DB Co Works Agreement at the point of its handover to Project Co):

(i) the Environmental Assessments;

(ii) the following City reference documents:

(A) "Downtown Ottawa Transit Tunnel: Tunney's Pasture to Blair Station via a Downtown LRT Tunnel, Environmental Project Report", Delcan, January 2010;

(B) "Official Plan", City of Ottawa;

(C) "Zoning By-law 2008-250", City of Ottawa;

(D) "Bayview/Somerset Area Secondary Study", City of Ottawa;

(E) "Downtown Ottawa Design Strategy – Phase I", City of Ottawa;

(F) "Escarpment Area District Plan", City of Ottawa;

(G) "Wellington Street Community Design Plan", City of Ottawa;

(H) "Carling Bayview Light Rail Transit Corridor Community Design Plan", City of Ottawa;

(I) "Nicholas Mann Gateway Precinct Design Plan", City of Ottawa;

(J) "Transportation Master Plan", City of Ottawa;

(K) "Infrastructure Master Plan", City of Ottawa;

(L) "Ottawa 20/20 Environmental Strategy", City of Ottawa;

(M) "Ottawa 20/20 Air Quality and Climate Change Master Plan", City of Ottawa;

(N) "Choosing Our Future", City of Ottawa, Ville de Gatineau and National Capital Commission;

(O) "Noise By-law 2004-253", City of Ottawa;

(P) "Environmental Noise Control Guidelines", City of Ottawa;

(Q) "Ottawa Travel Choices for Light Rail Implementation", City of Ottawa;

(R) "Standard Tender Document, Volume 1 Construction Specifications, Special Provisions F-1004 and F-1005", City of Ottawa; and

(S) "Sewer Use By-law 2003-514", City of Ottawa.

(iii) the following environmental reference documents:

(A) "Environmental Protection Requirements for Transportation Planning and Highway Design, Construction, and Operation and Maintenance", MTO;

(B) "Environmental Standards and Practices User Guide", MTO;

(C) "Municipal Class Environmental Assessment", Municipal Engineers Association;

(D) "Ontario Regulation 231/08 - Transit Projects and Metrolinx Undertakings", MOE;

(E) "Protocol for the Management of Excess Materials in Road Construction and Maintenance", MOE and MTO;

(F) "Environmental Reference for Highway Design", MTO;

(G) "Environmental Guide for Built Heritage and Cultural Heritage Landscapes", MTO;

(H) "Environmental Guide for Contaminated Property Identification and Management", MTO;

(I) "Environmental Guide for Fish and Fish Habitat", MTO;

(J) "Environmental Guide for Erosion and Sediment Control during Construction of Highway Projects", MTO;

(K) "Environmental Guide for Noise", MTO;

(L) "Environmental Reference for Contract Preparation", MTO;

(M) "Highway Drainage Design Standards", MTO;

(N) "Drainage Management Manual", MTO;

(O) "Salt Management Plan", MTO;

(P) "Construction Administration and Inspection Task Manual", MTO;

(Q) "A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines", Canadian Council of Ministers of the Environment (CCME) 1996;

(R) "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities", Environment Canada;

(S) "Stormwater Best Management Practice Handbook: Construction", Environment Canada;

(T) "Assessment Best Practice Guide for Wildlife at Risk in Canada", Environment Canada;

(U) "Best Management Practices: Fish and Wildlife Habitat Management", Environment Canada;

(V) "Best Management Practices: Water Management", Environment Canada;

(W) "Environmental Assessment Best Practice Guide for Wildlife at Risk in Canada", Environment Canada;

(X) "Code of Practice for the Environmental Management of Road Salts (Environment Canada, 2004)", Environment Canada;

(Y) "Ontario Regulation 174/06 – Development, Interference with Wetlands and Alterations to Shorelines and Watercourses", Rideau Valley Conservation Authority;

(Z) "Policy for the Management of Fish Habitat", DFO;

(AA) "Practitioners Guide to Habitat Compensation", DFO;

(BB) "Freshwater Intake End-of-Pipe Fish Screen Guideline", DFO;

(CC) "A Proponent's Guide To Fisheries Act Reviews For Federally Funded Infrastructure Projects", DFO;

(DD) "Practitioners Guide to Writing a Subsection 35(2) Fisheries Act Authorization", DFO;

(EE) "Proponent's Guide to Information Requirements for Review Under the Fish Habitat Protection Provisions of the Fisheries Act", DFO;

(FF) "Working Around Water Fact Sheets", DFO;

(GG) "The Fish Habitat Primer and Drain Primer", DFO;

(HH) "Fish Habitat and Conservation Protection. Guidelines for Attaining No Net Loss, 1998", DFO;

(II) "Federal Contaminated Site Risk Assessment in Canada. Part 1: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA). Environmental Health Assessment Services. Cat. No.: H46-2/04-367E". Health Canada 2004a;

(JJ) "Federal Contaminated Site Risk Assessment in Canada. Part II: Health Canada Toxicological Reference Values (TRVs). Environmental Health Assessment Services. Cat. No.: H46-2/04-368E." Health Canada 2004b;

(KK) "Water Management - Policies, Guidelines, Provincial Water Quality Objectives", MOE;

(LL) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", MOE;

(MM) "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario", MOE;

(NN) "Summary of Standards and Guidelines to support Ontario Regulation 419: Air Pollution", MOE;

(OO) "Guidelines for Identifying, Assessing and Managing Contaminated Sediments in Ontario: An integrated approach. May 2008", MOE;

(PP) "Stormwater Pollution Prevention Handbook", MOE;

(QQ) "Guideline for Implementing Spill Prevention and Contingency Plans Regulatory Requirements", MOE; http://www.ene.gov.on.ca/envision/gp/3243.pdf;

(RR) "Spills Reporting - A Guide to Reporting Spills and Discharges", MOE;

(SS) "Stormwater Management Planning and Design Manual, 2003", MOE;

(TT) "Guide to Evaluation of Human Exposure to Vibration in Buildings. ANSI S3.29-1983", American National Standard Institute;

(UU) "Noise Assessment Criteria in Land Use Planning", MOE;

(VV) "Model Noise By-Law, NPC-115 Construction Equipment", MOE;

(WW) "Natural Heritage Reference Manual for the Provincial Policy Statement", MNR;

(XX) "Significant Wildlife Habitat: Technical Guide", MNR;

(YY) "Environmental Guidelines for Access Roads and Water Crossings", MNR;

(ZZ) "Sediment Control Plans: Reducing Sediment Concerns at Water Crossings MNR;

(AAA) Native Plant Resource Guide for Ontario (2001 – 2002), Society for Ecological Restoration – Ontario Chapter, 2002; and

(BBB) "Ontario Provincial Policy Statement", Ministry of Municipal Affairs and Housing (Ontario).

2.2 Project Co's Environmental Obligations

(a) In addition to the requirements under Section 2.1 of this Schedule 17, throughout the Project Term, Project Co shall be responsible for managing all environmental matters associated with the Project, and shall perform the Works and the Maintenance in full compliance with this Schedule 17, including compliance with the objectives and targets arising from the following (in relation to the Stage 1 System only):

(i) "Sustainability Plan" – Capital Transit Partners.

(b) Without limiting Project Co's other obligations under the Environmental Approvals, Project Co shall:

(i) comply with those commitments, responsibilities and information extracted from the Environmental Assessments set forth in Appendix B to this Schedule 17 as expressly stated to be delivered or complied with by Project Co in the periods set forth therein; and

(ii) comply with those commitments, responsibilities, and assurances within the CEAA screening report for the Stage 1 System.

(c) The City has prepared, the following reports, plans, programs and other environmental documents associated with meeting the commitments of the Environmental Approvals:

(i) "Environmental Management Plan" Capital Transit Partners;

(ii) "Sustainability Plan", Capital Transit Partners;

(iii) "Station Acoustics Guidelines Document", Novus Environmental Inc.;

(iv) "Smoke Re-Entrainment Assessment - Albert Street Alignment", Novus Environmental Inc.;

(v) "Tunnel Ventilation Shaft Noise Assessment - Albert Street Alignment", Novus Environmental Inc.;

(vi) "University of Ottawa Campus and Parkdale Avenue / Merton Street Sections, Noise and Vibration Impact Assessment", Novus Environmental Inc.;

(vii) "Maintenance and Storage Facility, Noise and Vibration Impact Assessment", Novus Environmental Inc.;

(viii) "Maintenance and Storage Facility, Access Tunnel Construction Noise and Vibration Impact Assessment", Novus Environmental Inc.;

(ix) "Stage 1 Archaeological Assessment", Golder Associates;

(x) "Stage 1 Archaeological Assessment of the Maintenance and Storage Facility Site and the MSF Cut and Cover Access Tunnel", Golder Associates;

(xi) "Heritage Impact Assessment (Built Heritage/Cultural Landscape)", Golder Associates; and

(xii) "Tree Survey for the Maintenance and Storage Facility", Capital Transit Partners.

(d) Project Co shall submit, in accordance with the Schedule 10 – Review Procedure, any documentation of an environmental nature associated with the Project and not otherwise required at Commercial Close that:

(i) in the Discretion of the City Representative, may be required at a later time and so requested for review by the City Representative, and

(ii) is required at any time pursuant to Section 3.9 of this Schedule 17.

(e) Project Co's use of lands outside the boundaries of the Lands to address its obligations shall be governed by Applicable Law and applicable Permits, Licences and Approvals.

(f) <u>If required, Project Co shall obtain any necessary Permits required under OESA or SARA.</u>

(g) Project Co shall participate with the City in Stakeholder consultation and implement any resulting commitments and requirements in accordance with the Environmental Assessments and in accordance with Schedule 18.

(h) For greater certainty, Project Co shall be responsible, at its own cost and risk, for complying (and will cause all Project Co Parties to comply) with all obligations of an environmental nature under this Project Agreement that are specified as being the responsibility of Project Co.

2.3 The City's Environmental Obligations

(a) Throughout the Project Term, the City Representative will be responsible for reviewing, in accordance with the Schedule 10 – Review Procedure, the following documents addressing environmental matters associated with the Project:

(i) the plans, reports and other documents listed in Table 3.1 of this Schedule 17; and

(ii) any other documentation of an environmental nature not otherwise required at Commercial Close that:

(A) in the Discretion of the City Representative, may be required at a later time and so requested for review by the City Representative; and

(B) is required at any time pursuant to Section 3.9 of this Schedule 17.

(b) The following works, associated with the requirements of the Environmental Approvals, have been or will be initiated by the City prior to Financial Close to facilitate completion of the Works (in the case of the matters referred to in paragraphs (i) and (ii) below) or prior to the signature of the DB Co Works Agreement (in the case of the matters referred to in paragraph (iii) below):

(i) Environmental Reports, such as:

(A) Archaeological reports;

(B) Built heritage and cultural landscape reports;

(C) Noise and vibration reports;

(D) Air quality reports;

(E) Environmental Site Assessment reports;

(F) Landfill gas assessment reports;

(G) Designated substance survey reports; and

(ii) Any other works associated with carrying out the obligations under the Environmental Assessments expressly stated to be delivered wholly or in part by the City in Appendix B to this Schedule 17

(iii) Any other works associated with carrying out the obligations under the Environmental Assessments expressly stated to be delivered wholly or in part by the City in Appendix A-1 to Schedule 17 of the DB Co Works Agreement (in so far as such obligations relate to the Construction Period (as defined therein) for the relevant part of the Site (as defined therein)).

(c) The City shall lead the Stakeholder consultation program in accordance with Part 4 of this Schedule 17 and Schedule 18.

(d) The City shall liaise with the Ontario Ministry of the Environment and Transport Canada (lead Relevant Authority for the federal CEAA screening) regarding obligations set forth in the federal and provincial Environmental Approvals to be performed by the City and/or federal government, as identified in Appendix B to this Schedule 17 or in Appendix A-1 to Schedule 17 of the DB Co Works Agreement (in so far as such obligations relate to the Construction Period (as defined therein) for the relevant part of the Site (as defined therein)).

2.4 Environmental Approval Obligations

(a) Project Co shall be solely responsible to deliver or comply with all obligations, commitments and responsibilities stated in the Environmental Assessments appended to Appendix A to this Schedule 17 which are not expressly identified elsewhere in this Schedule 17 to be delivered or complied with by the City and/or federal government.

(b) The intent of Appendix B is to clarify those obligations, commitments and responsibilities set forth in the Environmental Assessments that are being, or will be delivered by the City and/or federal government during the periods set forth therein.

(c) Appendix B to this Schedule 17 shall be read in conjunction with the Environmental Assessments listed in Appendix A.

(d) Without limiting the generality of Section 2.2 of this Schedule 17, Project Co shall comply with and shall do everything necessary to ensure satisfaction of, and will be responsible for, the obligations set forth in Appendix B of this Schedule 17 expressly stated to be delivered or complied with by Project Co, in each case during the periods set forth therein. Project Co shall be jointly responsible with the applicable governmental agencies in respect of matters expressly stated to be delivered or complied with jointly by Project Co and the City and/or federal government.

(e) Those obligations, commitments and responsibilities that, as provided in Appendix B to this Schedule 17, are to be transferred to Project Co to carry out after Financial Close and will, 14 days after Financial Close, be transferred to Project Co for the remainder of the Project Term.

(f) Project Co shall also comply with, those obligations, commitments and responsibilities set out in Appendix A to Schedule 17 of the DB Co Works Agreement that are stated in that Appendix A to be transferred to the City or its maintenance contractor to be carried out after the completion of the DB Co Works. Such obligations, commitments and responsibilities shall include, for the avoidance of doubt, the implementation of all mitigation measures applicable to maintenance and operations identified in the provincial Confederation West Extension Environmental Project Report and amendments, provincial Confederation East Extension Environmental Project Report and amendments as well as federal Confederation Line Extension Environmental Effects Evaluation Report, but excluding the following obligations which shall remain the responsibility of the City, namely:

(i) any such measures which are to be carried out outside the perimeter of the Stage 2 Lands; and

(ii) any measures relating to the realignment of Pinecrest Creek (notwithstanding that part of such measures may need to be carried out within the perimeter of Stage 2 Lands, but subject always to Article 1.9 of Appendix A of Schedule 15-3 – Maintenance and Rehabilitation Requirements) and which are related to:

(a) its performance as a wildlife crossing (e.g. confirming if the culverts are being used by small/medium mammals, turtles, etc. to cross from one side of the rail corridor to another); and

(b) maintenance of the culverts to ensure Fisheries Act obligations are met including:

(A) gradual removal of debris such that flooding downstream, extreme flows downstream, release of suspended sediment and fish stranding can be avoided; and

(B) implementing DFO measures to avoid causing harm to fish and fish habitat including aquatic species at risk,

but nothing in this paragraph (ii) shall affect Project Co's responsibility to maintain the physical structures of the relevant culverts to the extent they are within the Stage 2 Lands.

(g) In the case of any conflict, ambiguity or inconsistency between Appendix B and any other provision within this Project Agreement, such other provision will prevail over Appendix B.

2.5 Environmental Impacts and Changes to Environmental Approvals

(a) <u>Project Co shall keep environmental impacts of the Project within the magnitude and extent identified in the documents listed in Sections 2.1(a)(i), Section 2.2(c) and Section 2.3(b)(vii) of this Schedule 17, and where not possible, Project Co shall follow amendment procedures in accordance with the Environmental Approvals and any other</u>

Environmental Laws. Any proposal to amend the Environmental Approvals in accordance with procedures under Environmental Laws, will require the concurrence of the City Representative prior to contacting applicable Governmental Authorities. The proposal to amend the Environmental Approvals shall be submitted to the City Representative in accordance with the Schedule 10 – Review Procedure.

(b) Any changes or amendments to the Environmental Approvals required as a result of Project Co's design or construction of the Project or any other action or inaction of Project Co, shall be at the cost and risk of Project Co whether or not the application for such change is made by the City or Project Co, and shall be in accordance with the Schedule 10 – Review Procedure whereby all documentation shall be shared with the City Representative prior to submittal to other Governmental Authorities. Any changes or amendments to the Environmental Approvals in respect of the Stage 1 System which are required as a result of DB Co's design or construction of the Stage 2 System shall be implemented by way of a Variation and the City shall issue a Variation Enquiry and the relevant provisions of Schedule 22 - Variation Procedure shall apply, except that the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree.

(c) Project Co shall be responsible for obtaining, in accordance with Section 2.6 of this Schedule 17, all Permits, Licences and Approvals from relevant Governmental Authorities and satisfying all other requirements (including in respect of consultations, hearings, reviews, studies and reports and initial and ongoing mitigation and compensation works, and future work activities to satisfy requirements and conditions of the Environmental Approvals) in connection with or resulting from any such change or amendment to the Environmental Approvals and for all works, costs, fees, expenses and delays incurred in connection therewith.

2.6 Permits, Licences and Approvals

(a) Except as otherwise specifically provided in this Project Agreement in relation to Permits, Licences and Approvals, Project Co is required, at its own cost and risk, to obtain all Permits, Licences and Approvals which relate to, or are required under Environmental Laws in connection with the Project, or are otherwise necessary for Project Co to fulfill its environmental obligations under this Project Agreement.

2.7 Notification to the City

(a) Project Co shall notify the City Representative immediately of:

(i) all charges, orders, investigations or notices of violation or non-compliance issued against Project Co or any Project Co Party or otherwise relating to the performance of the Works and Maintenance or the Lands under any Environmental Laws; and

(ii) any notice, claim, action or other proceeding by any person against Project Co or any Project Co Party or otherwise relating to the performance of the Works and Maintenance or the Lands under any Environmental Laws.

2.8 Inquiries to Governmental Authorities

(a) Where required, Project Co shall promptly provide the City Representative with such written authorizations as the City may require from time to time in order to make inquiries of any Governmental Authorities regarding Project Co or Project Co's compliance with Environmental Laws and Permits, Licences and Approvals, including Project Co's applications for Permits, Licences and Approvals.

(b) Project Co shall forward to the City Representative a copy of any report, submission, application or other document relating to environmental matters on or at or affecting or otherwise relating to the Lands concurrent with filing or lodging with or otherwise providing such document to any Governmental Authority.

2.9 Environmental Records

(a) Project Co shall maintain in accordance with Schedule 26 – Record Provisions all documents and records relating to environmental matters (including the Environmental Approvals and all other Permits, Licences and Approvals) in connection with the Lands and the performance of the Works and Maintenance.

2.10 Transition Period

(a) The following transition period activities shall be undertaken by the Parties within 14 days after Financial Close with regard to works performed by the City and/or federal government associated with carrying out those environmental obligations set forth in Appendix B that shall be transferred to Project Co 14 days after Financial Close:

(i) The City shall provide Project Co with a summation report of activities and status of works performed by the City and federal government associated with carrying out the obligations under the Environmental Approvals;

(ii) The City shall provide Project Co with all applicable documentation related to the obligations under the Environmental Approvals performed by the City and federal government;

(iii) The City and Project Co shall hold a meeting to review the summation report and transferred documentation; and

(iv) The City and Project Co shall hold an appropriate number of site visits to review field activities performed by the City.

PART 3
ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY

3.1 Environmental and Sustainability Director

(a) Project Co shall appoint an Environmental and Sustainability Director who shall, throughout the Project Term and irrespective of such person's other responsibilities, have defined authority for ensuring the establishment and maintenance of the Environmental Management Plan, as well as auditing and reporting on the status of, and compliance with the Environmental Management Plan, the Environmental Approvals, the Sustainability Plan and the environmental plans and reports identified in Sections 3.7 and 3.9 of this Schedule 17 and any terms and conditions associated with environmental Permits, Licences and Approvals.

(b) The Environmental and Sustainability Director shall be a Key Individual.

(c) Without limiting the generality of the foregoing, the job specification and responsibilities of the Environmental and Sustainability Director shall include the following:

(i) directing all aspects of Project Co's environmental and sustainability program for the Project, including overseeing the environmental sustainability auditing program;

(ii) ensuring environmental and sustainability issues are addressed and requirements are met in accordance with this Project Agreement and all Environmental Approvals;

(iii) ensuring the Sustainability Plan and the Works addresses the City's four sustainability dimensions (natural environment, social, cultural, and economic);

(iv) ensuring that all sustainability initiatives are coordinated with the City and that the initiatives fit within the City's corporate sustainability priorities and strategies;

(v) establishing and maintaining working relationships with relevant Governmental Authorities and Stakeholders through the City Representative;

(vi) taking a lead role in internal environmental and sustainability design reviews including development of mitigation and compensation proposals acceptable to the City Representative and Governmental Authorities;

(vii) liaising with the City Representative and with Governmental Authorities (through the City Representative) as required and acting as the single point representative for Project Co on all matters relating to environmental management and sustainability;

(viii) directing the preparation and submission to the City Representative of all reports required under the Environmental Approvals;

(ix) supporting and maintaining working relationships with relevant First Nations, through the City Representative; and

(x) directing the preparation and submission to the City Representative of all communication materials associated with the Stakeholder consultation program in accordance with Part 4 of this Schedule 17, and Schedule 18 of this Project Agreement.

3.2 Environmental and Sustainability Manager

(a) Project Co shall appoint an Environmental and Sustainability Manager who shall, throughout the Project Term and under the direction of the Environmental and Sustainability Director, have defined authority for ensuring the day-to-day implementation of the Works and the Maintenance associated with the Environmental Management Plan, the Environmental Approvals, and the environmental plans and reports identified in Sections 3.7 and 3.9 of this Schedule 17, and auditing and reporting on the performance of such Works and Maintenance.

(b) The Environmental and Sustainability Manager shall be a Key Individual.

(c) Without limiting the generality of the foregoing, the job specification and responsibilities of the Environmental and Sustainability Manager shall include the following:

(i) managing all environmental and sustainability issues associated with the Project on a day-to-day basis, including overseeing the environmental monitoring and follow-up program in accordance with the Environmental Approvals;

(ii) establishing and maintaining working relationships with relevant Governmental Authorities and Stakeholders through the City Representative;

(iii) effective operation of the Environmental Management Plan on a day-to-day basis;

(iv) effective operation of the Sustainability Plan on a day-to-day basis;

(v) ensuring environmental issues are addressed and requirements are met in accordance with the Environmental Approvals and this Project Agreement;

(vi) supporting and maintaining working relationships with relevant First Nations, through the City Representative; and

(vii) preparing and submitting to the City Representative all communication materials associated with the Stakeholder consultation program in accordance with Part 4 of this Schedule 17 and Schedule 18.

3.3 Sustainability Coordinator

(a) Project Co shall appoint a Sustainability Coordinator who shall, under the direction of the Environmental and Sustainability Manager, be responsible for the development and

implementation of a sustainability plan for the project and ensuring that the outlined sustainability requirements are met. The Sustainability Coordinator shall ensure that the development and implementation of the sustainability plan address all four sustainability dimensions including natural environment, social, cultural and economic.

3.4 Environmental Permits and Approvals Coordinator

(a) Project Co shall appoint an Environmental Permits and Approvals Coordinator who shall, throughout the Project Term and under direction of the Environmental and Sustainability Manager, be responsible for obtaining and ensuring the compliance with environmental Permits, Licences and Approvals relating to the Works and the Maintenance.

3.5 Environmental Specialists

(a) Project Co shall have available, at all times during the Project Term, under direction of the Environmental and Sustainability Manager, a multi-disciplinary team of specialists experienced in the disciplines required to meet Project Co's obligations under this Schedule 17.

3.6 Environmental Inspector(s)

(a) Project Co shall appoint Environmental Inspectors who shall, under direction of the Environmental and Sustainability Manager, ensure compliance of the Works and the Maintenance with the Environmental Management Plan.

(b) Without limiting the generality of the foregoing, the job specification and responsibilities of the Environmental Inspector(s) shall include the following:

(i) monitor construction activities on a daily basis;

(ii) maintain a log of monitoring events;

(iii) complete a daily monitoring report and provide to the Environmental Sustainability Manager; and

(iv) provide advice and recommendations for improving environmental protection and correcting any inefficient practices and/or issues of non-compliance.

3.7 Environmental Plans and Reports

(a) <u>Project Co shall develop, implement, and update the plans and reports required pursuant to the Environmental Approvals, and in accordance with additional assessments completed during preliminary engineering to address Environmental Assessment commitments and other considerations that will include, but are not limited to, those listed in Table 3.1 and Schedule 33:</u>

Table 3.1 – Schedule of Plans, and Reports Submission Requirements

Key Performance Measure (KPM)*	Deliverable Name	Schedule 17 Specification Reference	Due Date	Deliverable Submission Period	Submitted under the Review Procedure
n/a	Environmental Management Plan (First Submission)	Section 3.8(b)	45 days after Financial Close	By due date	Yes
KPM 3.8(c)	Environmental Management Plan (Updates)	Section 3.8(c)	As required, and in any event no later than June 1st annually	Through Project Term	Yes
n/a	Monthly environmental reports	Section 3.7(e)	14 days after the end of the month for which the report is prepared	During any period during which construction activities are undertaken	Yes
n/a	Environmental completion report(s) (prepared for each Phase of the Project)	Section 3.7(f)	14 days prior to each Milestone Acceptance Date and the Revenue Service Commencement Date	Until Revenue Service Commencement	Yes
n/a	Bi-weekly environmental monitoring reports	Section 3.7(g)	1 week after the end of the period for which the report is prepared	Until Revenue Service Commencement	Yes
KPM 3.7(h)	Independent environmental audit	Section 3.7(h)	June 1st biennially	Through Project Term	Yes
n/a	Landscape Plan and Landscape Plan Drawings	Section 3.7(i) and in accordance with Schedule 15.2, Part 1, Article17	90 days prior to the commencement of the Works	By due date	Yes
n/a	Fisheries compensation plan(s) (prepared for each Phase of the Project) (if required)	Section 3.7(j)	60 days prior to the commencement of the Works	By due date	Yes
n/a	Complaint Protocol	Section 3.7(k)	60 days prior to the commencement of the Works	By due date	Yes
n/a	Dust Control Plan	Section 3.7(l)	45 days prior to the commencement of the Works	By due date	Yes
n/a	Sustainability Plan (First Submission)	Section 3.10	45 days after Financial Close	By due date	Yes
KPM 3.10(c)	Sustainability Plan (Updates)	Section 3.10	Subsequent updates as applicable and in any event no later than June 1 annually	By due date	

Key Performance Measure (KPM)*	Deliverable Name	Schedule 17 Specification Reference	Due Date	Deliverable Submission Period	Submitted under the Review Procedure
n/a	Excavated Material Management Plan	Section 5.4(a)	60 days prior to commencement of the Works	By due date	Yes
n/a	Excavated Material Management Plan	Section 5.4(c)	14 days prior to the Revenue Service Commencement	By due date	Yes
n/a	Dewatering Management Plan	Section 5.8(a)	60 days prior to commencement of the Works	By due date	Yes
n/a	Dewatering Management Plan	Section 5.8(b)	14 days prior to the Revenue Service Commencement	By due date	Yes
n/a	Erosion and Sediment Control Plan(s)	in accordance with Schedule 15.2, Part 1, Article 18	30 days prior to the commencement of any construction as part of the Works	By due date	Yes
n/a	Spill Prevention and Response Plan	Section 5.9(a)	60 days prior to commencement of the Works	By due date	Yes
n/a	Spill Prevention and Response Plan	Section 5.9(b)	14 days prior to the Revenue Service Commencement	By due date	Yes
n/a	Archaeological Risk Management Plan	Section 7.1(a)	60 days prior to commencement of the Works	By due date	Yes
n/a	Weekly noise and vibration construction monitoring reports	Section 8.7(c)	Friday each week in areas where construction is underway	By due date	Yes
KPM 8.8(a)	Noise and Vibration Survey	Section 8.8(a)	June 1st biennially	During the Maintenance Term	Yes

* Key Performance Measures are only applicable following Revenue Service Availability Date.

Project Co shall update its plans as appropriate to address the Belfast MSF Expansion and the DB Co Works, taking into account equivalent plans or reports prepared in respect of the Stage 2 Works under the DB Co Works Agreement and/or the Belfast MSF Expansion Variation.

(b) The documents required to be submitted under the Schedule 10 – Review Procedure as set forth in Table 3.1 shall be submitted to the City Representative in accordance with Schedule 10 – Review Procedure.

(c) Project Co shall promptly provide the City Representative with copies of all environmental site assessments, audits, reports, documents, and test results relating to the Site and the Project, including all assessments, audits, reports and tests conducted by or on behalf of or coming into the possession of Project Co at any time whether before or after Financial Close.

(d) Project Co shall prepare and submit an Environmental Quality Management Plan in accordance with Schedule 11 – Quality Management.

(e) Project Co shall prepare and submit to the City Representative and Governmental Authorities, during any period during which Construction Activities are undertaken, a monthly environmental report that includes, but is not limited to:

(i) design and construction activities undertaken as part of the Works during the period;

(ii) key environmental issues associated with (i);

(iii) consultation activities and communication with Governmental Authorities;

(iv) mitigation measures (successes and failures) associated with (ii); and

(v) monitoring activities, resolutions to environmental impacts, and how Project Co was able to comply with all Environmental Approvals.

(f) An environmental completion report shall be prepared by Project Co and submitted to the City Representative prior to Milestone Acceptance of each Milestone and Substantial Completion. The report shall, as a minimum, document compliance with requirements of the Environmental Approvals and all other environmental obligations under this Project Agreement.

(g) Bi-weekly environmental monitoring reports shall be prepared during the Works and submitted to the City Representative. Bi-weekly environmental monitoring reports shall, as a minimum, document the status of environmental protection measures, ineffective measures/issues of non-compliance and associated corrective actions. This shall include description, photos and status of Works by area as they relate to the environmental obligations under this Project Agreement.

(h) Project Co shall obtain and submit to the City Representative, from an independent environmental consultant (the qualifications of which have been accepted by the City Representative pursuant to the Review Procedure), biennial independent environmental audits of compliance with the environmental obligations under this Project Agreement. Compliance with this requirement shall be at Project Co's own cost, including obtaining any additional investigations recommended by the environmental consultant.

(i) Landscape Plan and Landscape Plan Drawings, as defined in Part 1, Article 17 of Schedule 15-2, shall be prepared and submitted by Project Co in accordance with the requirements set forth therein.

(j) If required, Project Co shall develop a detailed fisheries compensation plan to obtain *Fisheries Act* (Canada) approval in consultation with DFO, the Rideau Valley Conservation Authority, and the City Representative.

(k) Project Co shall prepare a Complaint Protocol addressing how it will deal with and respond to inquiries and complaints received during the Project Term. Project Co acknowledges that its Complaint Protocol will be placed in the public record.

(l) A Dust Control Plan shall be prepared by Project Co and submitted to the City Representative that documents how dust generated from construction activities will be mitigated, and addresses issues such as weather events, and how Project Co will adopt the dust control measures outlined in the Environmental Approvals.

3.8 Environmental Management Plan

(a) Project Co shall develop, implement and update the Environmental Management Plan for the Project that is guided by the environmental management plan developed during the preliminary engineering phase and in accordance with the requirements of this Schedule 17.

(b) Project Co shall prepare and submit the Environmental Management Plan (First Submission) to the City Representative. The Environmental Management Plan (First Submission) shall:

(i) comply with all of Project Co's environmental obligations, including without limitation those set forth in the Environmental Approvals and in this Schedule 17;

(ii) identify credentials of Project Co's environmental team referenced in Sections 3.1 to 3.6 of this Schedule 17 for performing specialized environmental tasks;

(iii) identify roles and responsibilities and reporting structure of Project Co's environmental team as identified within Sections 3.1 to 3.6 of this Schedule 17;

(iv) identify monitoring and reporting requirements;

(v) integrate with the Sustainability Plan defined under Section 3.10 of this Schedule 17;

(vi) include the component plans as set out in the Environmental Approvals; and

(vii) identify an Environmental Education Awareness Plan.

(c) Project Co shall expand and update throughout the Project Term the Environmental Management Plan to reflect the Design and Construction Works and Maintenance scheduling, site conditions and weather-dependent contingency measures, and requirements of the Environmental Approvals, Permits, Licences and Approvals, and any other environmental plans and reports pursuant to Sections 3.7 and 3.9 of this Schedule 17. Environmental Management Plan (Updates) shall be prepared and submitted by Project Co to the City Representative as required, and in any event no later than June 1st annually.

3.9 Schedule of Other Required Environmental Plans and Reports

(a) In addition to those plans and reports listed in Table 3.1, Project Co shall submit a list of other environmental plans and reports which Project Co is responsible for under the Environmental Approvals, Environmental Laws, and the requirements of this Schedule 17 to the City Representative, which details each deliverable, the environmental obligation that is being fulfilled and a due date.

3.10 Sustainability Plan

(a) Project Co shall develop and implement, in consultation with the City, a Sustainability Plan for the Project that:

(i) is guided by the framework outlined in the sustainability plan developed during the preliminary engineering phase; and

(ii) the Choosing Our Future initiative and the City's Environmental Strategy as part of the Ottawa 20/20 initiative (or as updated).

(b) Project Co shall prepare and submit a Sustainability Plan (First Submission) for the Project that includes, but is not limited to, a description of:

(i) development and implementation of sustainable practices and approaches for the Works and Maintenance;

(ii) the objectives and metrics relating to sustainable practices to be achieved throughout the Project Term;

(iii) a framework, strategy and methods and tools, including innovative approaches, to achieve the foregoing objectives and metrics;

(iv) the coordination of the Sustainability Plan with the Project Co's Environmental Management Plan;

(v) training, education and communication of sustainability objectives and activities for the Project Co Parties and all other parties involved in the Project;

(vi) approaches to promoting sustainability initiatives to Stakeholders and in accordance with the provisions of Schedule 18 – Communication Protocol;

(vii) methods and tools for monitoring and reporting on metrics to the City;

(viii) roles and responsibilities of Project Co's sustainability team, including those detailed within Section 3.1 to 3.6 of this Schedule 17; and

(ix) Project Co's decision and risk management approach relating to sustainable practices.

(c) Project Co shall expand and update throughout the Project Term the Sustainability Plan to reflect any City agreed changes resulting from refinements to the Design and Construction and Maintenance Works, and any sustainability requirements of the Environmental Approvals, Permits, Licences and Approvals, and any other environmental plans and reports pursuant to Sections 3.7 and 3.9 of this Schedule 17. The Sustainability Plan (Updates) shall be prepared and submitted by Project Co to the City Representative as required, and in any event no later than June 1st annually.

PART 4
CONSULTATION

4.1 General

(a) The design and development of the Project shall be implemented in coordination with Stakeholder consultation commitments and requirements as set out in the Environmental Approvals, this Schedule 17, and Schedule 18 – Communications Protocol.

PART 5
CONTAMINATION AND EXCAVATED MATERIAL MANAGEMENT

5.1 Notification Requirements

(a) Without limiting the notification obligations of Project Co in Section 16.2 of the Project Agreement, Project Co shall also undertake the notifications requirements detailed in Sections 5.2 and 5.3 of this Schedule.

5.2 Notification to the City

(a) Project Co shall immediately notify the City Representative of :

(i) the discovery of Contamination;

(ii) any Release of Contamination which includes any Release that could cause an adverse effect on the Project, the Lands or any other lands or subject Project Co or the City to any fines, penalties, orders, investigations or other proceedings under any Environmental Laws, together with full particulars of such Release, including the location, time, Government Authorities notified, damages suffered or caused and remedial action taken;

(iii) all charges, orders, investigations or notices of violation or non-compliance issued against Project Co or any Project Co Party relating to the performance of the Works and the Maintenance or the Lands under any Environmental Laws; and

(iv) any notice, claim, action or other proceeding by any person against Project Co or any Project Co Party or otherwise relating to the performance of the Works and Maintenance or the Lands concerning the Release or alleged Release of any Contamination.

5.3 Notification to Governmental Authorities

(a) In addition to notifying the City Representative in accordance with Subsection 5.2(a), whenever required by applicable Environmental Laws, Project Co shall notify the relevant Governmental Authorities of any Release of any Contamination at or from or to the Lands.

5.4 Excavated Material Management Plan

(a) Project Co shall prepare and submit an Excavated Material Management Plan to the City Representative that describes how Project Co will address management of Contamination including handling, transportation, testing, disposal and/or ultimate disposition of all excavated material, i.e. soil, rock and solid waste excavated as part of the Works. The Excavated Material Management Plan shall describe and include, but not be limited to, the following:

(i) procedures for management including handling, transportation, testing, disposal and/or ultimate disposition of excavated material;

(ii) measures to be undertaken to minimize excess excavated material generation and maximize reuse of excavated material within the Lands;

(iii) how Project Co will ensure excess excavated material management for the Works will be performed in compliance with Environmental Laws;

(iv) estimated quantities of excess excavated material to be generated by the Works, including but not limited to total material excavation; excavated material to be used within the Lands, and excavated material to be managed outside the Lands;

(v) how all excess excavated material generated by the Works will be managed using best management practices;

(vi) estimated grain size distribution of excavated materials generated during tunnel construction and how this material will be re-used within the Lands as well as how and where it will be stockpiled/processed for re-use outside the Lands;

(vii) protocol for how areas of known Contamination will be managed and estimated quantities of contaminated material to be disposed outside of the Lands;

(viii) protocol outlining how the potential discovery of contamination in areas not previously identified will be managed including the preparation of a plan for the remediation or removal of Contamination as detailed in Section 5.5(c) and

(ix) reporting procedures to document how all management activities and best practices have been implemented.

(b) Where Project Co intends to dispose of excess excavated material outside the Lands, demonstrate that testing and sampling protocols have been followed to establish concentrations for chemical parameters of concern and that Environmental Laws have been complied with.

(c) Project Co shall prepare and submit a report to the City Representative prior to Substantial Completion that summarizes how all excavated material management activities have been implemented during the Works and summarizes final quantities described in Section 5.4(a)(iv).

5.5 Management Removal and Remediation

(a) With respect to any Contamination located on, in or under the Lands for which Project Co is responsible pursuant to Subsections 16.2(a) or 16.2(a1) of the Project Agreement, Project Co shall:

(i) Complete an assessment of risk with respect to such Contamination and, on demonstrating to the reasonable satisfaction of the City that the Contamination does not represent a Risk to Human Health or the Environment as required by Applicable Law and that the Contamination would not otherwise be disturbed or altered as a result of the Project Co execution of the Project Agreement, implement any management or remedial measures as are required to ensure that such Contamination continues not represent a Risk to Human Health or the Environment as required by Applicable Law; and/or,

(ii) To the extent that Project Co does not, for any reason, satisfy the City, acting reasonably, that any Contamination located on, in or under the Lands does not represent a Risk to Human Health or the Environment as required by Applicable Law, Project Co shall promptly, and in any event prior to the Expiry Date or earlier termination of this Project Agreement, remove from the Lands all such Contamination or remediate all such Contamination to the numerical or risk-based standards required or permitted by Applicable Laws, and otherwise in accordance with Applicable Laws.

The above provisions shall not be construed as limiting the obligations of Project Co under Subsections 5.4(a)(vii) and (viii) and Section 5.5(c) of this Schedule 17 or Section 16 of the Project Agreement. Nothing in this Section 5.5 shall require Project Co to re-assess any risk in relation to Contamination on the Stage 2 Lands, provided that DB Co addressed such Contamination in accordance with the terms of the DB Co Works Agreement or as otherwise instructed or agreed by the City. To the extent that DB Co has submitted any plans as part of the DB Co Works in relation to Contamination on the Stage 2 Lands and implemented such plans in accordance with the terms of the DB Co Works Agreement or as otherwise instructed or agreed by the City, the City agrees that it will not require Project Co to further remediate or remove such Contamination. To the extent DB Co has not implemented such plans in accordance with the terms of the DB Co Works Agreement or as otherwise instructed or agreed by the City, this shall constitute a DB Co Defect and the provisions of the DB Co Interface Agreement shall apply accordingly. Nothing in this Section 5.5 shall prevent Project Co from pursuing a claim under Section 9.12 of the Project Agreement for Equivalent Project Relief.

(b) In addition to Project Co's obligations under Section 16 of the Project Agreement and this Schedule 17, with respect to any Contamination or Existing Contamination or Stage 2 Existing Contamination for which Project Co or any Project Co Party is responsible for Releasing as described in Section 16.2(b) of the Project Agreement, Project Co shall promptly remove or remediate all such Contamination to the numerical or risk-based standards required or permitted by Applicable Laws, and otherwise in accordance with

Applicable Laws, all in accordance with a plan prepared and accepted by the City pursuant to Subsection 5.5(c) below.

(c) Upon encountering any Contamination at the Lands that is not addressed in an Excavated Material Management Plan, for which Project Co is responsible pursuant to Section 16.2(a), Section 16.2(a1) or Section 16.2(b) of the Project Agreement or for which the City is responsible pursuant to Section 16.2(c) of the Project Agreement, if instructed to do so by the City Representative pursuant to Section 16.2(f) of the Project Agreement, Project Co shall:

(i) prepare and submit to the City Representative pursuant to the Review Procedure a plan for the remediation or removal of such Contamination, if such remediation or removal is required in accordance with this Project Agreement, or otherwise confirming that no such remediation or removal is so required. Following the acceptance of such plan by the City Representative, Project Co shall commence and complete any required remedial or removal work in accordance with such plan, keeping the City Representative informed with respect to the status of the remedial or removal work. Any plan accepted by the City Representative pursuant to this Section 5.5(c) shall be incorporated into an Excavated Material Management Plan.

5.6 Hazardous Substances Brought onto Site

Notwithstanding any Applicable Laws or any other provision in this Project Agreement to the contrary, all products and materials, goods or other items which in their natural, original state, or through environmental transformation or degradation contain Hazardous Substances, brought onto the Lands by Project Co or any Project Co Party or any person for whom Project Co is in law responsible shall be and remain the sole and exclusive property and responsibility of Project Co and shall not become the property or responsibility of the City, notwithstanding their incorporation into or affixation to the Lands or the System Infrastructure and notwithstanding any termination or expiration of the Project Agreement. Any resulting Contamination at the Lands and the remediation and/or removal thereof and the cost of such remediation and/or removal shall be the sole responsibility of Project Co.

5.7 Designated Substances Listing

Without limiting the obligations of Project Co as defined in Schedule 15-2, Part 1, Article 16, or otherwise under Applicable Law, Project Co shall be responsible for providing each Subcontractor with the designated substances listing prepared by the City pursuant to the designated substances survey work initiated by the City prior to Financial Close as described in Sections 2.2 (c)(i)(V) and 2.3(b)(i)(G) of this Schedule 17, and to undertake any required work to update the designated substances listing throughout the Project Term.

5.8 Dewatering Management Plan

(a) Project Co shall prepare and submit a Dewatering Management Plan to the City Representative that describes how Project Co will address the management of excess

water generated by the Project. The Dewatering Management Plan shall include any dewatering requirements detailed in Schedule 15-2, Part 1, Article 12 and Article 18 and shall include, but not be limited to, the following:

(i) procedures for water testing, containment, classification, treatment, and disposal/discharge;

(ii) how Project Co will ensure water management for the Project will be performed in compliance with Environmental Laws; and

(iii) report procedures to document how all management activities and best practices have been implemented.

(b) Project Co shall prepare and submit a report to the City Representative prior to Substantial Completion that summarizes how all dewatering management activities have been implemented during the Works and summarizes their outcomes.

(c) For the avoidance of doubt, Project Co shall incorporate within its Dewatering Management Plan any obligations within the equivalent plan submitted to the City in respect of the DB Co Works and which relate to the Maintenance Services.

5.9 Spill Prevention and Response Plan

(a) Project Co shall prepare and submit a Spill Prevention and Response Plan to the City Representative that describes how the Project Co will address management of spills generated by the Works and Maintenance. The Spill Prevention and Response Plan shall describe and include, but not be limited to, the following:

(i) procedures for notification and reporting, spill containment, and spot spills;

(ii) response strategy for spill adjacent to or into a waterbody; and

(iii) practices to be employed for reducing the potential for spill and materials/equipment from entering water including re-fuelling protocols.

(b) Project Co shall prepare and submit a Spill Prevention and Response Plan report to the City Representative prior to Substantial Completion that summarizes how all Spill Prevention and Response Plan activities have been implemented during the Works and summarizes their outcomes.

(c) For the avoidance of doubt, Project Co shall incorporate within its Spill Prevention and Response Plan any obligations within the equivalent plan submitted to the City in respect of the DB Co Works and which relate to the Maintenance Services.

PART 6
ELECTROMAGNETIC COMPATIBILITY AND INTERFERENCE (EMC/EMI)

6.1 EMC/EMI

(a) Project Co shall be responsible for the testing of and mitigation measures related to human exposure to static and time-varying electric and magnetic fields in accordance with the provision of Schedule 15-2, Part 4, Article 9.

(b) For the avoidance of doubt, Project Co's obligations hereunder shall include the measures applicable to the DB Co Works set out in Article 11 of Part 3 of Schedule 15-2 – Design and Construction Requirements of the DB Co Works Agreement.

PART 7
ARCHAEOLOGY AND CULTURAL HERITAGE

7.1 Archaeology Risk Management

(a) Project Co will be responsible to develop an Archaeology Risk Management Plan, as detailed in Table 3.1 of Schedule 17 and subject to Section 16.3 of this Project Agreement. The Archaeology Risk Management Plan will address any recommendations resulting from archaeological reports prepared for the Project and protocols for the discovery of human remains or undocumented archaeological resources. Consultation with the Algonquins of Ontario will be undertaken as part of the development of the protocols and the overall Archaeology Risk Management Plan. The Archaeology Risk Management Plan shall include as a minimum the following requirements:

(i) the actions required resulting from the recommendations of the archaeological assessment reports completed by the City including any archaeological monitoring requirements by a licenced archaeologist during construction activities;

(ii) a process for amending the Archaeological Risk Management Plan to incorporate any additional actions required resulting from subsequent archaeological assessment reports completed;

(iii) a protocol to be followed should human remains be discovered which includes how Project Co will ensure that human remains are managed in compliance with Applicable Laws including the *Cemeteries Act*, R.S.O. 1990 c. C.4 and the Funeral, Burial and Cremation Service Act, 2002, S.O. 2002, c.33 (when proclaimed in force) whereby any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services, as well as the Ministry of Tourism and Culture;

(iv) a protocol to be followed should previously undocumented archaeological resources be discovered which includes how Project Co will ensure that previously undocumented archaeological resources are managed in compliance with Applicable Laws including Section 48 (1) of the *Ontario Heritage Act*, including assessing the need to monitor sites by a licensed archaeologist during construction whereby the proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork; and

(v) a process to ensure that Project Co complies with Applicable Laws for the management of archeological sites including Sections 48 and 69 of the *Ontario Heritage Act* which state that it is an offence for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artefact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister of Tourism and Culture

stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Registrar of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

7.2 Built Heritage and Cultural Landscapes Best Practice Guidelines

(a) Project Co shall be guided by the following best practice guidelines for the Works. The best practice guidelines shall include as a minimum the following:

(i) new construction that will have an adverse visual impact on character defining elements of heritage structures, landscapes, and properties be mitigated by the design and placement of new structures to be sympathetic and secondary to the adjacent cultural heritage resources of the area;

(ii) any specifically identified views or cultural landscapes be conserved;

(iii) any policies relating to visual character in any supporting City policy document/by-law will be reflected;

(iv) the design for the tunnelled station entryways and supporting infrastructure take into account the surrounding cultural heritage resources and be both sympathetic and secondary to these resources; and

(v) prior to the finalization of entryway and supporting infrastructure designs, the draft designs be reviewed by the appropriate Stakeholders, and be assessed against the applicable municipal, provincial, and federal plans, guidelines or policies.

PART 8
AIR QUALITY, NOISE AND VIBRATION

8.1 Air Quality

(a) Project Co, as part of the Works, will include the following:

(i) requirements for designing, purchasing, and operating equipment according to applicable regulatory requirements, land use permits, and industry best management practices for air quality management;

(ii) measures for managing project related air emissions including fugitive dust and odour; and

(iii) meeting all applicable regulatory requirements and standards regarding air emissions including fugitive dust and odour.

8.2 Noise and Vibration General

(a) Project Co, as part of the Works will include, without limiting the requirements set forth in Sections 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, and 8.11 of this Schedule 17, the following:

(i) measures to manage the adverse effects of ground-borne and air-borne noise and vibration by minimizing and mitigating noise and vibration generated as a result of the Project activities;

(ii) meeting best management practices and standards as well as municipal, provincial and federal and regulatory requirements pertaining to ground-borne and air-borne noise and vibration; and

(iii) designing, constructing, procuring, and operating equipment according to Section 8.2 (a) (i) and (ii).

(b) Project Co shall ensure that the effects from blasting during construction will be managed in accordance with the City of Ottawa's Specification S.P. No: F-1201 'Use of Explosives', except for Sensitive Receivers where more stringent criteria as detailed in Section 8.6 may apply.

(c) Project Co will consider time of day impacts when assessing the mitigation measures during construction and maintenance including those from vibration effects of blasting.

8.3 Ground-Borne Noise and Vibration Assessment

(a) Project Co shall engage a qualified Acoustical Engineer to assess potential noise and vibration impacts resulting from their design and construction plans.

(b) Project Co shall, as a minimum, undertake ground-borne noise and vibration assessments such as those described in the Federal Transit Administration's Transit Noise and Vibration Impact Assessment, Report FTA-VA-90-1003-06, Federal Transit Authority, U.S. Department of Transportation, 2006, or as amended. Additional alternative methods of assessment may also be applied, as deemed appropriate by Project Co's Acoustical Engineer. Where an alternative assessment is proposed to be applied for a Sensitive Receiver, the alternative assessment shall be developed in consultation with the Sensitive Receiver and accepted by the City Representative.

(c) For Sensitive Receivers, Project Co shall undertake detailed ground-borne noise and vibration assessments which will include measurement of the following as inputs:

(i) line source force density levels for the proposed Vehicle; and

(ii) line source transfer mobilities from the tracks to the Sensitive Receiver (facility/space, as appropriate).

Additional alternative methods of assessment may also be applied, as deemed appropriate by Project Co's Acoustical Engineer. Where an alternative assessment is proposed to be applied for a Sensitive Receiver, the alternative assessment shall be developed in consultation with the Sensitive Receiver and accepted by the City Representative.

(d) Project Co shall apply the resulting data from these measurements to the prediction of anticipated worst-case ground-borne noise and vibration impacts from construction, operations and maintenance within the receiver space(s) of the Sensitive Receiver. The estimation procedure shall include predictions of sound pressure levels within the space for comparison with the applicable design criteria set forth in Section 8.6.

8.4 Ground-Borne Noise and Vibration Mitigation

(a) Project Co shall develop, in consultation with stakeholders and for the City Representative's review and acceptance, ground-borne noise and vibration mitigation measures to be implemented during construction and during the Maintenance Term in areas along the corridor to meet the applicable criteria detailed in this Schedule 17.

(b) Given the sensitive uses along the Project alignment, mitigation measures will likely be necessary to ensure that the noise and vibration criteria limits are satisfied. Project Co shall design effective mitigation measures to ensure that the maximum allowable sound level limits outlined in Section 8.6 of this Schedule 17 are satisfied.

(c) Project Co should understand the sensitivities along the Project alignment. Mitigation measures may include floating trackbed and resilient fasteners or equivalent measures.

(d) Subject to the requirements and criteria for specific Sensitive Receivers set out in Section 8.6 of this Schedule, Project Co shall ensure that mitigation measures for Sensitive Receivers are developed to address ground borne noise and vibration impacts within buildings and or facilities resulting from the construction of the OLRT system, and due solely to construction sources.

(e) Despite Section 8.4 (d), for Sensitive Receivers during construction, in cases where it is not practicable to meet the criteria outlined in Sections 8.6 of this Schedule 17, Project Co shall coordinate with the affected noise and vibration Sensitive Receivers and the City Representative to identify acceptable alternative means and measures to allow construction to proceed, which may include temporary relocation of the Sensitive Receivers.

(f) The performance of selected mitigation measures for application during the Maintenance Term must be verified using test data measured on similar track conditions, vehicle type and operating conditions as provided in Project Co's detailed design.

(g) For the avoidance of doubt, Project Co's maintenance obligations shall include implementing equivalent measures applicable to the DB Co Works.

8.5 Ground-Borne Noise and Vibration – General Design Criteria

(a) Project Co shall develop noise and vibration criteria for use during the construction period. These criteria will be presented to the City's Representative for acceptance.

(b) Subject to more stringent requirements applicable to Sensitive Receivers set out in Section 8.6, Project Co shall ensure that ground-borne noise and vibration impacts within buildings and or facilities resulting from the operations and maintenance of the LRT system during the Maintenance Term shall not exceed the criteria specified in Table 8.1 and in Table 8.2.

Table 8.1 − Ground-Borne Noise Criteria[5]

Land Use	Assessment Criteria (dB re 20 micro-Pascals)[1,5]		
	Frequent Events[2]	Occasional Events[3]	Infrequent Events[4]
Residences and buildings where people normally sleep.	35 dBA	38 dBA	43 dBA
Institutional land uses with primarily daytime use.	40 dBA	43 dBA	48 dBA

Notes:
1. An event is defined as a single OLRT vehicle passby.
2. Frequent events are defined as more than 70 OLRT vehicle passbys per day.
3. Occasional events are defined as between 30 and 70 OLRT vehicle passbys per day.
4. Infrequent events are defined as less than 30 OLRT vehicle passbys per day.
5. Decibels (dB) reference to 20 micro-Pascals.
6. The criteria in this table do not apply to vibrations resulting from use of explosives. Refer to Clause 8.2(b) for criteria applicable in connection with the use of explosives.

Table 8.2 − Ground-Borne Vibration Criteria

Land Use	Assessment Criteria (VdB re 1 micro-in/sec)[1,5]		
	Frequent Events[2]	Occasional Events[3]	Infrequent Events[4]
Residences and buildings where people normally sleep.	72	75	80
Institutional land uses with primarily daytime use.	75	78	83

Notes:
1. An event is defined as a single OLRT vehicle passby.
2. Frequent events are defined as more than 70 OLRT vehicle passbys per day.
3. Occasional events are defined as between 30 and 70 OLRT vehicle passbys per day.
4. Infrequent events are defined as less than 30 OLRT vehicle passbys per day.
5. Vibration velocity levels reported in decibels relative to a level of 1 micro-inch/second denoted as VdB.
6. The criteria in this table do not apply to vibrations resulting from use of explosives. Refer to Clause 8.2(b) for criteria applicable in connection with the use of explosives.

8.6 Ground-Borne Noise and Vibration Detailed Design Criteria – Sensitive Receivers

(a) Project Co's Acoustical Engineer shall undertake the following in relation to potentially Sensitive Receivers of ground-borne noise and vibration:

(i) a survey of the lands along the Project alignment and/or within a zone of influence of rail noise and vibration impacts, as determined by the Acoustical Engineer, to identify potential Sensitive Receivers including heritage structures; the survey will also include the identification of specific sensitive equipment or procedures;

(ii) the survey will be conducted in consultation with the potentially Sensitive Receivers and the list of Sensitive Receivers developed from the survey will be presented to the City for acceptance; and

(iii) baseline noise and vibration measurements at and/or within the Sensitive Receiver locations as determined by the Acoustical Engineer in consultation with the Sensitive Receiver and accepted by the City's Representative.

(b) Project Co shall ensure that baseline measurements are done using methods and instrumentation that are appropriate for the evaluation of vibration performance of the space (i.e., transducer sensitivity, spectral resolution and spatial orientation).

(c) Project Co's Acoustical Engineer shall develop a ground-borne noise and vibration standard criteria for Sensitive Receivers ("Ground Borne Noise and Vibration Standard for Sensitive Receivers"), through the assessment and evaluation of the baseline measurements, consultation with the Sensitive Receiver groups and a review of any sensitive equipment's specific manufacturer requirements except for the National Arts Centre, the Canadian Broadcasting Corporation and the Government Conference Centre, where the criteria detailed in Sections 8.6 (e) and 8.6 (f) will be used as the Ground Borne Noise and Vibration Standard. These standard criteria will be reviewed and accepted by the City Representative.

(d) As a minimum, for a given noise and/or vibration Sensitive Receiver, the OLRT intrusion criteria listed in Table 8.3 and Table 8.4 shall be applied to assess noise and vibration intrusion due to the construction as well as the operation of OLRT unless acceptable means and measures have been determined, in accordance with Section 8.4 (d), for the construction period.

(e) For the National Arts Centre, the Canadian Broadcasting Corporation and the Government Conference Centre, Project Co shall use the sound level limits for OLRT intrusion criteria listed in Tables 8.5, 8.6 and 8.7 as the respective representative Ground Borne Noise Standard for Sensitive Receivers. Working in concert with the Sensitive Receivers, Project Co's Acoustical Engineer will verify these sound level criteria by taking measurements during normal operations as part of the final design process in cooperation with the National Arts Centre, the Canadian Broadcasting Corporation and the Government Conference Centre. Should any revisions to these criteria be proposed by Project Co's Acoustical Engineer based on the verification process, these criteria will be presented to the City's Representative for acceptance.

(f) For the National Arts Centre. the Canadian Broadcasting Corporation and the Government Conference Centre, Project Co shall use a vibration limit for tactile perceptibility of OLRT intrusion of 72 VdB re 1 micro-in/sec root-mean square vibration velocity as measured in one third octave bands of frequency over the range of 8 Hz to 80 Hz, in the critical spaces listed in Tables, 8.5, 8.6 and 8.7. Vibration levels lower than this limit may be required to comply with the criteria limits listed in Tables 8.5, 8.6 and 8.7, in which case a more stringent vibration threshold would apply.

(g) Project Co shall ensure that ground borne noise and vibration intrusion levels due to the OLRT vehicle passby at Sensitive Receivers do not exceed the Ground Borne Noise and Vibration Standard for Sensitive Receivers.

8.7 Monitoring During Construction – Sensitive Receivers

(a) Prior to construction Project Co shall develop, as a component of their Complaint Protocol detailed in Schedule 18, a process for managing and responding to noise and vibration concerns during construction. This component of the Complaint Protocol shall be developed in consultation with Sensitive Receivers and presented to the City Representative for acceptance.

(b) During construction which has the potential to impact a Sensitive Receiver Project Co's Acoustical Engineer shall provide noise and vibration monitoring. For the National Arts Centre, the Canadian Broadcasting Corporation and the Government Conference Centre, continuous monitoring shall be provided as a minimum.

(c) Project Co shall prepare and submit to the City Representative, weekly reports of the monitoring detailed in Section 8.7(a).

(d) Project Co shall report in a timely manner, and in any event within 24 hours, any identified non-conformance with the Ground Borne Noise and Vibration Standard for Sensitive Receivers resulting from the monitoring, to the City Representative.

(e) To address any such non-conformance, Project Co shall develop and implement mitigation measures in consultation with the Sensitive Receiver and with the acceptance of the City Representative.

8.8 Monitoring During the Maintenance Term

(a) Project Co's Acoustical Engineer shall carry out a survey of noise and vibration measurements for Sensitive Receivers, with reference to the baseline measurements and the Ground Borne Noise and Vibration Standard for Sensitive Receivers, once every two years during the Maintenance Term.

(b) Project Co's Acoustical Engineer shall respond to requests from the City's Representative to investigate complaints regarding noise and vibration for Sensitive Receivers in accordance with its Complaint Protocol detailed in Schedule 18, and shall determine whether to initially apply mitigation strategies or conduct additional monitoring.

(i) In the case where Project Co applies mitigation measures, these measures shall be applied within 48 hours of the request for investigation being made by the City Representative to Project Co, or within an alternative time frame agreed to by the City Representative, acting reasonably. The mitigation measures shall be effective in ensuring compliance with the Ground Borne Noise and Vibration Standard for Sensitive Receivers.

(ii) In the case where Project Co conducts additional monitoring, Project Co's Acoustical Engineer shall carry out site-specific noise and vibration measurements for Sensitive Receivers within 48 hours of a request being made by the City to Project Co, or within an alternative time frame agreed to by the City Representative, acting reasonably.

(c) Project Co's Acoustical Engineer shall provide the summary results and data of any such site-specific noise and vibration measurements, conducted in accordance with (a) or (b) above, to the City Representative within 48 hours of the completion of field measurements required for the survey, or within an alternative time frame agreed to by the City Representative, acting reasonably.

(d) Project Co shall be responsible for the costs of noise and vibration measurements in response to complaints of up to ten (10) sites per Contract Year. Any additional site-specific noise and vibration measurements shall be: paid for by Project Co if the results indicate that Project Co was not in compliance with the Ground Borne Noise and Vibration Standard for Sensitive Receivers, or shall be paid for by Project Co and reimbursed by the City, by way of an adjustment to the immediately following Monthly Service Payment, if the results indicate that Project Co was in compliance with such standard.

8.9 Penalty for Non-Conformance - KPM

(a) If the results of any survey conducted pursuant to Section 8.8 demonstrate that Project Co is not in full compliance with the Ground Borne Noise and Vibration Standard for Sensitive Receivers, or if Project Co's mitigation measures under Section 8.8(b)(i) do not result in full compliance with the Ground Borne Noise and Vibration Standard for

Sensitive Receivers, then Project Co shall rectify all such non-conformance within seven (7) days of the date of the survey being provided to the City Representative and Project Co. Project Co shall cause its Acoustical Engineer to carry out all necessary measurements to demonstrate that non-conformances have been rectified and shall provide these results to the City Representative.

(b) The City Representative may provide Project Co with a longer period of time (greater than 7 days) to rectify non-conformance, at the City Representative's Discretion.

(c) If Project Co fails to demonstrate that it has Rectified all such non-conformance within the seven (7) day time period, or such longer period as may be permitted by the City Representative in accordance with Section 8.9(b) above, a special Service Failure shall apply and the City shall deduct $5000 per day from the Monthly Service Payment, and assess three (3) Failure Points per day, until Project Co demonstrates Rectification.

8.10 Commissioning Noise and Vibration Compliance - Sensitive Receivers

(a) Project Co shall conduct compliance verification measurements for Sensitive Receivers in accordance with the requirements outlined in this Section 8.10. These measurements shall be conducted by Project Co's Acoustical Engineer in consultation with the Sensitive Receivers and for acceptance by the City Representative. Compliance testing may be subject to independent verification measurements conducted by the City.

(b) Project Co shall prepare a compliance measurement plan prior to undertaking any measurements. A separate compliance measurement plan shall be prepared for each Sensitive Receiver facility and shall clearly outline the measurement process, measurement equipment, measurement locations and analysis methods. Measurement plans shall be developed in consultation with the Sensitive Receivers and for acceptance by the City Representative prior to commencing any measurements.

(c) The compliance verification measurements shall be compared with the appropriate ground-borne noise and vibration criteria for Sensitive Receivers outlined in Section 8.6.

(d) Measurements shall be conducted for sound and vibration simultaneously at sensitive receiver spaces at the most critical normal listening positions.

(e) Test equipment, including all microphones and accelerometers, shall be selected appropriately to ensure that they have low enough noise floors to measure levels consistent with the criteria for Sensitive Receivers outlined in Section 8.6. As a minimum, Project Co shall use the following measurement equipment: Type 1 sound level meters with octave band filters and; seismic accelerometers with sensitivities of 1 V/g or higher.

(f) Measurements shall be conducted in a manner that is appropriate for the intended use of the space and is consistent with best practices. Unless dictated otherwise by the usage of the space, ambient noise measurements shall be performed in octave bands with the meter time constant set to FAST (125ms), and shall be performed during ambient conditions

that are representative of the intended usage of the space. Where appropriate, and consistent with the intended use, extraneous noise interruptions shall be excluded from the measurements.

8.11 Commissioning Noise and Vibration Compliance - National Arts Centre and Canadian Broadcasting Corporation and the Government Conference Centre

(a) Compliance verification measurements for the National Arts Centre, the Canadian Broadcasting Corporation and the Government Conference Centre shall be conducted as outlined in Section 8.10 and in this Section 8.11.

(b) The duration for ambient noise measurements shall be at least 20 seconds. Measurements of Lmin, Lmax and Leq in each octave band from 20 Hz to 8 kHz shall be reported for each of the measurement locations. The intention of the measurements is to quantify steady state ambient noise. If an intruding sound is audible during the 20 second measurement period, that measurement shall be discarded and a new one initiated. In order to ensure that occasional intrusions are excluded from the measurements and in the event of a disagreement, the following standard shall be satisfied. With the meter's time constant set to FAST, the overall Lmax minus Lmin (linear response) shall be less than 8 dB for all measurement locations. If this condition is not satisfied then the measurement shall be repeated.

(c) The reported ambient noise level in each octave band shall be the average of all Leq measurement locations, provided that the Lmax minus Lmin condition in Section 8.11(b) has been satisfied.

(d) Project Co shall conduct measurements to quantify reasonable operating worst case OLRT noise and vibration intrusion levels. The OLRT noise levels shall be based on Lmax with a FAST time constant (125ms). Measurements shall be made in octave bands. The Lmax for each train passby shall be reported and shall not exceed the noise level limits outlined in Tables 8.5, 8.6 or 8.7, as applicable, at any measurement location.

(e) Building systems may be turned off during these measurements to improve the signal to noise ratio and more clearly determine whether the sound levels measured are attributable to the operation of the OLRT.

(f) If the Lmax sound level demonstrates exceedance of the limits as outlined in Table 8.5, Table 8.6 or Table 8.7, as applicable, Project Co shall develop a rectification plan in consultation with the Sensitive receptor and for acceptance by the City Representative.

Table 8.3 − Ground-borne Vibration Criteria for Sensitive Receiver Spaces

Description of Use	Maximum RMS Vibration Velocity Level (VdB re 1 micro-in/sec)
Usually adequate for computer equipment, semiconductor probe test equipment, and microscopes with less than 40x magnification.	78[1]
Suitable in most instances for general surgical suites, microscopes to 100x magnification and for other equipment of low sensitivity. Upper bound for animal spaces (vivaria etc.), residential sleep areas.	72[1]
Adequate in most instances for optical microscopes to 400x magnification, microbalances, mass spectrometers other than MALDI and quadrupole or high-resolution, conventional spectrophotometers, etc. Lower bound of range appropriate for animal spaces (vivaria etc.).	66[1]
Appropriate for microtomes and cryotomes for 5 - 10 micron slices, most tissue and cell cutters, except as noted below. Most CT, CAT, PET, fMRI, SPECT, DOT, EROS.	60[1]
Appropriate standard for optical microscopes to 1000x magnification; moderately sensitive electron microscopes to 1 mm detail size; digital imaging and/or fluorescence with optical microscope; high precision balances measuring quantities less than 1 mg; MALDI mass spectrometer; nano-drop spectrophotometers, microtomes, and cryotomes for slices less than 5 microns; and tissue and cell culture of the following slices less than 5 microns; and tissue and cell culture of the following types - hanging drop, unstirred layers, embryonic stem cells, weakly adherent cells, very long-term cultures, chemotaxis, and invasion assays. TFT-LCD stepper/scanner processes.	54[2]
Suitable in most instance for demanding equipment, including many electron microscopes (SEM and TEM) to 30,000x magnification, microinjection, micromanipulation, electrophysiology, confocal microscopy, and quadrapole and other high-resolution mass spectrometers. Many nuclear magnetic resonance (NMR) systems require this environment. Low strength MRI (1.5T or less).	48[2]
Assumed to be adequate for the most demanding of sensitive systems, including long path, laser-based, small-target systems; systems working at nanometer scales; and other systems requiring extraordinary dynamic stability. Many NMR and MRI (3.0T and higher) systems perform best in this environment.	42[2]

Notes:
1. Root Mean Square (RMS) vibration velocity as measured in one-third octave bands of frequency over the range of 8 Hz to 80 Hz.
2. RMS vibration velocity as measured in one-third octave bands of frequency over the range of 1 Hz to 80 Hz.

Table 8.4 − Ground-borne Noise Criteria for Detailed Assessment of Sensitive Facilities

Room Types	Room Criteria (RC)	Room Types	Room Criteria (RC)
Residences/Apartments/ Condominiums	25 to 35	**Performing Art Spaces**	
Hotels/Motels		Drama theatres, concert and recital halls	25
Individual rooms or suites	25 to 35	Music teaching studios	25
Meeting/banquet rooms	25 to 35	Music practice rooms	30 to 35
Corridors, lobbies	35 to 45		
Service/support areas	35 to 45	**Laboratories (with fume hoods)**	
		Testing/research, minimal speech communication	45 to 55
Office Buildings		Research, extensive telephone use, speech communication	40 to 50
Executive and private offices	25 to 35	Group teaching	35 to 45
Conference rooms	25 to 35		
Teleconference rooms	≤25	**Church, Mosque, Synagogue**	
Open-plan offices	≤40	General assembly with critical music programs	25 to 35
with sound masking	≤35		
Corridors and lobbies	40 to 45	**Schools**	
		Classrooms	25 to 30
Hospitals and Clinics		Large lecture rooms	25 to 30
Private rooms	25 to 35	Without speech amplification	≤25
Wards	30 to 40		
Operating rooms	25 to 35	**Libraries**	30 to 40
Corridors and public areas	30 to 40		
		Indoor Stadiums, Gymnasiums	
Courtrooms		Gymnasiums and natatoriums	40 to 50
Unamplified speech	25 to 35	Large seating-capacity spaces with speech amplification	45 to 55
Amplified speech	30 to 40		

Note: Table 8.4 per American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) Handbook, 2011, Chapter 48 Noise and Vibration Control, or as amended.

Table 8.5 – Sound Pressure Level Limits Criteria for OLRT Intrusion NAC.

Note: sound level limits were developed by subtracting 3dB from the measured ambient levels in the 31.5Hz, 63Hz, and 125Hz octave bands, and subtracting 6dB from the measured level in and above the 250Hz octave bands.

	Octave Band Centre Frequency (Hz)					
Room	31	63	125	250	500	1000
Southam Hall	47*	38	32	22	15	9
Theatre Hall	47*	38	32	22	14	7
Studio Hall	40*	34*	32	21	15	9
Rehearsal Hall A	37*	32*	31	9	1	0
Rehearsal Hall B	41*	34*	32	15	15	8
Hexagon Studio	55*	40	32	22	15	9

* These values, which represent the existing conditions, are below the threshold of audibility. In the 31 Hz and 63 Hz octave bands, the threshold of audibility is 56 dB and 36 dB respectively. LRT intrusion levels do not need to satisfy criteria below the threshold of audibility.

Table 8.6 – Sound Pressure Level Limits Criteria for OLRT Intrusion CBC

Note: sound level limits were developed by subtracting 3dB from the measured ambient levels in the 31.5Hz, 63Hz, and 125Hz octave bands, and subtracting 6dB from the measured level in and above the 250Hz octave bands.

Room Types	31.5	63	125	250	500	1K	2K	4K	8K
Basement Level	57	44	43	36	35	25	17	8	3
1st Floor									
TV Studios	57	39	32	24	21	16	11	7	5
Radio Studios	57	41	38	28	13	5	3	3	3
TV Plateaus	57	52	45	30	22	15	12	7	3
Control Rooms	57	42	39	32	24	21	13	9	4
Super Booths	57	41	41	25	18	18	14	9	3
Announce Booths	57	38	31	23	15	5	3	3	3
Open News Room	59	52	47	37	29	24	19	12	3
Isolation Booth	57	51	39	21	20	8	3	3	3
2nd Floor									
TV Studios	57	47	36	18	12	5	4	3	3
Production Studios	57	37	27	13	11	5	3	3	3
Control Rooms	58	41	37	33	29	24	18	13	6
Edit Suites	57	47	45	30	20	17	13	8	3
Super Booths	57	36	33	14	8	5	3	3	3
Vocal Booths	57	41	36	16	14	6	3	3	3

Table 8.7 – Sound Pressure Level Limits Criteria for OLRT Intrusion Government Conference Centre

Note: sound level limits were developed by subtracting 3dB from the measured ambient levels in the 31.5Hz, 63Hz, and 125Hz octave bands, and subtracting 6dB from the measured level in and above the 250Hz octave bands.

	Octave Band Centre Frequencies (Hz)								
Room Names & Numbers	31.5	63	125	250	500	1K	2K	4K	8K
1st Floor									
Annex Room (103)	57	56	55	47	44	40	33	23	12
Sussex Lounge (104)	57	50	53	40	33	25	17	12	9
Sussex Room (106)	57	53	51	35	31	21	16	8	6
Sussex Room Translation Booth (typ.)	57	49	42	35	28	19	10	6	6
Main Hall	57	49	48	39	35	32	27	18	9
Main Hall Translation Booth (typ.)	57	37	28	18	15	13	9	6	5
Main Hall Broadcast Booth (typ.)	57	46	43	33	30	28	23	14	8
Office (168)	57	41	42	30	26	17	16	9	6
Meeting Room (175)	57	46	40	32	25	20	12	7	6
2nd Floor									
Conference Room (200)	57	47	47	37	33	30	19	12	6
Conference Room (200) Translation Booth	57	40	40	27	18	14	15	5	5
3rd Floor									
Open Office (304)	57	36	32	22	23	8	8	6	6
Office (303)	57	36	31	23	18	13	12	8	7
Office (312)	57	37	37	23	17	15	14	9	8
4th Floor									
Meeting Room (408)	57	41	40	25	20	11	6	5	5
Meeting Room / Office (411)	57	48	47	37	30	19	17	13	7
Gatineau Room (415)	57	50	44	32	28	25	20	10	6
Gatineau Room (415) Translation Booth	57	36	32	24	15	10	10	8	6
Colonel By Room (412) Translation Booth	57	36	22	13	8	5	4	5	6
Colonel By Room (412)	57	40	37	23	18	12	14	7	6
5th Floor									
Rideau Room (508)	58	44	43	36	32	26	21	9	6
Rideau Room (508) Translation Booth	57	40	35	28	22	26	22	13	7
Meeting Room (519)	57	40	42	28	28	18	11	6	6
Centennial Room (517)	57	48	43	32	30	23	15	10	7
Centennial Room (517) Translation Booth	57	41	37	23	18	13	9	5	6

PART 9
PERFORMANCE CRITERIA

9.1 Application of Performance Criteria

The Quality Failures set out below and associated payment penalties shall not be applicable until following the Revenue Service Availability Date.

9.2 Performance Criteria

FE Type	Category	Response	Rectification/ Remedial	Recording Frequency
AF =Availability Failure SF = Service Failure QF = Quality Failure	Major Medium Minor Veh. Avail. = Captured by the Vehicle Availability deduction regime St. Avail = Captured by the Station Availability deduction regime	N/A = Not Applicable	N/A = Not Applicable ND = Correct by start of service the following day	PR = Per Request PE = Per Event D = Daily W = Weekly M = Monthly Q = Quarterly B = Bi Annually A = Annually R = Randomly, At Any Moment in Time

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Application (Maximum Project Co exposure)
3.8(c)	Environmental Management Plan (Updates) shall be prepared and submitted by Project Co to the City Representative as required, and in any event no later than June 1st annually.	QF	Medium	N/A	1 day	PE	1 QF per day
3.10(c)	Sustainability Plan (Updates) shall be prepared and submitted by Project Co to the City Representative as required and in any event no later than June 1 annually.	QF	Medium	N/A	1 day	PE	1 QF per day

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Application (Maximum Project Co exposure)
8.5(b)	Project Co shall ensure that ground-borne noise and vibration impacts within buildings and or facilities resulting from the operations of the LRT system during the Maintenance Term shall not exceed the criteria specified in Table 8.1 and in Table 8.2.	SF	Major	N/A	2 days	PE	1 SF per day
8.6(f)	Project Co shall ensure that ground-borne noise and vibration impacts on Sensitive Receivers do not exceed the Ground Borne Noise and Vibration Standard for Sensitive Receivers.	SF	As per Section 8.9 - $5000 per day and application of 3 FP per day	N/A	As per Section 8.9 – 7 days	PE	1 SF applied per day when condition of non-conformance is identified
8.8(a)	Project Co's Acoustical Engineer shall carry out monitoring by undertaking a survey of noise and vibration measurements for Sensitive Receivers, with reference to the baseline measurements and the Ground Borne Noise and Vibration Standard for Sensitive Receivers biennially during the Maintenance Term and in any event no later than June 1st in the year the monitoring is undertaken.	QF	Major	N/A	21 days	PE	1 QF per day
8.8(b)(i)	Project Co's mitigation measures shall be applied within 48 hours of the request for investigation being made by the City Representative to Project Co, or within an alternative time frame agreed to by the City Representative, acting reasonably. The	SF	As per Section 8.9 - $5000 per day and application of 3 FP per day	N/A	As per Section 8.9 – 7 days from delivery of original survey to City	PE	1 SF applied per day when condition of non-conformance is identified.

Ref	Parameter	Failure Type	Category	Resp. Time	Rect. Or Rem. Time	Recording Frequency	Application (Maximum Project Co exposure)
	mitigation measures shall be effective in ensuring compliance with the Ground Borne Noise and Vibration Standard for Sensitive Receivers						
8.8(b)(ii)	Project Co's Acoustical Engineer shall carry out site-specific noise and vibration measurements for Sensitive Receivers, upon the request of the City Representative, within 48 hours of a request being made by the City Representative to Project Co, or within an alternative time frame agreed to by the City Representative, acting reasonably.	QF	Major	N/A	48 hours	PE	1 QF per day

APPENDIX A
ENVIRONMENTAL ASSESSMENTS

The "Downtown Ottawa Transit Tunnel: Tunney's Pasture to Blair Station via a Downtown LRT Tunnel" has been made available in the Data Room as a Reference Document.

The "Ottawa Light Rail Transit: Light Rail Transit from Tunney's Pasture to Blair Station, including a Downtown Tunnel" CEAA Screening report has been made available in the Data Room.

APPENDIX B
PROVINCIAL AND FEDERAL ENVIRONMENTAL ASSESSMENTS - TABLE OF COMMITMENTS AND ASSURANCES

EPR Ref.	Commitments and Assurances	Commitments and Assurances that were met during preliminary engineering phase	Responsible Party following the Preliminary Engineering Phase
Part A - Provincial EA - Downtown Ottawa Transit Tunnel: Tunney's Pasture to Blair Station via a Downtown LRT Tunnel Environmental Project Report (July 2010)			
10.7	Consultation		
	To consult with all stakeholders, including First Nations, federal and provincial agencies, the business community and the public. A consultation plan will be developed to address the issues that arise and to meet the needs of the different stakeholder groups and will use a variety of media to maintain contact and provide updated information.	The City of Ottawa conducted a comprehensive consultation program throughout the preliminary engineering phase of the OLRT project. This program was designed to meet both the legislative requirements of the EA process and to inform and consult with local community associations, BIAs, the Ottawa Chamber of Commerce and the general public.	City of Ottawa and/or Project Co as detailed in Schedules 17 and 18
10.7	Property Acquisition		
	Proceed with the acquisition of temporary and permanent property needs, including temporary construction easements, as the design work proceeds and definitive property plans are developed. The process will include negotiation and expropriation for private properties as required. For provincial and federal lands, the City will follow the approved land acquisition processes, working cooperatively with the respective agencies to acquire property for the project.	The City of Ottawa initiated the property acquisition process during the preliminary engineering phase and every effort will be made to complete prior to Financial Close.	City of Ottawa
10.7	Planning and Design Initiatives		
	Work with City's partners to apply the urban design and community planning policies and guidelines to all	The City of Ottawa initiated this planning and design initiative during the preliminary engineering phase.	Project Co

EPR Ref.	Commitments and Assurances	Commitments and Assurances that were met during preliminary engineering phase	Responsible Party following the Preliminary Engineering Phase
	elements of the project including runningway, stations, access points, ventilation shafts, electrical substations and the maintenance and storage facility. Opportunities to limit impacts, improve pedestrian and cycling accessibility and to improve overall mobility will be actively sought and evaluated in the design process. The process will consider long range policy statements for the National Capital and the City, and focus on implementing a transit solution that works at the local and regional level.		
10.7	Construction Issues		
	Conduct further research and analysis for the construction of the project, actively seeking ways to reduce construction impacts and speed up construction. The project will require contractors to meet the requirements of all applicable provincial and federal legislation related to construction including: • control of noise and vibration; • dust, fumes and other air quality factors; • traffic management and monitoring for general traffic, transit vehicles, pedestrians and cyclists; • groundwater control including permits to take water and dispose of it in the City's sewer system and settlement monitoring; • utility services including both municipal and private utilities; • emergency response planning to and around construction sites;	The City of Ottawa completed studies during the preliminary engineering phase which will be available for reference.	Project Co

EPR Ref.	Commitments and Assurances	Commitments and Assurances that were met during preliminary engineering phase	Responsible Party following the Preliminary Engineering Phase
	• designated substance surveys for buildings requiring demolition or alteration; • building pre-condition surveys to document the state of buildings adjacent to the construction; • erosion and sediment control plans; • stray current protection (if and where applicable) and monitoring for pipelines and other utilities; • manage brownfield sites in accordance with provincial regulations; • conduct environmental site assessments where warranted; and • conduct archaeological investigations where warranted.		
10.7	Permits and Approvals		
	Secure all necessary permits and approvals for the implementation of the project including planning approvals, building permits and all permits required by any provincial or federal agency with jurisdiction over a portion of the project.	Permits and approvals that may be required for the implementation of the project have been identified and are listed in Schedule 1, Appendix 1 of the Project Agreement.	Project Co will be responsible for all permits and approvals following Financial Close
10.7	Noise and Vibration Protocols		
	The City will undertake studies during the design process in accordance with MOE protocols.	The City of Ottawa completed noise and vibration studies during the preliminary engineering phase which will be available for reference.	Project Co
10.7	Canadian Environmental Assessment Act Determination		
	A CEAA Screening and determination is required.	The City of Ottawa completed the CEAA Screening report and a determination was made by the federal Responsible Authorities on July 13, 2012 that in	City of Ottawa

EPR Ref.	Commitments and Assurances	Commitments and Assurances that were met during preliminary engineering phase	Responsible Party following the Preliminary Engineering Phase
		consideration of the Screening report and the implementation of appropriate mitigation measures, the project is not likely to cause significant adverse environmental effects.	
10.7	Municipal Approvals		
	The City will work internally to put all municipal approvals in place. The project will be reviewed by staff, with reports rising to several City committees for final approval by Council. This process mirrors the work done to date for the approval of the functional plan.	The City will work to put all required approvals for City committees and Council in place as expeditiously as possible.	City of Ottawa
Part B - Federal EA - Canadian Environmental Assessment Act Screening Report			
n/a	The CEAA Screening report was completed in July 2012 and the federal Responsible Authorities determined on July 13 2012 that in consideration of the Screening report and the implementation of appropriate mitigation measures, the project is not likely to cause significant adverse environmental effects.	Project Co is required to meet the commitments and assurances that are detailed in the July 2012 CEAA Screening report.	Project Co

SCHEDULE 18

COMMUNICATIONS AND PUBLIC CONSULTATION PROTOCOL

1. GENERAL

1.1 Communications Principles

The Project represents an important infrastructure commitment by the City of Ottawa (City). Accordingly, comprehensive plans for communications and public consultation are required to ensure the public is informed and engaged where necessary and to meet the City's communications and consultation requirements. This plan will support effective communications between Project Co and the City, and with System Users and Highway Users and the citizens of the National Capital Region**.**

The City will partner with Project Co to deliver communications and public consultation activities that will:

(a) maintain transit ridership during construction;

(b) maintain transit user satisfaction;

(c) communicate traffic/transit changes to public;

(d) enhance opportunities for open, transparent, effective and pro-active communications with the public;

(e) recognize the contribution of the parties in this Project Agreement; and

(f) foster and maintain positive and constructive relationships with the public including communities and businesses that may be affected by construction activities.

The scope of this protocol includes but is not limited to all print and electronic communications related to planning, design, environmental assessments (EAs), construction, milestones, tenders, community and Stakeholder relations, media responses, website information, branded products and social media updates and responses.

Communications, media and Stakeholder/community relations activities require appropriate approvals from the Project partners. All materials will need to be approved by the City. Where required, provincial and federal governments approval will be facilitated through the City.

Communications materials will be developed in both official languages and all other communication with the public and public consultation shall be conducted in both official languages English and French.

1.2 Communications Working Group

The City and Project Co will provide staff to support all communications and public consultation activities related to the Project. These staff will form the Communications Working Group

whose responsibilities include developing and implementing communications and public consultation activities for the Project.

Immediately following Financial Close, the Communications Working Group will develop a communications and consultation protocol to identify their working relationship, roles and, responsibilities matrix and approvals processes, based on this Project Agreement.

1.3 Accessibility

All public communications from Project Co shall be deemed communications from the City for the purposes of the *Accessibility for Ontarians with Disabilities Act*, (Ontario).

2. CITY RESPONSIBILITIES

2.1 Lead Communications and Public Consultation Role

The City, as the Project owner, will assume the lead communications role. The City will take primary responsibility for all communications matters related to transit policy, transit fares, and developing regional messaging and public education messaging about the importance of transit, its long-term benefits and the need for transit investments. The City will:

(a) provide identified, dedicated lead communications contacts with applicable skills and experience with 24/7 availability on applicable aspects of communications and issues management;

(b) provide an identified, dedicated media-trained lead media spokesperson, with back-up media-trained personnel, as required with 24/7 availability on applicable aspects of communications;

(c) act as primary media contact for the Project;

(d) provide final review and approval of all public communications materials;

(e) communicate promptly with all relevant parties on crisis issues and communicating within 24 hours on general issues; and

(f) provide coordinated updates to internal/external Stakeholders, as required.

2.2 City Communications Responsibilities During the Design and Construction Works

Up to the Revenue Service Availability Date of the Project, the City will be responsible for the following matters:

(a) Communications: To develop, in cooperation with Project Co, a comprehensive communications strategy and program that includes community relations, coordinated issues management, such as complaints management and dispute resolution, coordinated media relations, marketing, special events, employee communications and government relations.

(b) Crisis Communications: To undertake, in cooperation with Project Co, required planning for potential crisis issues related to the Project. A plan will be developed within 30 days following Financial Close outlining the roles and responsibilities of both the City and Project Co during a crisis situation. In the event of an unforeseen emergency situation, the City shall be responsible for necessary communications activities outside of construction-related incidents and emergencies.

(c) Media Inquiries: The City will assess the purpose of media inquiries and identify the appropriate spokesperson to respond.

(d) System Related Communication: To provide all communications related to the provision of City Activities and to lead all communications otherwise related to the System.

(e) Social Media: Maintain a Project blog and provide timely responses to public queries and notify the public of meetings, events or initiatives.

(f) Performance Review: To review, on a periodic basis, Project Co's performance in providing communications support as outlined in Section 3 of this Schedule 18.

2.3 Communications Responsibilities of City and Project Co During the Maintenance Term

(a) No later than 30 days prior to the Required Revenue Service Availability Date, the Parties will agree on a communications protocol to apply during the Maintenance Term.

(b) To the extent the communications activities described in Section 3.2 apply to the Maintenance Services, the communications protocol described in Section 2.3(a) shall assign to Project Co the responsibilities set forth in Section 3.2 during the Maintenance Term.

3. PROJECT CO RESPONSIBILITIES

3.1 Support Communications Role

Project Co will support the City with respect to communications related to the Project and will provide such support in both official languages English and French. Project Co will:

(a) provide identified, dedicated media-trained communications contacts and lead media spokesperson (with back-up media-trained personnel, as required) with 24/7 availability on applicable aspects of communications;

(b) respond to communications issues in accordance with agreed timeframes;

(c) maintain and update Project Co's Project website, as required subject to review and approval by the City;

(d) support the City's Project website through the provision of static (written) and dynamic (multimedia) content, including, but not limited to:

(i) A weekly blog post on Project construction with a minimum length of 150 words;

(ii) A monthly feature article highlighting one aspect of Project design, construction or Project benefits, with a minimum length of 500 words;

(iii) Notifications of public consultations, consultation materials and post-consultation summaries;

(iv) Up-to-date graphics showcasing the design of each station; and

(v) Graphics and specifications for the selected Project vehicle;

(e) support website integration with other City departments and government Stakeholders, including, but not limited to; OC Transpo, Planning and Growth Management, Public Works, La Société de transport de l'Outaouais (STO) including integration with the "one-stop-shop" web portal currently in development;

(f) review and/or provide communications and/or technical materials reasonably requested by the City;

(g) update, in collaboration with the City, internal/ external Stakeholders, as required, including involvement and participation in community events;

(h) provide the public/ media reasonable access to the Site for milestone events;

(i) direct all media enquiries and interview requests to the City's lead communications contact;

(j) maintain a written record of all material public enquiries, complaints and communications and provide copies to the City's lead communications contact on a weekly basis (or immediately if urgent);

(k) report to the City on communications matters on an agreed upon basis;

(l) participate in City communications meetings, as required;

(m) during a crisis situation, ensure and make available sufficient communications and Project resources to work effectively with the City and proactively manage and perform its communications responsibilities; and

(n) facilitate reasonable access to construction sites for designated photographers/videographers for the purpose of creating documentary and archival imagery.

3.2 Project Co Communications Responsibilities During the Design and Construction Works

(a) Within 30 days following Financial Close and in collaboration with the City, Project Co will develop, maintain and implement a design and construction liaison and communications plan that includes:

(i) linkages to appropriate City wide initiatives including related infrastructure, program and communications initiatives including the Travel Choices interim report communications recommendations included in Schedule 15;

(ii) a description of Project Co's approach to all communications aspects of the Project;

(iii) a description of Project Co's communications team, including the roles and responsibilities for each team member and any Project Co Party who will provide any aspect of the communications program;

(iv) the identification of proposed communication tools to be used to partner and report to the City, for coordinated media and community relations, for coordinated issues management, for complaints management and dispute resolution and for coordinated crisis communications, with the goal of keeping the community and other Stakeholders informed with respect to the progress of the Project;

(v) community relations strategies and tactics, including but not limited to newsletters, construction notices and items associated with public consultation events and initiatives, construction-related signage, local or community-based communications that require a quick turnaround and social media;

(vi) public consultation and information for planning, environmental assessments, pre-construction and construction activities, which should include but not be limited to: advertising, storyboards, construction notices, Stakeholder briefings, neighbourhood meetings, flyers, informational and decorative hoarding;

(vii) a public education and advertising campaign based on the City's advertisement strategy for the Project and contribute funding to advertisement and public education campaigns related to the construction of the Project; and

(viii) tenders: Project Co shall supply a list of all Project tenders to be issued on a biweekly basis to the City's communications team via the Project's Working Group, and shall advise the City two weeks prior to the posting of each tender to allow for any potential issue management concerns to be addressed.

(b) Up to the Required Revenue Service Availability Date Project Co will:

(i) update the design and construction liaison and communications plan on an annual basis or as reasonably requested by the City;

(ii) coordinate with the City in the implementation of the design and construction liaison and communications plan;

(iii) provide a dedicated representative who will attend regular meetings with the City to discuss communication issues and developments;

(iv) produce monthly progress reports, which will include information on activities, public and media enquiries, any emerging issues, and actions taken in response to issues;

(v) in coordination with the City, provide regular updates to the immediately affected property owners and neighbourhoods on Design and Construction Works related issues with particular attention to communicating the scope, schedule and status of the Design and Construction Works and reasonable advance notice of the schedule, where reasonably possible. This will include processes to proactively address any Design and Construction Works related inquiries and issues (e.g., public inquiries and complaints re noise, hours of work, dust, etc.);

(vi) provide regular updates to the City related to the management of local traffic during the Design and Construction Works;

(vii) as soon as practicable following Financial Close develop, in collaboration with the City, a crisis communication plan outlining roles and responsibilities for a list of potential crisis issues that could develop during the Design and Construction Works; and

(viii) follow any guidelines provided by the City related to signage or advertising at the Site.

(c) Within 60 days of contract award Project Co will:

(i) Develop, in consultation with the City, a community and Stakeholder outreach plan that will include a mobile outreach vehicle.

(A) This vehicle will attend community events including Ottawa schools and community association events as included in the Stakeholder plan or as reasonably requested by the City.

(B) These events will happen no less than twice a month or as reasonably agreed upon with the City.

(C) This vehicle will visibly represent the Project branding and will include public boards updating Stakeholder on relevant Project milestones/information as well as items for distribution with Project branding.

(D) This vehicle will be staffed by an informed Project Co staff and a City staff member when required.

(ii) Develop a promotional introductory video (no less than 5 minutes) introducing Project Co and outlining the vision for the Project implementation.

(d) Provide a construction schedule with communications milestones, to include:

(i) access to a downtown underground station for a press and political representatives event;

(ii) access to an aboveground station (Lebreton, Blair, Tunney's Pasture or Bayview) for a press and political representatives event; and

(iii) access to Rideau Station for a sesquicentennial related event from (June 25 – July 2, 2017).

(e) Project Co shall prepare a Complaint Protocol addressing how it will deal with and respond to inquiries, suggestions and complaints received during the entire Works. Project Co acknowledges that its Complaint Protocol will be placed in the public record.

(i) All complaints, inquiry and suggestion responses will be approved by City Communications staff.

(ii) City and Project Co will agree upon a maximum response time to these complaints, inquiries and suggestions.

(iii) Project Co will be responsible for maintaining an inquiry tracking software system and will track all complaints, inquiries and suggestions received and responses.

4. PUBLIC DISCLOSURE AND MEDIA RELEASES

4.1 Public Disclosure and Media Releases

(a) Project Co shall not, and shall ensure that no Project Co Party shall, issue or disseminate any media release, public announcement or public disclosure (whether for publication in the press, on the radio, television, internet or any other medium) relating to the Project, this Project Agreement, the City Activities or any matters related thereto, without the prior written consent of the City, in its Discretion, or, in the case of any media release, public announcement or public disclosure required by Applicable Law, without the prior written consent of the City.

(b) Unless otherwise required by Applicable Law (but only to that extent), neither Party shall use the other Party's name or refer to the other Party, directly or indirectly, in any media release, public announcement or public disclosure (whether for publication in the press, on the radio, television, internet or any other medium) relating to the Project, this Project Agreement, the City Activities or any matter related thereto, without the prior written consent of the other Party.

(c) Project Co shall comply, and shall ensure that all Project Co Parties comply, at all times, with the City's media release and publicity protocols or guidelines, as such protocols and/or guidelines are updated by the City from time to time.

5. CONSTRUCTION SIGNAGE

5.1 Construction Signage Guidelines

With respect to any signage that may be erected and maintained at or on the Site or Project, Project Co, Project Co Parties and/or the Lenders, as applicable, shall:

(a) include the City of Ottawa logo, Ontario logo, Canada wordmark and any Project related logo/branding;

(b) be in both official languages English and French;

(c) ensure that the signage is no larger than the larger of: (i) an existing government Project sign on the Site; or (ii) 16 feet by 8 feet;

(d) adhere to local by-laws including by-laws regarding placement and size;

(e) consider signage material suitable for long-term outdoor exposure;

(f) provide a mock-up of the signage to the City Representative for approval prior to printing; and

(g) be responsible for installation, maintenance and removal of the signage.

6. CONSULTATION

6.1 General

(a) The design and development of the Project shall be implemented in coordination with Stakeholder consultation commitments and requirements as set out in the Environmental Approvals.

(b) Consultations shall be conducted on a range of topics, some of which will be overarching and apply to the length of the Project (e.g. overall general construction approach; urban design, landscaping and aesthetics), while others may be more stage, topic or geographic area-specific (e.g. noise mitigation; dust control; access to affected businesses). The nature or form of the consultation may vary based on the topic being addressed.

(c) All public notices and public consultation shall be in both official languages English and French.

6.2 Stakeholders

As a general Project principle, the views and perspectives of various Stakeholders are to be given respectful consideration and due weight. Those to be consulted will include, but not be limited to the following:

(a) the City of Ottawa;

(b) the general public (including property owners, ratepayer and neighbourhood groups, and citizens at large);

(c) First Nations;

(d) business (both individual operators and representative groups);

(e) transportation service providers;

(f) conservation authorities and other Governmental Authorities;

(g) Utility Companies;

(h) Emergency Services Providers; and

(i) various community interest groups, including environmental groups, health groups, natural and cultural heritage groups, and others.

6.3 City of Ottawa Responsibilities

The City will collaborate with Project Co to develop all public consultation activities and events during the Design and Construction Works. The City will:

(a) provide, when required, appropriate staff, independent consultation/facilitation specialists and advance media relations services to attend and be resources to various consultation events;

(b) direct consultations by providing advice on and approval in respect of the following items which Project Co is to prepare and submit in accordance with the Review Procedure:

    (i) comprehensive and meeting-specific consultation plans;

    (ii) consultation event summaries — both 'quick turnaround' synopses and more comprehensive reports;

    (iii) proposals for Project Co Parties who will participate in and/or be present at consultations and related meetings and workshops; and

    (iv) together with Project Co, determining how Stakeholder input will be considered, responded to, and/or accommodated in the Project.

6.4 Project Co Responsibilities

Project Co will support the City in conducting and implementing the consultation program and related communication activities and, for greater certainty, provide such support in both official languages English and French. During the Design and Construction Works Project Co will:

(a) prepare and submit individual plans for each consultation event prior to each such event, including clear objectives, target audiences, meeting format/approaches and related tactics;

(b) coordinate the placement and cover the related costs of any advertising and public notices to promote public consultation events;

(c) secure and cover the related costs of all meeting venues and prepare site-specific layout plans;

(d) provide all equipment and supplies necessary to conduct the consultation events (including, but not limited to, computers, projectors, cables, power cords, screens, easels, flip-charts, pens/markers, registration/sign-in sheets, etc.);

(e) provide a contact for and coordinating responses to any consultation events for which a participant RSVP is being requested;

(f) attend with representatives of the City at Stakeholder meetings, municipal council and local government presentations, and such other meetings as the City deems necessary or desirable, including the provision of sufficient personnel to staff the events at sign-in tables, displays, roundtable discussions, as presenters, etc;

(g) provide personnel experienced and sufficiently skilled/equipped to make professional presentations and answer questions at consultation events;

(h) prepare consultation event summaries — both quick turnaround synopses for the City's exclusive use and more comprehensive reports at the conclusion of a particular consultation program component (for example, a set of workshops) identified in the overall consultation plan;

(i) together with the City, determine how Stakeholder input shall be considered, responded to, and/or accommodated in the Project, including respectful, meaningful, and timely feedback to those providing comments/ideas;

(j) prepare and maintain a current list and a log of all Stakeholder communications and contacts;

(k) prepare a final consultation report for Revenue Service Availability, that describes and integrates all facets of the consultation program, including how Project Co has addressed Stakeholder input, and that can serve as the official consultation record;

(l) provide any necessary information required to demonstrate compliance with and fulfillment of the consultation-related provisions of the Environmental Assessment;

(m) ensure that sufficient insurance and liability coverage is in place for any consultation events/venues;

(n) exhibit a high degree of professionalism and courteousness in the conduct of the consultation program; and

(o) support a store front office that will be provided by the City with updated communications material and a bilingual communications staff member.

SCHEDULE 19

MILESTONE PAYMENTS

[REDACTED]

SCHEDULE 20

PAYMENT MECHANISM

PART A: DEFINITIONS

Section 1. Definitions

1.1 "**Accelerated Service Level**" means a circumstance in any Contract Year where Project Co is required, by virtue of:

(a) a Major Service Change occurring in that Contract Year or any previous Contract Year; or

(b) the occurrence of the Stage 2 East Revenue Service Commencement Date or the Stage 2 West Revenue Service Commencement Date earlier than the relevant Original Planned Revenue Service Commencement Date for either such Stage,

to provide a Service Level in excess of the Service Level contemplated for that Contract Year by the Operations Service Plan in effect at the date of the Maintenance Services Variation.

1.2 "**Aggregate Station Availability Ratio**" for Contract Month *n* means the total Scheduled Station Hours for all Stations in Contract Month *n* less the total Station Availability Failure Hours for all Stations in Contract Month *n*, divided by the total Scheduled Station Hours for all Stations in Contract Month *n*. For clarity, the formula is provided below:

Where:

$ASAR_n$ Means the Aggregate Station Availability Ratio for the relevant Contract Month *n*;

SSH_n Means the sum total of Scheduled Station Hours for all Stations during Contract Month *n*, and includes both Peak and Off-Peak hours; and

SAF_n Means the sum total of Station Availability Failure Hours for all Stations during Contract Month *n*, and includes both Peak and Off-Peak hours.

1.3 "**Aggregate Vehicle Kilometres Availability Ratio**" for any period *n* means the total Revenue Service Vehicle Kilometres in period *n* plus the number of Scheduled Revenue Service Vehicle Kilometres which were "missed" or not achieved during period *n* and which are attributed in the relevant Performance Monitoring Report as being due to a Non-Project Co Cause, divided by the total Scheduled Revenue Service Vehicle Kilometres for period *n*. For clarity, the formula is provided below:

Where:

$AVKR_n$ Means the Aggregate Vehicle Kilometres Ratio for the relevant period *n*;

Rkm_n Means the total amount of Revenue Service Vehicle Kilometres for period *n*, and includes both Peak and Off-Peak service;

$NPCCkm_n$ Means the number of Scheduled Revenue Service Vehicle Kilometres which were "missed" or not achieved during period *n* and which are attributed in the relevant Performance Monitoring Report as being due to a Non-Project Co Cause; and

Skm_n Means the total Scheduled Revenue Service Vehicle Kilometres for period *n*, and includes both Peak and Off-Peak service.

1.4 "**Annual Service Payment**" means the sum in Canadian dollars calculated in accordance with the provisions set out in Section 2 of Part B of this Schedule 20.

1.5 "**Availability Failure**" means either a Vehicle Kilometres Availability Failure or a Station Availability Failure.

1.6 "**Average Monthly Lifecycle Payment**" means:

(a) prior to the earlier of the Stage 2 East Revenue Service Commencement Date and the Stage 2 West Revenue Service Commencement Date, the total amount of the Lifecycle Payments set out in Column C of Table 3 of Appendix A of this Schedule 20, divided by the number of Contract Months in the Maintenance Term, being $; and

(b) from the earlier of the Stage 2 East Revenue Service Commencement Date and the Stage 2 West Revenue Service Commencement Date, the total amount of the sum of Lifecycle Payments set out in Column C and Column D of Table 3 of Appendix A payable after such date, divided by the number of Contract Months remaining in the Maintenance Term from such date, on the assumption that the Stage 2 East Revenue Service Commencement Date occurs on December 17, 2024, being $.

For clarity:

(c) the Lifecycle Payment amounts set out in Table 3 of Appendix A are expressed in Inflation Base Date prices and hence, the calculation of the Average Monthly Lifecycle Payment in respect of a relevant Contract Month shall be index-linked in accordance with the escalation factor in Section 4.2 of Part B of this Schedule 20;

(d) the calculation in subsection (b) shall be made on the achievement of the earlier of the Stage 2 East Revenue Service Commencement Date and the Stage 2 West Revenue Service Commencement Date and the dollar figure included in that subsection shall be updated accordingly; and

(e) the dollar figure included in subsection (b) may be further updated following any Variation initiated pursuant to Section 5.3 of this Part B.

1.7 "**City Representative**" has the meaning given in Schedule 1 – Definitions and Interpretation.

1.8 "**City Trial Running**" has the meaning given to the term "Trial Running" in the DB Co Works Agreement.

1.9 **"Contract Month"** means a calendar month, except with respect to:

(a) the first Contract Month of the Maintenance Term, which runs from the Revenue Service Commencement Date until the end of the calendar month in which such day falls (and for the avoidance of doubt this shall be Contract Month 1, and all other Contract Months shall be numbered sequentially from this); and

(b) the last Contract Month of the Maintenance Term, which runs from the first day of the calendar month in which the Expiry Date falls until the Expiry Date.

1.10 "**Contract Year**" means the period of 12 calendar months that commences on January 1st of each calendar year and ends on December 31st of such calendar year, provided that:

(a) the first Contract Year shall be such period that commences on the first day of the first Contract Month and ends on the next ensuing December 31st; and

(b) the final Contract Year shall be such period that commences on January 1st that precedes the date on which the Project Agreement expires or is terminated, for whatever reason, and ends on the expiry or termination of the Project Agreement.

1.11 "**CPI-XFET**" means the Consumer Price Index excluding food, energy, and the effect of indirect taxes for Canada, as reported by Statistics Canada.

1.12 "**Daily Operating Report**" means the daily report prepared by Project Co regarding prior day(s) service delivery, vehicle, systems, station performance and Helpdesk activity, as described in Appendix A to Attachment 14 of Schedule 15-3 – Maintenance and Rehabilitation Requirements of the Project Agreement.

1.13 "**Deduction**" means a deduction made from a Monthly Service Payment in accordance with this Schedule 20.

1.14 "**East Trial Running Period**" means the period between the Stage 2 East Substantial Completion Date and the Stage 2 East Revenue Service Availability Date.

1.15 "**Eligible Lifecycle Costs**" is defined in Section 3 of Part F of this Schedule 20.

1.16 "**Escalation Factor**" means the escalation factor calculated in accordance with Section 4.1 of Part B of this Schedule 20.

1.17 "**Event**" means:

(a) A Vehicle Kilometres Availability Failure;

(b) A Station Availability Failure; or

(c) an incident or state of affairs which does not meet or comply with the Performance Criteria set out in Schedule 15-3 – Maintenance and Rehabilitation Requirements, which is capable of becoming:

(i) a Service Failure, if the Event is not Responded to within the Response Time or Rectified within the Rectification Time; or

(ii) if, in accordance with Schedule 15-3 – Maintenance and Rehabilitation Requirements, no Rectification Time or Response Time applies, the Event shall be either a Service Failure or Quality Failure as determined by the designation of the applicable Performance Criteria in Schedule 15-3 – Maintenance and Rehabilitation Requirements as Failure Type "SF" or "QF" respectively,

1.18 "**Event of Vandalism**" has the meaning given in Appendix A, Attachment 16 to Schedule 15-3 - Maintenance and Rehabilitation Requirements.

1.19 "**Failure Points**" means points allocated to Project Co in respect of the occurrence of Availability Failures, System Events, Service Failures and Quality Failures which are determined by the provisions set out in Part G of this Schedule 20.

1.20 "**Group 1 Stations**", "**Group 2 Stations**", and "**Group 3 Stations**" are defined in Appendix D.

1.21 "**Helpdesk**" means the contact point to be established by Project Co pursuant to Appendix A, Attachment 11 of Schedule 15-3 – Maintenance and Rehabilitation Requirements in respect of the helpdesk service for the notification of Events and other day to day matters arising in relation to the provision of Maintenance Services.

1.22 "**Inflation Base Date**" means October 1, 2016.

1.23 "**Insurance Payment**" means the amount calculated in accordance with Schedule 25 - Insurance and Performance Security Requirements.

1.24 "**Insurance Review Date**" has the meaning given in Schedule 25 - Insurance and Performance Security Requirements.

1.25 "**Joint Insurance Cost Report**" has the meaning given in Schedule 25 - Insurance and Performance Security Requirements.

1.26 "**Labour Industrial Aggregate Index**" means the Industrial aggregate excluding unclassified businesses index for Canada, CANSIM 281-0063, as reported by Statistics Canada.

1.27 "**Lifecycle Payment**" means the relevant amounts for each Contract Month as represented in Columns C and D of Table 3 in Appendix A to this Schedule 20 and does not include additional costs other than anticipated costs (and directly related contingencies and reserves) in respect of the replacement, refreshment and/or refurbishment of the Fixed Facilities, Fixed Equipment, Vehicles, and Vehicle Equipment during the Maintenance Term.

1.28 "**Materials Index – Machinery**" means the Machinery Manufacturing index for Canada, CANSIM 329-0077, as reported by Statistics Canada.

1.29 "**Materials Index - Electrical**" means the Electrical Equipment Manufacturing index for Canada, CANSIM 329-0077, as reported by Statistics Canada.

1.30 "**Materials Index – Machinery and Equipment**" means the Machinery and Equipment index for Canada, CANSIM 329-0075, as reported by Statistics Canada.

1.31 "**Materials Index – Durable Manufacturing**" means the Durable Manufacturing index for Canada, CANSIM 281-0063, as reported by Statistics Canada.

1.32 "**Monthly Service Payment**" means the sum in Canadian Dollars payable by the City to Project Co in accordance with the Project Agreement, as calculated in Section 1.1 of Part B of this Schedule 20.

1.33 "**Non-Project Co Cause**" means any one of the following issues or events, to the extent that such issue or event directly causes an interruption, slowdown, partial or complete shutdown of service on the System that leads to a reduction in Revenue Service Vehicle Kilometres:

(a) An order issued by the Operations Control Centre or another entity or agency of the City of Ottawa which affects service, including an order to slow down or stop train service on the System, provided that such order has not been caused by circumstances attributed to Project Co;

(b) A derailment, grade crossing accident, collision, or any other accident involving vehicles which have been entered into revenue service, which occurs for reasons unrelated to Project Co's performance of the Maintenance Services and beyond Project Co's control;

(c) An Event of Vandalism which is specifically described in the Vandalism Matrix in Attachment 16 to Schedule 15-3 in the column titled "Relief from deductions under the Payment Mechanism";

(d) The actions of Protesters and/or Trespassers;

(e) Passenger activity during Revenue Service Hours including requests for emergency stops, or sick or injured passengers requiring medical attention;

(f) Failure by any Driver or other City personnel to act in accordance with Standard Operating Procedures and/or the LRT Rules;

(g) Any event which is a Relief Event, but only to the extent that the Project Agreement does not already provide Project Co with relief from Deductions in respect of reduced Revenue Service Vehicle Kilometres due to such event;

(h) The actions of any Additional Contractors or Third Party Contractors, provided that if the City has assigned certain responsibilities to Project Co in respect of the Additional Works or Third Party Works, as the case may be, in accordance with Section 9.7(a) of the Project Agreement, then a Non-Project Co Cause shall only apply in a case where:

(i) the City fails to carry out its obligations under Sections 9.7(b) or 9.7(c), as applicable; or

(ii) the Additional Contractor(s) and/or Third Party Contractor(s) engage in unlawful or negligent acts;

(i) The actions of governmental authorities or emergency response personnel who require access to the System and/or disruptions in service, provided that any such actions are not the result of Project Co failing to comply with any legal or regulatory obligation;

(j) Any loss or reduction in service during a Major Maintenance Shutdown Period (as defined in Schedule 15-3), or during any other period of time during which the City explicitly agrees that Project Co is authorized to cause a reduction or shutdown of service on the System without penalty;

(k) Residual delays caused by any of the items listed in this section; and

(l) Any other interruption, slowdown, partial or complete shutdown of service on the System which occurs due to the City's operation of the System and which is not attributed to Project Co's performance of the Maintenance Services.

1.34 "**Off-Peak Period**" means all hours during which Revenue Service is required to be provided on the System, and which are not Peak Period hours.

1.35 "**Peak Period**" means:

(a) Between the hours of 06:30 and 9:00 on each Weekday which is not a statutory holiday in the Province of Ontario; and

(b) Between the hours of 14:45 and 18:00 on each Weekday which is not a statutory holiday in the Province of Ontario.

1.36 "**Performance Criteria**" means a description in Schedule 11 – Quality Management, Schedule 15-3 – Maintenance and Rehabilitation Requirements, or Schedule 17 – Environmental Obligations of the level of performance that Project Co must achieve to attain compliance with the relevant output specification.

1.37 "**Performance Monitoring Report**" has the meaning given in Schedule 11 – Quality Management.

1.38 "**Permanent Repair**" means Rectification where a Temporary Repair has been permitted and carried out pursuant to Section 3 of Part E of this Schedule 20.

1.39 "**Quality Failure**" means any failure by Project Co to provide the Maintenance Services in accordance with any Performance Criteria designated as Failure Type "QF" in Schedule 11 – Quality Management, Schedule 15-3 – Maintenance and Rehabilitation Requirements, or Schedule 17 – Environmental Obligations.

1.40 "**Quality Failure Deduction**" means a Deduction which may be made in respect of a Quality Failure.

1.41 "**Rectification**" means, following the occurrence of an Event and where rectification is applicable in accordance with Schedule 15-3 – Maintenance and Rehabilitation Requirements, making good

the Event so that the subject matter of the Event complies with the levels of service required pursuant to the Project Agreement. Without prejudice to the generality of the foregoing this shall include (a) restoring any functional capability which has been disabled or is otherwise not in compliance with the Maintenance and Rehabilitation Requirements; (b) repairing any defect, hazard, or other condition which was not in compliance with the Maintenance and Rehabilitation Requirements; and (c) formally notifying the Helpdesk that Rectification has been completed; and "Rectify" or "Rectified" shall be construed accordingly.

1.42 "**Rectification Time**" means the period specified in Schedule 15-3 – Maintenance and Rehabilitation Requirements within which Rectification of the relevant Event must be completed, calculated from the time that such Event is reported to the Helpdesk. For the avoidance of doubt, if no period for rectification is specified in Schedule 15-3 – Maintenance and Rehabilitation Requirements in respect of the relevant Event, no Rectification Time applies.

1.43 "**Remedial Period**" means the period allowed for remedying a Quality Failure in accordance with Section 1.3 of Part E of this Schedule 20.

1.44 "**Response**" means, following the notification of the occurrence of an Event and where response is applicable in accordance with Schedule 15 – Output Specifications, the following actions by Project Co:

(a) establishing the location, investigating the nature and cause of the Event and attending the site if necessary;

(b) appointing a suitably qualified, experienced and accountable person to assess the situation who, within reasonable limits, is empowered to take or to authorize any required action;

(c) taking any necessary actions to make the non-compliant system or item safe and secure, thereby as a minimum fulfilling all health and safety requirements;

(d) taking any and all necessary actions to establish temporary measures that mitigate the effect of the Event and maintain the normal functioning of the System to the extent possible;

(e) when necessary, giving the City Representative an assessment of the problem, the action taken, details of any work required with timescales and any limitations that this may impose on the System and the Maintenance Services; and

(f) formally advising the Helpdesk that the Response has been completed.

1.45 "**Response Time**" means the time required by Schedule 15 – Maintenance and Rehabilitation Requirements for Project Co to complete its Response measured from when an Event is reported to the Helpdesk.

1.46 "**Revenue Service Vehicle Kilometres**" means the total distance travelled by vehicles in Revenue Service during a Contract Month, measured in Kilometres and reported by the Performance Monitoring Report for that Contract Month.

1.47 "**Scheduled Revenue Service Vehicle Kilometres**" means the total revenue service vehicle kilometres required in a Contract Month by the City through the booking process set out in Article 3.3 of Appendix A to Schedule 15-3, measured in kilometres and reported by the Performance Monitoring Report for that Contract Month.

1.48 "**Scheduled Station Hours**" means the total number of hours during a Contact Month that a Station is required to be open and available for use during Revenue Service Hours in accordance with the Station Access Standard, based on the Operations Service Plan then in effect.

1.49 "**Service Failure**" means any failure by Project Co to provide the Maintenance Services in accordance with Performance Criteria designated Failure Type "SF" in Schedule 11 – Quality Management, Schedule 15-3 – Maintenance and Rehabilitation Requirements, or Schedule 17 – Environmental Obligations and which, where a Response Time or Rectification Time applies, has not been responded to or rectified (as the case may be) within the relevant time. For the avoidance of doubt, where no Response Time and/or Rectification Time applies (for example, in respect of scheduled activities) there shall be a Service Failure at the point at which the non-compliance occurred (for example, non-performance of the scheduled activity by the scheduled time).

1.50 "**Service Failure Deduction**" means a Deduction which may be made in respect of a Service Failure.

1.51 "**Service Level**" has the meaning given in Schedule 15-1 – Maintenance and Rehabilitation Requirements.

1.52 "**Stage 2 East Initial Payment**" has the meaning given to it in Schedule 25 – Insurance and Performance Security Requirements.

1.53 "**Stage 2 West Initial Payment**" has the meaning given to it in Schedule 25 – Insurance and Performance Security Requirements.

1.54 "**Station Access Standard**" means the standard set out in Article 3.0(b)(ii) of Attachment 7 to Appendix A of Schedule 15-3 to the Project Agreement.

1.55 "**Station Availability Failure**" occurs where any Station does not comply with the Station Access Standard otherwise than by reason of any Station-Related Non-Project Co Cause.

1.56 "**Station Availability Failure Deduction**" means a Deduction calculated in accordance with Section 2.1 of Part D of this Schedule 20, regarding any failure of Project Co during a Contract Month to maintain Stations in compliance with the Station Access Standard.

1.57 "**Station Availability Failure Hours**" means, for any Station, the total number of hours during a Contract Month during which there is a condition of Station Availability Failure. For each Contract Month, Station Availability Failure Hours shall be rounded to the nearest 15-minute increment, and may be expressed as a decimal.[1]

[1] Example: Three (3) hours and fifteen (15) minutes of Station Availability Failure shall be represented as 3.25 Station Availability Failure Hours.

1.58 "**Station-Related Non-Project Co Cause**" means any one of the following issues or events, to the extent that such issue or event causes a Station to be non-compliant with the Station Access Standard:

(a) An Event of Vandalism which:

(i) Disables one or more Elevators; or

(ii) Results in the Station being unsafe for entry by passengers,

provided that the Station-Related Non-Project Co Cause condition shall be limited to Project Co's Rectification or Remedial Period, as set out in Schedule 15-3, related to the Elevator disablement or the Event of Vandalism, as applicable;

(b) The actions of Protesters and/or Trespassers;

(c) Any event which is a Relief Event, but only to the extent that the Project Agreement does not already provide Project Co with relief from Deductions in respect of Station Availability Failure due to such event;

(d) The actions of any Additional Contractors or Third Party Contractors, provided that if the City has assigned certain responsibilities to Project Co in respect of the Additional Works or Third Party Works, as the case may be, in accordance with Section 9.7(a) of the Project Agreement, then a Non-Project Co Cause shall only apply in a case where:

(i) the City fails to carry out its obligations under Sections 9.7(b) or 9.7(c), as applicable; or

(ii) the Additional Contractor(s) and/or Third Party Contractor(s) engage in unlawful or negligent acts;

(e) The actions of governmental authorities or emergency response personnel who require closure of Stations or other actions which are inconsistent with the Station Access Standard, provided that any such actions are not the result of Project Co failing to comply with any legal or regulatory obligation; and

(f) Any closure of Stations during a Major Maintenance Shutdown Period (as defined in Schedule 15-3), or during any other period of time during which the City explicitly agrees that Project Co is authorized to cause a reduction or shutdown of service on the System without penalty.

1.59 "**System Event**" means an event identified as such in Table 1 in Article 1.7 of Part D to this Schedule 20.

1.60 "**Temporary Repair**" means, in respect of the occurrence of an Event which results in a Service Failure, Quality Failure, or Station Availability Failure, works of a temporary nature that do not constitute Rectification but temporarily allow for safe use of the affected elements of the System and substantially make good the relevant Event for the period until a Permanent Repair can be undertaken.

1.61 "**Total Vehicle Kilometres**" is defined in Schedule 15-1, and for clarity includes Revenue Service Vehicle Kilometres, as well as additional distance travelled by vehicles for purposes of entering into or exiting from service, or training of operators, and is measured in kilometres and reported by the Performance Monitoring Report for that Contract Month.

1.62 "**Trial Running Payments**" means the amounts payable pursuant to Sections 1.5 and 1.6 of Part B to this Schedule 20.

1.63 **"Trial Running Periods"** means, collectively, the East Trial Running Period and the West Trial Running Period.

1.64 "**Un-Adjusted Service Payment**" means the amount that would be calculated for the relevant Contract Month in accordance with the formula set out in Section 1.1 of Part B of this Schedule 20, with the following exceptions:

(a) without applying the sums represented by the symbols ΣD, GS, PS, or ADHA or TR; and

(b) replacing the term LCP_n with the Average Monthly Lifecycle Payment

1.65 "**Vehicle Kilometres Availability Failure**" means any failure of the System to attain the Scheduled Revenue Service Vehicle Kilometres for a Contract Month, otherwise than by reason of any Non-Project Co Causes.

1.66 "**Vehicle Kilometres Availability Failure Deduction**" means a Deduction calculated in accordance with Section 1.1 of Part D of this Schedule 20, regarding Vehicle Kilometres Availability Failure.

1.67 "**Volume Payment**" means the sum in Canadian dollars calculated monthly, in accordance with the provisions set out in Section 3.1 of Part B of this Schedule 20.

1.68 "**Weekday**" means Monday, Tuesday, Wednesday, Thursday, or Friday.

1.69 "**West Trial Running Period**" means the period between the Stage 2 West Substantial Completion Date and the Stage 2 West Revenue Service Availability Date.

PART B: CALCULATION OF SERVICE PAYMENTS

Section 1. Monthly Service Payment

1.1 The Monthly Service Payment shall be payable in respect of each Contract Month during the Maintenance Term. Subject to Sections 2.4 and 2.5 of this Part B, the Monthly Service Payment shall be calculated in accordance with the following formula:

Where:

MSP_n	Means the Monthly Service Payment for the Contract Month for which the formula is to be applied.
ASP_n	Means the applicable Annual Service Payment for the Service Level in effect for the relevant Contract Year, calculated in accordance with the provisions set out in Section 2.1 of Part B of this Schedule 20.
VP	Means the Volume Payment for the relevant Contract Month, calculated in accordance with the provisions set out in Section 3.1 of Part B of this Schedule 20.
LCP_n	Means the Lifecycle Payment for the relevant Contract Month, calculated in accordance with the provisions set out in Section 3.2 of Part B of this Schedule 20.
ΣD	Means the sum of Vehicle Kilometres Availability Failure Deductions, Station Availability Failure Deductions, Quality Failure Deductions, and Service Failure Deductions in respect of the relevant Contract Month.
GS	Means any Gainshare Adjustment arising pursuant to the terms of Section 5 of Part 1 to Schedule 8 – Energy Matters and Section 5 of Part 2 to Schedule 8 – Energy Matters.
PS	Means any Painshare Adjustment arising pursuant to the terms of Section 5 of Part 1 to Schedule 8 – Energy Matters and Section 5 of Part 2 to Schedule 8 – Energy Matters.
$ADHA$	Means any Annual Driver Hours Adjustment arising pursuant to the terms of Section 7.2 of Schedule 39 – Operations Matters.
TR	Means the Trial Running Payments arising pursuant to Section 1.5 and Section 1.6 below.

1.2 Project Co shall apply any Gainshare Adjustment and/or Painshare Adjustment calculated for a Contract Year as a single lump sum amount, applied to the Monthly Service Payment in respect

of the Contract Month in which the relevant Gainshare Adjustment and/or Painshare Adjustment was determined in accordance with Schedule 8 – Energy Matters.

1.3 Project Co shall apply any Annual Driver Hours Adjustment calculated for a Contract Year as a single lump sum amount, applied to the Monthly Service Payment in respect of the Contract Month in which the relevant Annual Driver Hours Adjustment was determined in accordance with Schedule 39 - Operations Matters.

1.4 If the calculation prescribed by Section 1.1 of Part B to this Schedule 20 yields an amount for a Contract Month which is a negative number, then the Monthly Service Payment for the relevant Contract Month shall be deemed to be zero (0).

1.5 In consideration for the due and proper performance of the Maintenance Services during the East Trial Running Period, the Trial Running Payments for the relevant Contract Month(s) shall be:

(a) the sum of $ per day together with the corresponding Trial Running Volume Payment per day calculated in accordance with the provisions set out in Section 3.1 of Part B of this Schedule 20;

1.6 In consideration for the due and proper performance of the Maintenance Services during the West Trial Running Period, the Trial Running Payments for the relevant Contract Month(s) shall be:

(a) the sum of $ per day together with the corresponding Trial Running Volume Payment per day calculated in accordance with the provisions set out in Section 3.1 of Part B of this Schedule 20

Section 2. Annual Service Payment

2.1 The Annual Service Payment for any Contract Year shall be calculated in accordance with the following formula:

Where:

ASP_n Means the total, escalated Annual Service Payment for the relevant Contract Year.

CP_n Means the Capital Payment during the relevant Contract Year, as referenced in Column B of Table 1 in Appendix A.

MP_n Means the un-escalated Maintenance Payment for the Service Level in effect during the relevant Contract Year, as referenced in Column B of Table 2 in Appendix A.

SPV_n Means the un-escalated SPV Payment during the relevant Contract Year, as referenced in Column D of Table 1 in Appendix A.

ESC_n Means the Escalation Factor for the relevant Contract Year as calculated in accordance with Section 4.1 of this Part B.

Section 3. Volume Payment and Lifecycle Payment

3.1 The Volume Payment for any Contract Month *n* shall be calculated in accordance with the following formula:

Where:

VP_n Means the Volume Payment for the Service Level in effect during the relevant Contract Month *n*;

Tkm_n Means the Total Vehicle Kilometres for the relevant Contract Month *n*;

PPkm Means the Price per Vehicle Kilometre for the Service Level in effect during the relevant Contract Month, as set out in Column C of Table 2 in Appendix A to this Schedule 20; and

ESC_n Means the Escalation Factor for the relevant Contract Year as calculated in accordance with Section 4.1 of this Part B.

For the purposes of calculating the Trial Running Payments pursuant to Sections 1.5 and 1.6 of this Part B, the Trial Running Volume Payment shall be calculated on the basis of the Volume Payment formula above, save that:

(i) the Total Vehicle Kilometres for the relevant Contract Month *n* shall refer only to those incurred during the relevant Trial Running Period and in respect of the relevant part of the Stage 2 System (and such Total Vehicle Kilometres shall not otherwise be counted as part of the Volume Payment above); and

(ii) the Price Per Vehicle Kilometer for the East Trial Running Period shall be that of Service Level 3a and the Price Per Vehicle Kilometre for the West Trial Running Period shall be that of Service Level 4;

(iii) The Parties acknowledge that, during the East Trial Running Period and the West Trial Running Period, but only after the completion of the City Trial Running for each such Trial Running Period, the Stage 2 East System and the Stage 2 West System, respectively, shall be operated for three hours daily on the basis of an off-peak, PM service, and there shall be no material deviation from this by either Party without the consent of the other Party, not to be unreasonably withheld or delayed. The City shall provide Drivers and other operational support (including Guideway access) as may be reasonably required from the City to support these operations, subject to arrangements agreed in advance by the Parties, each acting reasonably.

3.2 The Lifecycle Payment applicable for any Contract Month *n* shall be calculated in accordance with the following formula:

Where:

LCP_n Means the total, escalated Lifecycle Payment applicable for the relevant Contract Month *n*;

$LCP_S1_{Month\ n}$ Means the Lifecycle Payment in respect of the Stage 1 System for the relevant Contract Month *n* as set out in Column C of Table 3 in Appendix A to this Schedule 20;

$LCP_S2_{Month\ m}$ Means, subject to Sections 5.3(a) and (b) of this Part B, the Lifecycle Payment in respect of the Stage 2 System for the relevant Contract Month *m* as set out in Column D of Table 3 in Appendix A to this Schedule 20. For the avoidance of doubt, subject to any Variation made pursuant Section 5.3 of this Part B, the Lifecycle Payment in respect of the Stage 2 System will be paid on the dates set out for Contract Month *m* regardless of any change to Contract Month *n*;

$LCESC_n$ Means the Lifecycle Escalation Factor for the relevant Contract Year as calculated in accordance with Section 4.2 of this Part B.

Section 4. Escalation Factors

4.1

Section 5. Changes in Service Level and Partial Years

5.1 If the Service Level is changed during a Contract Year resulting in a change in the Annual Service Payment during such Contract Year, the formula in Section 2.1 above shall be applied by using one of the two methods below, as agreed by the City and Project Co:

(a) Pro-rating the Annual Service Payment for such Contract Year based on the number of days in the Contract Year each Service Level is in effect; or

(b) Re-applying the above formula on the date on which the new Service Level comes into effect, and using the resulting Annual Service Payment as the basis for calculating the Monthly Service Payment from that date forward.

5.2 If the Service Level is changed during a Contract Month resulting in a change in the applicable Price per Vehicle Kilometre, then the total Volume Payment for that Contract Month shall be calculated as an aggregate based on:

(a) With regard to Total Vehicle Kilometres run prior to the change in Service Level, the Price per Vehicle Kilometre in effect prior to the change in Service Level; and

(b) With regard to Total Vehicle Kilometres run following the change in Service Level, the Price per Vehicle Kilometre associated with the new Service Level.

5.3

Lifecycle Payments

(a) If the Stage 2 East Revenue Service Commencement Date and the Stage 2 West Revenue Service Commencement Date both occur within six (6) months of the Original Planned Revenue Service Commencement Date for the relevant Stage, the Lifecycle Payments in respect of Stage 2 shall remain unchanged relative to the profile provided in Column D of Table 3 in Appendix A;

(b) If the Stage 2 East Revenue Service Commencement Date and/or the Stage 2 West Revenue Service Commencement Date occurs more than six (6) months after the Original Planned Revenue Service Commencement Date for the relevant Stage, then the City shall issue a Variation Enquiry under Schedule 22 – Variation Procedure with a view to adjusting the Lifecycle Payments in respect of the Stage 2 System, as per the profile provided in Column D of Table 3 in Appendix A, for the remaining term between the Revenue Service Commencement Date for that Stage and the Expiry Date, so as to ensure that Project Co is put in a no better and no worse position compared with the position had the Revenue Service Commencement Date for such Stage commenced on the Original Planned Revenue Service Commencement Date. The City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree.

Other costs

(c) If the Stage 2 East Substantial Completion Date and/or Stage 2 West Substantial Completion Date occurs after the Planned Substantial Completion Date for the relevant Stage without the required level of advance notice of postponement of such date having been given of any postponement of such date pursuant to Section 5.3 (d) below, then the City shall (save to the extent the delay in question has been caused by Project Co or a Project Co Party, other than as a result of any act or omission of Project Co or a Project Co Party that forms part of the Stage 2 Integration Activities instructed pursuant to a Variation Enquiry issued under Section 27.4(b)), make daily payments at the appropriate rate in the table below as compensation for Project Co's additional costs and losses arising as a result of such lack of advance notice of postponement (without prejudice to the operation of Section 5.3(b) above, where applicable), based on the level of advance notice (if any) that has been given of such postponement. Such amounts shall accrue from the relevant Planned Substantial Completion Date (subject to Section 5.3(d)(ii) below) to the Stage 2 East Substantial Completion Date or, as the case may be, the Stage 2 West Substantial Completion Date and any amounts accrued shall be added to the next available instalment(s) of the Monthly Service Payment.

Required level of notice of postponement of the Planned Substantial Completion Date	**Payments for Stage 2 East**	**Payments for Stage 2 West**
Less than or equal to 30 days	$	$
More than 30 days and less than 89 days	$	$
More than 89 days and less than 179 days	$	$
More than or equal to 180 days	Zero	Zero

(d) The City may at any time issue a notice to Project Co to postpone the Planned Substantial Completion Date for either the Stage 2 East System or the Stage 2 West System, provided that:

(i) if the notice of postponement is issued more than 180 days before the then current Planned Substantial Completion Date for that Stage, there shall be no cost to the City as result of issuing such notice; and

(ii) if the notice of postponement is issued after any of the notice requirements referred to in Section 5.3(c) have already been missed, this shall not affect Project Co's ongoing entitlement to payments under Section 5.3(c) in respect of any such missed notice requirements.

(e) Project Co shall be entitled to assume that the Stage 2 East Substantial Completion Date or Stage 2 West Substantial Completion Date (as the case may be) shall not occur prior to the Planned Substantial Completion Date (including any postponement to such date notified pursuant to this Section 5.3), unless the City issues a Variation Enquiry under Schedule 22 – Variation Procedure to require Project Co to commence the Maintenance Services earlier than the Planned Substantial Completion Date (to the extent possible) and so as to ensure that Project Co is put in a no better and no worse position as a result of such requirement to accelerate the commencement of Maintenance Services. In this regard, the City acknowledges that Project Co does not anticipate being able to provide the Maintenance Services in respect of Trial Running (as defined in the DB Co Works Agreement) more than three months in advance of the Planned Substantial Completion Commencement Date.

For the purposes of this Section 5.3 the following definitions shall apply:

"**Original Planned Revenue Service Commencement Date**" means:

(a) in respect of Stage 2 East, 17 December 2024; and

(b) in respect of Stage 2 West, 15 June 2025.

"**Planned Substantial Completion Date**" means:

(a) in respect of Stage 2 East, 26 November 2024; and

(b) in respect of Stage 2 West, 25 May 2025.

or such other date as may apply pursuant to Section 5.3(d) above.

5.4 With respect to the Contract Months in which:

(a) the Revenue Service Commencement Date, and

(b) the Expiry Date,

occur, unless such date falls on the first or last day of the Contract Month (respectively), a pro rata adjustment to the Monthly Service Payment shall be made to reflect the actual number of days in the relevant Contract Month.

Section 6. Insurance Payments

6.1 No later than 60 days prior to each Insurance Review Date, Project Co will require its insurance broker to prepare and submit to the City the Joint Insurance Cost Report. The City and Project Co, both acting reasonably, will agree on the Insurance Payment.

6.2 Project Co will provide the City with an invoice for the Insurance Payment when it receives an invoice for the premiums for the Relevant Insurance. This invoice will be separate from any invoice delivered in respect of the Monthly Service Payment.

6.3 In respect of Stage 2 East and Stage 2 West, Project Co will provide the City with an invoice for the Stage 2 East Initial Payment and the Stage 2 West Initial Payment when it receives an invoice for the Stage 2 East Incremental Premium Amount or the Stage 2 West Incremental Premium Amount, as the case may be.

6.4 The City shall pay each Insurance Payment, the Stage 2 East Initial Payment and the Stage 2 West Initial Payment within 30 days of receipt of the relevant invoice delivered in accordance with this Section 6.

6.5 Capitalised terms used in this Section 6 which are not otherwise defined in this Schedule 20 or in Schedule 1 – Definitions shall have the meaning given to them in Schedule 25 – Insurance and Performance Security Requirements.

PART C: DEDUCTIONS FROM MONTHLY SERVICE PAYMENTS - GENERAL

Section 1. Entitlement to Make Deductions

1.1 If at any time during the Maintenance Term a Quality Failure, Service Failure or Availability Failure shall occur, the City shall be entitled to make a Deduction from the relevant Monthly Service Payment in respect of that Quality Failure, Service Failure or Availability Failure. Notwithstanding the foregoing, Deductions shall not apply:

(a) in respect of the Maintenance Services provided in respect of the Stage 2 East System during the East Trial Running Period; and

(b) in respect of the Maintenance Services provided in respect of the Stage 2 West System during the West Trial Running Period:

provided that this shall not affect the City's ability to abate the payments otherwise payable to Project Co in respect of such Maintenance Services during such periods to the extent such Maintenance Services are not provided in accordance with the terms of this Agreement and provided further that:

(i) this shall not affect the parties' respective rights and obligations under Section 32 (City's Remedial Rights);

(ii) the amount of any such abatement shall be in proportion to the value of the Maintenance Services that are not provided in accordance with the terms of this Agreement;

(iii) the maximum aggregate of all such abatements that the City can make from the applicable Trial Running Payment in respect of any Contract Month shall be the amount of the Trial Running Payment that would have been calculated for the relevant Contract Month in accordance with Section 1.5 or 1.6, as applicable, of Part B to this Schedule 20 prior to the application of any abatements; and

(iv) the City shall only seek to abate any such payments where:

(A) the failure to provide such Maintenance Services is of a material nature in the context of the provision of the totality of the Maintenance Services being provided in respect of the Stage 2 East System during the East Trial Running Period or in respect of the Stage 2 West System during the West Trial Running Period; and

(B) Project Co has failed to implement an appropriate remedial plan within 24 hours of the earlier of (i) the time when Project Co became aware of the failure or (ii) the time when Project Co reasonably ought to have been aware of the failure.

1.2 The maximum aggregate of all Deductions that the City can make from a Monthly Service Payment in respect of any Contract Month shall be the Un-Adjusted Service Payment relating to that Contract Month.

Section 2. Classification of Deductions

2.1 Subject to Section 2.2 of Part C of this Schedule 20, the classification of an Event as a potential Quality Failure, Service Failure, or Availability Failure shall be made at the time at which the occurrence of the Event is reported to the Helpdesk. An Event which is incorrectly classified may be re-classified with the approval of the City Representative and the Project Co Representative, acting reasonably, in which case the applicable Performance Monitoring Report and Daily Operating Report will be revised accordingly.

2.2 A Vehicle Kilometres Availability Failure is not required to be reported to the Helpdesk. Vehicle Kilometres Availability Failures will be determined through the Daily Operating Report process and summarized for Payment Mechanism calculation purposes in the Performance Monitoring Report.

PART D: DEDUCTIONS FOR VEHICLE AND STATION UNAVAILABILITY

Section 1. Vehicle Kilometres Availability Failure Deductions

1.1 The Vehicle Kilometres Availability Failure Deduction in respect of a Contract Month *n*, shall be calculated in accordance with the following formula:

Where:

VAFD n	Means the Vehicle Kilometres Availability Failure Deduction applicable to Contract Month *n*
$VAFD_{Peak}$	Means the Vehicle Kilometres Availability Failure Deduction for Vehicle Kilometres Availability Failure during Peak Period applicable to Contract Month *n*, calculated in accordance with Section 1.2 of this Part D to Schedule 20.
$VAFD_{Off\text{-}Peak}$	Means the Vehicle Kilometres Availability Failure Deduction for Vehicle Kilometres Availability Failure during Off-Peak Period applicable to Contract Month *n*, calculated in accordance with Section 1.3 of this Part D to Schedule 20.
EvD	Means the sum of System Event Deductions applicable to Contract Month *n*, calculated in accordance with Section 1.7 of this Part D to Schedule 20.

1.2 The amount to be deducted in respect of Vehicle Kilometres Availability Failure for Peak Periods during Contract Month *n*, shall be calculated in accordance with the following formula:

Where:

$VAFD_{Peak}$	Means the amount to be deducted in respect of Vehicle Kilometres Availability Failure for Peak Periods applicable to Contract Month *n*
$DF_{Peak,\,n}$	Means the Deduction Factor for Peak Period service during Contract Month *n*, determined in accordance with Section 1.4 of this Part D to Schedule 20.
$UASP_n$	Means the Un-Adjusted Service Payment for Contract Month *n*.

1.3 The amount to be deducted in respect of Vehicle Kilometres Availability Failure for Off-Peak Periods during Contract Month *n*, shall be calculated in accordance with the following formula:

Where:

$VAFD_{Off\text{-}Peak}$ Means the amount to be deducted in respect of Vehicle Kilometres Availability Failure for Off-Peak Periods applicable to Contract Month *n*

$DF_{Off\text{-}Peak,\,n}$ Means the Deduction Factor for Off-Peak Period service during Contract Month *n*, determined in accordance with Section 1.5 of this Part D to Schedule 20.

$UASP_n$ Means the Un-Adjusted Service Payment for Contract Month *n*.

1.4 The Deduction Factor in respect of Peak Periods during Contract Month *n*, shall be determined by calculating the Availability Ratio for Contract Month *n*, in accordance with the formula set out below, and applying the corresponding Deduction Factor from Table 1 and Table 2 in Appendix B to this Schedule 20 (see Section 1.7 for additional detail).

Where:

$AR_{Peak,\,n}$ Means the Availability Ratio for Peak Period service during Contract Month *n*.

$Rkm_{Peak,\,n}$ Means the total amount of Revenue Service Vehicle Kilometres during Peak Periods for Contract Month *n*.

$NPCCkm_{Peak,\,n}$ Means the number of Scheduled Revenue Service Vehicle Kilometres which were "missed" or not achieved at Peak Periods during Contract Month *n* and which are attributed in the relevant Performance Monitoring Report as being due to a Non-Project Co Cause.

$Skm_{Peak,\,n}$ Means the total Scheduled Revenue Service Vehicle Kilometres during Peak Periods for Contract Month *n*.

1.5 The Deduction Factor in respect of Off-Peak Periods during Contract Month *n*, shall be determined by calculating the Availability Ratio for Contract Month *n*, in accordance with the formula set out below, and applying the corresponding Deduction Factor from Table 1 and Table 2 in Appendix B to this Schedule 20 (see Section 1.7 for additional detail).

Where:

$AR_{Off\text{-}Peak,\,n}$ Means the Vehicle Availability Ratio for Off-Peak Period service during Contract Month *n*.

$Rkm_{Off\text{-}Peak,\,n}$ Means the total amount of Revenue Service Vehicle Kilometres during Off-Peak Periods for Contract Month *n*.

NPCCkm $_{Off\text{-}Peak,\ n}$ — Means the number of Scheduled Revenue Service Vehicle Kilometres which were "missed" or not achieved at Off-Peak Periods during Contract Month *n* and which are attributed in the relevant Performance Monitoring Report as being due to a Non-Project Co Cause.

Skm $_{Off\text{-}Peak,\ n}$ — Means the total Scheduled Revenue Service Vehicle Kilometres during Off-Peak Periods for Contract Month *n*.

1.6 For the purposes of Sections 1.4 and 1.5 of this Part D to Schedule 20, when selecting a Deduction Factor from the tables in Appendix B to this Schedule 20, the Availability Ratio shall be rounded to the nearest 0.1%.

1.7 For the purposes of Sections 1.4 and 1.5 of this Part D to Schedule 20, the Deduction Factors in Table 1 in Appendix B shall be applied during Service Levels 1-3a and Deduction Factors in Table 2 in Appendix B shall be applied during Service Levels 4-9, with the exception of a period of the first three months of Service Level 4, wherein the Deduction Factors in Table 1 shall be applicable.

1.8 The following deductions ("System Event Deductions") shall also apply in respect of Vehicle Kilometres Availability Failure. The maximum aggregate amount of System Event Deductions to be applied in one day shall be $.

SYSTEM EVENT DEDUCTIONS - TABLE 1

System Event	System Event Deduction Applied
On any single Weekday during a Contract Month, the Aggregate Vehicle Kilometres Availability Ratio for either (a) morning Peak Period service (06:30 to 09:00) or (b) afternoon Peak Period service (14:45 to 18:00) is less than %.	$ per occurrence. For clarity, each Peak Period which fails to meet the % service standard shall result in the $ System Event Deduction, such that Project Co could receive two such deductions in a single day, one in respect of morning Peak Period service and the second in respect of afternoon Peak Period service.
On any single day during a Contract Month, the Aggregate Vehicle Kilometres Availability Ratio for that day is less than %	$ per occurrence.

1.9 A portion of the System Event Deductions and the maximum daily aggregate amount listed above shall be index-linked using the Escalation Factor as referred to in Section 4.1 of Part B to this Schedule 20. The relevant portion to be indexed shall be, in each Contract Year, the fraction represented by $MP_n/(CP_n + MP_n)$ for that Contract Year, as defined in Section 2.1 of Part B to this Schedule 20.

Section 2. Station Availability Failure Deductions

2.1 The Station Availability Failure Deduction in respect of a Contract Month *n*, shall be calculated in accordance with the following formula:

Where:

SAFDn Means the Station Availability Failure Deduction applicable to Contract Month *n*

$SAFD_{Peak}$ Means the amount deducted in respect of Station Availability Failure during Peak Period applicable to Contract Month *n*, calculated in accordance with Section 2.2 of this Part D to Schedule 20.

$SAFD_{Off\text{-}Peak}$ Means the amount deducted in respect of Station Availability Failure during Off- Peak Period applicable to Contract Month *n*, calculated in accordance with Section 2.3 of this Part D to Schedule 20.

2.2 The amount to be deducted in respect of Station Availability Failure during Peak Periods during Contract Month *n*, shall be calculated in accordance with the following formula:

Where:

$SAFD_{Peak}$ Means the amount to be deducted in respect of Station Availability Failure during Peak Period applicable to Contract Month *n*

$St.DF_{Peak,\,n}$ Means the Station Deduction Factor for Peak Period service during Contract Month *n*, determined in accordance with Section 2.4 of this Part D to Schedule 20.

$UASP_n$ Means the Un-Adjusted Service Payment for Contract Month *n*.

2.3 The amount to be deducted in respect of Station Availability Failure during Off-Peak Periods during Contract Month *n*, shall be calculated in accordance with the following formula:

Where:

$SAFD_{Off\text{-}Peak}$ Means the amount to be deducted in respect of Station Availability Failure during Off-Peak Period applicable to Contract Month *n*

$St.\ DF_{Off\text{-}Peak,\,n}$ Means the Station Deduction Factor for Off-Peak Period service during Contract Month *n*, determined in accordance with Section 2.5 of this Part D to Schedule 20.

$UASP_n$ Means the Un-Adjusted Service Payment for Contract Month *n*.

2.4 The Station Deduction Factor in respect of Peak Periods during Contract Month *n*, shall be determined by calculating the Station Availability Ratio for Contract Month *n*, in accordance with the formula set out below, and applying the corresponding Station Deduction Factor from Table 3 and Table 4 in Appendix B to this Schedule 20 (see Section 2.6 for additional detail).

Where:

$SAR_{P,n}$ Means the Station Availability Ratio for Peak Period service during Contract Month *n*

$SSH_{Gp.1P,n}$ Means the sum total of Scheduled Station Hours for all Group 1 stations during Peak Periods for Contract Month *n*

$SAF_{Gp.1P,n}$ Means the sum total of Station Availability Failure Hours for all Group 1 stations during Peak Periods for Contract Month *n*

$SSH_{Gp.2P,n}$ Means the sum total of Scheduled Station Hours for all Group 2 stations during Peak Periods for Contract Month *n*

$SAF_{Gp.2P,n}$ Means the sum total of Station Availability Failure Hours for all Group 2 stations during Peak Periods for Contract Month *n*

$SSH_{Gp.3P,n}$ Means the sum total of Scheduled Station Hours for all Group 3 stations during Peak Periods for Contract Month *n*

$SAF_{Gp.3P,n}$ Means the sum total of Station Availability Failure Hours for all Group 3 stations during Peak Periods for Contract Month *n*

2.5 The Station Availability Factor in respect of Off-Peak Periods during Contract Month *n*, shall be determined by calculating the Station Availability Ratio for Contract Month *n*, in accordance with the formula set out below, and applying the corresponding Station Availability Factor from Table 3 and Table 4 in Appendix B to this Schedule 20 (see Section 2.6 for additional detail).

Where:

$SAR_{OP\,n}$ Means the Station Availability Ratio for Off-Peak Period service during Contract Month

$SSH_{Gp.1OP,n}$ Means the sum total of Scheduled Station Hours for all Group 1 stations during Off-Peak Periods for Contract Month *n*

$SAF_{Gp.1OP,n}$ Means the sum total of Station Availability Failure Hours for all Group 1 stations during Off-Peak Periods for Contract Month *n*

$SSH_{Gp.2OP,\,n}$	Means the sum total of Scheduled Station Hours for all Group 2 stations during Off-Peak Periods for Contract Month *n*
$SAF_{Gp.2OP,\,n}$	Means the sum total of Station Availability Failure Hours for all Group 2 stations during Off-Peak Periods for Contract Month *n*
$SSH_{Gp.3OP,\,n}$	Means the sum total of Scheduled Station Hours for all Group 3 stations during Off-Peak Periods for Contract Month *n*
$SAF_{Gp.3OP,\,n}$	Means the sum total of Station Availability Failure Hours for all Group 3 stations during Off-Peak Periods for Contract Month *n*

2.6 For the purposes of Sections 2.4 and 2.5 of this Part D to Schedule 20, the Deduction Factors in Table 3 in Appendix B shall be applied during Service Levels 1-3a and Deduction Factors in Table 4 in Appendix B shall be applied during Service Levels 4-9, with the exception of a period of the first three months of Service Level 4, wherein the Deduction Factors in Table 3 shall be applicable.

Section 3. Partial Availability

3.1 Where a Station does not meet the Station Access Standard, but the following conditions hold:

(a) At least one platform is accessible by elevator, and all access to such platform is otherwise in compliance with the Station Access Standard; and

(b) At least one entrance to the Station is open and access through this entrance to the accessible platform is in compliance with the Station Access Standard,

then Project Co shall be given credit for partial availability and the Station Availability Failure Hours that would otherwise be assessed for the duration of the Station's failure to meet the Station Access shall be reduced by 50%.

3.2 Where the City exercises its discretion under Article 3.0(c)(i)(B) of Schedule 15-3 to permit a Vehicle which does not meet the Vehicle Cleaning Standard or Vehicle Maintenance Standard (i)(xiv) to be entered into Revenue Service as part of a Train, the Revenue Service Vehicle Kilometres traveled by that Vehicle while it fails to meet such standard shall be deemed to be reduced by 50%.

PART E: DEDUCTIONS FOR QUALITY AND SERVICE FAILURES

Section 1. Amount Of Deductions For Quality Failures

1.1 The amount of the Deduction in respect of a Quality Failure shall be as follows:

(a) in the case of a Minor Quality Failure, the sum of $, index-linked using the Escalation Factor as referred to in Section 4.1 of Part B in this Schedule 20;

(b) in the case of a Medium Quality Failure, the sum of $, index-linked using the Escalation Factor as referred to in Section 4.1 of Part B in this Schedule 20; and

(c) in the case of a Major Quality Failure, the sum of $, index-linked using the Escalation Factor as referred to in Section 4.1 of Part B in this Schedule 20.

1.2 There are no Response Times or Rectification Times in respect of Quality Failures. The occurrence of a Quality Failure will result in a Quality Failure Deduction in respect of the Contract Month in which the Quality Failure occurred.

1.3 Following the occurrence of a Quality Failure, Project Co shall be allowed a Remedial Period. The length of the relevant Remedial Period shall be specified by the relevant Performance Criteria. If, before the expiry of the Remedial Period, Project Co demonstrates, to the reasonable satisfaction of the City Representative, that it has remedied the Quality Failure, no further Deduction shall be made in respect of the Quality Failure. Otherwise, a further Deduction shall be made of the appropriate amount (as described in Section 1.1 of Part E of this Schedule 20) and a further Remedial Period or Remedial Periods of equal duration shall apply (and, if appropriate, Deductions shall continue to be made) until such time as Project Co shall demonstrate, to the reasonable satisfaction of the City Representative, that it has remedied the Quality Failure.

Section 2. Amount Of Deductions For Service Failures

2.1 The amount of the Deduction in respect of a Service Failure shall be as follows:

(a) in the case of a Minor Service Failure, the sum of $, index-linked using the Escalation Factor as referred to in Section 4.1 of Part B in this Schedule 20;

(b) in the case of a Medium Service Failure, the sum of $, index-linked using the Escalation Factor as referred to in Section 4.1 of Part B in this Schedule 20; and

(c) in the case of a Major Service Failure, the sum of $, index-linked using the Escalation Factor as referred to in Section 4.1 of Part B in this Schedule 20.

2.2 Where a Service Failure Performance Criteria has a Response Time or a Rectification Time, a Service Failure shall only occur if the Event in question has not been responded to within the applicable Response Time or rectified within the applicable Rectification Time.

2.3 Following the occurrence of a Service Failure, Project Co shall be allowed an additional Response Time or Rectification Time (as the case may be) equivalent to the original Response Time or Rectification Time. If, before the expiry of this additional period, Project Co demonstrates, to the reasonable satisfaction of the City Representative, that it has remedied the

Service Failure, no further Deduction shall be made in respect of the Service Failure. Otherwise, a further Deduction shall be made of the appropriate amount (as described in Section 2.1 of Part E of this Schedule 20) and a further Response Time or Rectification Time of equal duration shall apply (and, if appropriate, Deductions shall continue to be made) until such time as Project Co shall demonstrate, to the reasonable satisfaction of the City Representative, that it has remedied the Service Failure.

2.4 The provisions of Section 2.3 of this Part E shall not apply to Service Failures where, if the response or rectification is not carried out within the Response Time or the Rectification Time, as applicable, the City Representative notifies the Project Co Representative that the City no longer requires Project Co to address such Service Failure.

2.5 Where a Service Failure Performance Criteria has no Response Time or Rectification Time, a Service Failure shall occur upon the occurrence of the Event in question and a Service Failure Deduction shall apply in accordance with Sections 2.1 and 2.3 of this Part E.

Section 3. Temporary Repairs

3.1 If Project Co informs the City that it is unable to Rectify an Event within the specified Rectification Time due to the need for specialized materials or personnel that are not, and cannot reasonably be expected to be, immediately available but that a Temporary Repair can be effected:

(a) The City may, in its discretion and acting reasonably, permit Project Co to carry out the Temporary Repair proposed by Project Co; and

(b) where a Temporary Repair is permitted, a deadline by which a Permanent Repair must be made shall be agreed to by the Parties, each acting reasonably, giving Project Co a reasonable period within which to carry out the Permanent Repair (the "Permanent Repair Deadline").

3.2 If the Temporary Repair is effected within the specified Rectification Time and the Permanent Repair is effected by no later than the Permanent Repair Deadline, no Quality or Service Failure (as applicable) will occur, and no Deduction may be made, in respect of the Event.

3.3 If the Temporary Repair is not effected within the specified Rectification Time, a Quality or Service Failure (as applicable) shall be deemed to occur and the following provisions shall apply:

(a) there shall be a further period beginning at the expiry of the Rectification Time and of a duration equal to that of the Rectification Time;

(b) Project Co shall ensure that the Temporary Repair is successfully carried out prior to the expiry of the additional period referred to in Section 3.3(a);

(c) if the Temporary Repair is not successfully carried out prior to the expiry of the additional period referred to in Section 3.3(a) a further Quality or Service Failure (as applicable) shall occur and a further additional period shall commence;

(d) unless the Temporary Repair has been successfully carried out prior to the expiry of the additional period then a further Quality or Service Failure (as applicable) shall occur until such time as the Temporary Repair shall have been successfully completed; and

(e) if the Temporary Repair is not successfully carried out prior to the Permanent Repair Deadline, and no Permanent Repair has been successfully carried out, the right for Project Co to carry out a Temporary Repair pursuant to this Section 3 shall cease and Section 3.4 of this Part E shall apply.

3.4 If the Permanent Repair is not effected by the Permanent Repair Deadline, a Quality or Service Failure (as applicable) shall be deemed to occur.

PART F: REVIEW AND AMENDMENT OF PAYMENT MECHANISM

Section 1. Five Year Review

1.1 The amount of Deductions for Vehicle Kilometres Availability Failures, Station Availability Failures, Quality Failures and Service Failures, as well as the overall functioning of the Payment Mechanism shall be reviewed by the City and Project Co at any time if requested by either Party, up to a maximum of one review per Contract Year. In any event, a review shall be carried out at least once in every five Contract Years.

1.2 The City and Project Co shall act reasonably and diligently in carrying out the reviews.

1.3 For the avoidance of doubt, the Parties intend that any changes made as a result of such a review shall not alter the overall risk profile of the relevant Maintenance Services or the likely magnitude of Vehicle Kilometres Availability Failures, Station Availability Failures, Quality Failures and Service Failures. Where proposed changes would result in any such alteration, the matter shall be deemed to be a Variation and Schedule 22 - Variation Procedure shall apply.

1.4 The City and Project Co may in respect of each matter the subject of the review either:

(a) agree that the status of the relevant matter shall continue to apply unchanged in the Contract Year immediately following the review; or

(b) agree adjustments to the relevant matter to take effect in the Contract Year immediately following the review.

1.5 Any agreed adjustment pursuant to a review shall be effective from the commencement of the Contract Year immediately following the relevant review carried out in accordance with Section 1.1 of this Part F.

Section 2. Peak Periods and Station Grouping

2.1 The City may change the definition of “Peak Period” and “Off-Peak Period”, for the purposes of the Payment Mechanism, at its sole discretion at any time during the Maintenance Term by providing Project Co with sixty (60) days written notice, provided that the total number of Peak Period hours in a week does not exceed twenty-nine (29) hours.

2.2 The City may change the grouping of Stations (Group 1, Group 2, and Group 3 definitions), for the purposes of the Payment Mechanism, at its sole discretion at any time during the Maintenance Term by providing Project Co with sixty (60) days written notice, provided that:

(a) Group 1 shall not include more than twelve (12) Stations; and

(b) Group 2 shall not include more than seven (7) Stations

2.3 The City may increase the total number of Peak Period hours per week and/or increase the number of Group 1 or Group 2 stations, beyond the limits set out in 2.1 and 2.2, above, subject to agreement between the Parties on appropriate amendments to the Payment Mechanism in order to ensure there is no change in overall risk profile of the relevant Maintenance Services or the likely magnitude of Vehicle Kilometres Availability Failures, Station Availability Failures, Quality Failures and Service Failures.

Section 3. Lifecycle Payment Adjustment

3.1 In the event of an Accelerated Service Level, Project Co may request adjustments to the schedule of Lifecycle Payments set out in Table 3 of Appendix A to this Schedule 20, in accordance with the provisions of Section 3 to this Part F, provided that, notwithstanding the remaining provisions of this Section 3, in respect of any Accelerated Service Level described in paragraph (b) of the definition for that term, the Parties shall make such adjustments to the procedure set out in this Section 3 as are necessary to ensure that Project Co is put in no better and no worse position compared with the position had such Accelerated Service Level not been required.

3.2 Any adjustments to the schedule of Lifecycle Payments under this Section 3 of Part F shall be limited by the following constraints:

(a) Adjustments shall be limited to costs in respect of the replacement, refreshment and/or refurbishment during the Maintenance Term of the following components of the System ("Eligible Lifecycle Costs"):

(i) Trackwork, as described in Part 2 of Schedule 15-2 to the Project Agreement; and

(ii) Overhead Catenary System, as described in Part 4 of Schedule 15-2 to the Project Agreement;

(b) Adjustments shall be limited to the following forms of adjustment:

(i) Acceleration of already scheduled Lifecycle Payments in respect of Eligible Lifecycle Costs, such that Project Co would be entitled to receive a specific Lifecycle Payment or portion thereof in a Contract Month which is earlier than under the then-prevailing schedule of Lifecycle Payments; or

(ii) Introduction of new Lifecycle Payments in respect of Eligible Lifecycle Costs which, by virtue of the Accelerated Service Level, will either:

(A) require an additional cycle of replacement, refreshment and/or refurbishment during the Maintenance Term which is over and above such cycles already scheduled in the Maintenance and Rehabilitation Plan; or

(B) reach the end of their lifecycle and require replacement, refreshment and/or refurbishment during the Maintenance Term where no such

replacement, refreshment and/or refurbishment is scheduled in the then-prevailing Maintenance and Rehabilitation Plan; and

(c) Adjustments must:

(i) be attributable by the quantity of service provided by Project Co, measured by vehicle kilometres, and

(ii) not be attributable to any Project Co failure to adhere to its Maintenance and Rehabilitation Plan,

each supported by items 3.3(c) and 3.3(d) in the application process described below.

3.3 Project Co shall apply for an adjustment to the schedule of Lifecycle Payments as a Project Co Variation Notice in accordance with the provisions of Schedule 22 – Variation Procedure. In addition to the requirements of Schedule 22, Project Co's application shall contain the following elements:

(a) Identify the components of the System and Eligible Lifecycle Costs which form the basis of the application;

(b) Identify the originally scheduled dates (if any) for replacement, refreshment and/or refurbishment of the relevant components of the System in the Maintenance and Rehabilitation Plan, and the proposed amended dates for such lifecycle works;

(c) Describe the rationale for the proposed amended dates for lifecycle works, with specific reference to the following:

(i) The number of vehicle kilometres scheduled by the Preliminary Service Plan to have been provided at the originally scheduled date of lifecycle works;

(ii) The number of vehicle kilometres that will have been provided by Project Co at the proposed amended date of lifecycle works; and

(iii) Reference to manufacturer specifications or industry standards and the impact of the Accelerated Service Level in triggering a need for replacement, refreshment and/or refurbishment in accordance with these specifications or standards; and

(d) Carry out an Internal Quality Audit (as described in Schedule 10 of the Project Agreement) on Project Co's adherence to its Maintenance and Rehabilitation Plan for the relevant components of the System

3.4 For greater certainty, where Project Co's application includes a request for introduction of new Lifecycle Payments in accordance with Section 3.2 of this Part F, then the amount of such new Lifecycle Payments shall be determined in accordance with the terms of Schedule 22 – Variation Procedure.

3.5 Project Co's application shall provide the City with at least eighteen (18) months of notice in advance of any proposed amended or additional Lifecycle Payment.

3.6 Project Co and the City shall work collaboratively to minimize the number of adjustments to the Lifecycle Payment schedule, including:

(a) wherever possible, agreeing upon adjustments to the Lifecycle Payment schedule that take account of a number of years of Accelerated Service Level where it is apparent that the condition of Accelerated Service Level will continue to persist and future Service Levels can reasonably be predicted; and

(b) deferring adjustment to the Lifecycle Payment schedule where the City, acting reasonably, believes that a condition of Accelerated Service Level is temporary and Service Levels will soon revert to or track the Operations Service Plan in effect at Financial Close, and there is no long term lifecycle impact to Project Co.

PART G: FAILURE POINTS

Section 1. Failure Points

1.1 Failure Points shall be awarded for every Quality Failure, Service Failure, System Event and Availability Failure which occurs during the Maintenance Term, unless such Failure Points are cancelled pursuant to any other provision of the Project Agreement. Notwithstanding the foregoing, Failure Points shall not apply:

(a) in respect of the Maintenance Services provided in respect of the Stage 2 East System between the Stage 2 East Substantial Completion Date and the Stage 2 East Revenue Services Commencement Date; and

(b) in respect of the Maintenance Services provided in respect of the Stage 2 West System between the Stage 2 West Substantial Completion Date and the Stage 2 West Revenue Services Commencement Date,

provided that this shall not affect the parties' respective rights and obligations under Section 32 (City's Remedial Rights)

1.2 The number of Failure Points attributable to Quality Failures, Service Failures, System Events and Availability Failures is set out in Appendix C to this Schedule 20.

(a) Failure Points in respect of System Events shall be awarded following the identification of each such System Event through the Daily Operating Report;

(b) Failure Points in respect of Vehicle Kilometres Availability Failure shall be awarded for each Contract Month based on the relevant Aggregate Vehicle Kilometres Availability Ratio calculated for that Contract Month, in accordance with Section 1.1 of Appendix C to this Schedule 20;

(c) Failure Points in respect of Station Availability Failure shall be awarded for each Contract Month based on the relevant Aggregate Station Availability Ratio calculated for that Contract Month, in accordance with Section 3.1 of Appendix C to this Schedule 20;

(d) Failure Points in respect of Quality Failures and Service Failures shall be awarded in respect of each Quality Failure and Service Failure, in accordance with Section 4 and 5 of Appendix D to this Schedule 20.

1.3 For the purposes of Section 1.2(d) of this Part G to Schedule 20, the Failure Points in respect of Section 4.0 in Appendix C shall be applied during Service Levels 1-3 and the Failure Points in respect of Section 5.0 in Appendix C shall be applied during Service Levels 3a-9.

1.4 For the avoidance of doubt when awarding Failure Points, where a further Quality Failure or Service Failure is deemed to have occurred in accordance with Sections 2.2 and 2.3 of Part E of this Schedule 20, the appropriate number of Failure Points shall be awarded in respect of each such Quality Failure and Service Failure, even though they arise from the same circumstances.

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PART H: MONITORING AND REPORTING

Section 1. Sources of Information

1.1 The table below sets out the sources of the factual information regarding the performance of the Maintenance Services for the relevant Contract Month for the purposes of calculating the relevant Monthly Service Payment, the Deductions assessed and the number of Failure Points awarded.

Item	Source
Revenue Service Vehicle Kilometres for Contract Month *n*	Performance Monitoring Report for Contract Month *n*
Scheduled Revenue Service Vehicle Kilometres for Contract Month *n*	Performance Monitoring Report for Contract Month *n*
Number of Scheduled Revenue Service Vehicle Kilometres which were "missed" or not traveled by Project Co due to a Non-Project Co Cause, for Contract Month *n*	Performance Monitoring Report for Contract Month *n*
Total Vehicle Kilometres for Contract Month *n*	Performance Monitoring Report for Contract Month *n*
Scheduled Station Hours	Operations Service Plan in effect as of the relevant date
Station Availability Failure Hours	Performance Monitoring Report for Contract Month *n*
Quality Failures	Performance Monitoring Report for Contract Month *n*
Service Failures	Performance Monitoring Report for Contract Month *n*

Section 2. Failure by Project Co to Monitor or Report

2.1 If there shall be any error or omission in the Performance Monitoring Report for any Contract Month, Project Co and the City shall agree the amendment to the Performance Monitoring Report or, failing agreement within 10 days of notification of the error or omission which shall not be made more than 2 calendar months following the relevant Performance Monitoring Report, except in the circumstances referred to in Section 2.4 of this Part H either party may refer the matter to the Dispute Resolution Procedure.

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2.2 If Project Co fails to monitor or accurately report any Availability Failure, Service Failure or Quality Failure then, without prejudice to the Deduction to be made in respect of the relevant Availability Failure or Quality Failure, the failure to monitor or report shall be deemed to be a new Quality Failure, and Project Co shall be awarded 2 Quality Failure points for each occurrence of such Quality Failure, unless the circumstances set out in Section 2.4 of this Part H apply, in which case Project Co shall be awarded 5 Quality Failure Points for each such occurrence.

2.3 In the event that any inspection or investigation by the City of records made available pursuant to the Project Agreement reveals any further matters of the type referred to in Sections 2.1 and 2.2 above, those matters shall be dealt with in accordance with Section 2.1 and 2.2 of this Part H, as appropriate, and the City shall, in addition, be entitled to make Deductions in respect of any Availability Failure, Service Failure or Quality Failure in the manner prescribed in Part C of this Schedule 20. Any such Deductions shall be made from the Monthly Service Payment, payable in respect of the Contract Month in which the relevant matters were revealed by City investigations or, to the extent that the City is unable to make any further deductions from the Monthly Service Payment in respect of that Contract Month by virtue of Section 1.2 of Part C of this Schedule 20, may be carried forward and deducted from Monthly Service Payments due in respect of subsequent Contract Months.

2.4 For the purposes of Sections 1.1 and 1.2 of this Part H the relevant circumstances are:

(a) fraudulent action or inaction;

(b) deliberate misrepresentation; or

(c) gross misconduct or incompetence in each case on the part of Project Co or a Project Co Party.

2.5 The provisions of this Part H shall be without prejudice to any rights of the City pursuant to Sections 32, 45 and 60 of the Project Agreement.

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APPENDIX A: ANNUAL SERVICE PAYMENT AND MONTHLY SERVICE PAYMENT INPUTS

Table 1

COLUMN A	COLUMN B	Column C	Column D	COLUMN E
Contract Year	**Capital Payment (not subject to escalation)**	**Maintenance Payment (in Inflation Base Date Prices)**	**SPV Payments (in Inflation Base Date Prices)**	**Price per Vehicle Kilometre (in Inflation Base Date prices)**
1*	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
2	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
3	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
4	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
5	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
6	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
7	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
8	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
9	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.

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10	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
11	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
12	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
13	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
14	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
15	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
16	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
17	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
18	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
19	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
20	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
21	$	As per Table 2 and relevant	$	As per Table 2 and relevant

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		Service Level in effect.		Service Level in effect.
22	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
23	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
24	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
25	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
26	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
27	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
28	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
29	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
30	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.
31*	$	As per Table 2 and relevant Service Level in effect.	$	As per Table 2 and relevant Service Level in effect.

* Contract Year 1 and 31 are partial years; total number of Contract Months equals 360 months.

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Table 2 – Maintenance Payment and Price per Vehicle Kilometre

COLUMN A	COLUMN B	
Service Level	**Maintenance Payment (in Inflation Base Date prices)**	
Service Level 1	$	$
Service Level 2	$	$
Service Level 3	$	$
Service Level 3a	$	$
Service Level 4	$	$
Service Level 5	$	$
Service Level 6	$	$
Service Level 7	$	$
Service Level 8	$	$
Service Level 9	$	$

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Table 3 – Lifecycle Payments

COLUMN A	COLUMN B		
Contract Month *n*	**Contract Month *m***		
1	25-May-18 / 31-May-18		
2	01-Jun-18 / 30-Jun-18		
3	01-Jul-18 / 31-Jul-18		
4	01-Aug-18 / 31-Aug-18		
5	01-Sep-18 / 30-Sep-18		
6	01-Oct-18 / 31-Oct-18		
7	01-Nov-18 / 30-Nov-18		
8	01-Dec-18 / 31-Dec-18		
9	01-Jan-19 / 31-Jan-19		
10	01-Feb-19 / 28-Feb-19		
11	01-Mar-19 / 31-Mar-19		
12	01-Apr-19 / 30-Apr-19		
13	01-May-19 / 31-May-19		
14	01-Jun-19 / 30-Jun-19		
15	01-Jul-19 / 31-Jul-19		
16	01-Aug-19 / 31-Aug-19		
17	01-Sep-19 / 30-Sep-19		
18	01-Oct-19 / 31-Oct-19		
19	01-Nov-19 / 30-Nov-19		
20	01-Dec-19 / 31-Dec-19		
21	01-Jan-20 / 31-Jan-20		
22	01-Feb-20 / 29-Feb-20		
23	01-Mar-20 / 31-Mar-20		
24	01-Apr-20 / 30-Apr-20		
25	01-May-20 / 31-May-20		
26	01-Jun-20 / 30-Jun-20		
27	01-Jul-20 / 31-Jul-20		
28	01-Aug-20 / 31-Aug-20		
29	01-Sep-20 / 30-Sep-20		
30	01-Oct-20 / 31-Oct-20		
31	01-Nov-20 / 30-Nov-20		

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COLUMN A	COLUMN B		
Contract Month *n*	**Contract Month *m***		
32	01-Dec-20 / 31-Dec-20		
33	01-Jan-21 / 31-Jan-21		
34	01-Feb-21 / 28-Feb-21		
35	01-Mar-21 / 31-Mar-21		
36	01-Apr-21 / 30-Apr-21		
37	01-May-21 / 31-May-21		
38	01-Jun-21 / 30-Jun-21		
39	01-Jul-21 / 31-Jul-21		
40	01-Aug-21 / 31-Aug-21		
41	01-Sep-21 / 30-Sep-21		
42	01-Oct-21 / 31-Oct-21		
43	01-Nov-21 / 30-Nov-21		
44	01-Dec-21 / 31-Dec-21		
45	01-Jan-22 / 31-Jan-22		
46	01-Feb-22 / 28-Feb-22		
47	01-Mar-22 / 31-Mar-22		
48	01-Apr-22 / 30-Apr-22		
49	01-May-22 / 31-May-22		
50	01-Jun-22 / 30-Jun-22		
51	01-Jul-22 / 31-Jul-22		
52	01-Aug-22 / 31-Aug-22		
53	01-Sep-22 / 30-Sep-22		
54	01-Oct-22 / 31-Oct-22		
55	01-Nov-22 / 30-Nov-22		
56	01-Dec-22 / 31-Dec-22		
57	01-Jan-23 / 31-Jan-23		
58	01-Feb-23 / 28-Feb-23		
59	01-Mar-23 / 31-Mar-23		
60	01-Apr-23 / 30-Apr-23		
61	01-May-23 / 31-May-23		
62	01-Jun-23 / 30-Jun-23		
63	01-Jul-23 / 31-Jul-23		
64	01-Aug-23 / 31-Aug-23		

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COLUMN A	COLUMN B		
Contract Month *n*	**Contract Month *m***		
65	01-Sep-23 / 30-Sep-23		
66	01-Oct-23 / 31-Oct-23		
67	01-Nov-23 / 30-Nov-23		
68	01-Dec-23 / 31-Dec-23		
69	01-Jan-24 / 31-Jan-24		
70	01-Feb-24 / 29-Feb-24		
71	01-Mar-24 / 31-Mar-24		
72	01-Apr-24 / 30-Apr-24		
73	01-May-24 / 31-May-24		
74	01-Jun-24 / 30-Jun-24		
75	01-Jul-24 / 31-Jul-24		
76	01-Aug-24 / 31-Aug-24		
77	01-Sep-24 / 30-Sep-24		
78	01-Oct-24 / 31-Oct-24		
79	01-Nov-24 / 30-Nov-24		
80	01-Dec-24 / 31-Dec-24		
81	01-Jan-25 / 31-Jan-25		
82	01-Feb-25 / 28-Feb-25		
83	01-Mar-25 / 31-Mar-25		
84	01-Apr-25 / 30-Apr-25		
85	01-May-25 / 31-May-25		
86	01-Jun-25 / 30-Jun-25		
87	01-Jul-25 / 31-Jul-25		
88	01-Aug-25 / 31-Aug-25		
89	01-Sep-25 / 30-Sep-25		
90	01-Oct-25 / 31-Oct-25		
91	01-Nov-25 / 30-Nov-25		
92	01-Dec-25 / 31-Dec-25		
93	01-Jan-26 / 31-Jan-26		
94	01-Feb-26 / 28-Feb-26		
95	01-Mar-26 / 31-Mar-26		
96	01-Apr-26 / 30-Apr-26		
97	01-May-26 / 31-May-26		

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COLUMN A	COLUMN B		
Contract Month *n*	**Contract Month *m***		
98	01-Jun-26 / 30-Jun-26		
99	01-Jul-26 / 31-Jul-26		
100	01-Aug-26 / 31-Aug-26		
101	01-Sep-26 / 30-Sep-26		
102	01-Oct-26 / 31-Oct-26		
103	01-Nov-26 / 30-Nov-26		
104	01-Dec-26 / 31-Dec-26		
105	01-Jan-27 / 31-Jan-27		
106	01-Feb-27 / 28-Feb-27		
107	01-Mar-27 / 31-Mar-27		
108	01-Apr-27 / 30-Apr-27		
109	01-May-27 / 31-May-27		
110	01-Jun-27 / 30-Jun-27		
111	01-Jul-27 / 31-Jul-27		
112	01-Aug-27 / 31-Aug-27		
113	01-Sep-27 / 30-Sep-27		
114	01-Oct-27 / 31-Oct-27		
115	01-Nov-27 / 30-Nov-27		
116	01-Dec-27 / 31-Dec-27		
117	01-Jan-28 / 31-Jan-28		
118	01-Feb-28 / 29-Feb-28		
119	01-Mar-28 / 31-Mar-28		
120	01-Apr-28 / 30-Apr-28		
121	01-May-28 / 31-May-28		
122	01-Jun-28 / 30-Jun-28		
123	01-Jul-28 / 31-Jul-28		
124	01-Aug-28 / 31-Aug-28		
125	01-Sep-28 / 30-Sep-28		
126	01-Oct-28 / 31-Oct-28		
127	01-Nov-28 / 30-Nov-28		
128	01-Dec-28 / 31-Dec-28		
129	01-Jan-29 / 31-Jan-29		
130	01-Feb-29 / 28-Feb-29		

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COLUMN A	COLUMN B		
Contract Month *n*	**Contract Month *m***		
131	01-Mar-29 / 31-Mar-29		
132	01-Apr-29 / 30-Apr-29		
133	01-May-29 / 31-May-29		
134	01-Jun-29 / 30-Jun-29		
135	01-Jul-29 / 31-Jul-29		
136	01-Aug-29 / 31-Aug-29		
137	01-Sep-29 / 30-Sep-29		
138	01-Oct-29 / 31-Oct-29		
139	01-Nov-29 / 30-Nov-29		
140	01-Dec-29 / 31-Dec-29		
141	01-Jan-30 / 31-Jan-30		
142	01-Feb-30 / 28-Feb-30		
143	01-Mar-30 / 31-Mar-30		
144	01-Apr-30 / 30-Apr-30		
145	01-May-30 / 31-May-30		
146	01-Jun-30 / 30-Jun-30		
147	01-Jul-30 / 31-Jul-30		
148	01-Aug-30 / 31-Aug-30		
149	01-Sep-30 / 30-Sep-30		
150	01-Oct-30 / 31-Oct-30		
151	01-Nov-30 / 30-Nov-30		
152	01-Dec-30 / 31-Dec-30		
153	01-Jan-31 / 31-Jan-31		
154	01-Feb-31 / 28-Feb-31		
155	01-Mar-31 / 31-Mar-31		
156	01-Apr-31 / 30-Apr-31		
157	01-May-31 / 31-May-31		
158	01-Jun-31 / 30-Jun-31		
159	01-Jul-31 / 31-Jul-31		
160	01-Aug-31 / 31-Aug-31		
161	01-Sep-31 / 30-Sep-31		
162	01-Oct-31 / 31-Oct-31		
163	01-Nov-31 / 30-Nov-31		

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COLUMN A	COLUMN B		
Contract Month *n*	**Contract Month *m***		
164	01-Dec-31 / 31-Dec-31		
165	01-Jan-32 / 31-Jan-32		
166	01-Feb-32 / 29-Feb-32		
167	01-Mar-32 / 31-Mar-32		
168	01-Apr-32 / 30-Apr-32		
169	01-May-32 / 31-May-32		
170	01-Jun-32 / 30-Jun-32		
171	01-Jul-32 / 31-Jul-32		
172	01-Aug-32 / 31-Aug-32		
173	01-Sep-32 / 30-Sep-32		
174	01-Oct-32 / 31-Oct-32		
175	01-Nov-32 / 30-Nov-32		
176	01-Dec-32 / 31-Dec-32		
177	01-Jan-33 / 31-Jan-33		
178	01-Feb-33 / 28-Feb-33		
179	01-Mar-33 / 31-Mar-33		
180	01-Apr-33 / 30-Apr-33		
181	01-May-33 / 31-May-33		
182	01-Jun-33 / 30-Jun-33		
183	01-Jul-33 / 31-Jul-33		
184	01-Aug-33 / 31-Aug-33		
185	01-Sep-33 / 30-Sep-33		
186	01-Oct-33 / 31-Oct-33		
187	01-Nov-33 / 30-Nov-33		
188	01-Dec-33 / 31-Dec-33		
189	01-Jan-34 / 31-Jan-34		
190	01-Feb-34 / 28-Feb-34		
191	01-Mar-34 / 31-Mar-34		
192	01-Apr-34 / 30-Apr-34		
193	01-May-34 / 31-May-34		
194	01-Jun-34 / 30-Jun-34		
195	01-Jul-34 / 31-Jul-34		
196	01-Aug-34 / 31-Aug-34		

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COLUMN A	COLUMN B		
Contract Month *n*	**Contract Month *m***		
197	01-Sep-34 / 30-Sep-34		
198	01-Oct-34 / 31-Oct-34		
199	01-Nov-34 / 30-Nov-34		
200	01-Dec-34 / 31-Dec-34		
201	01-Jan-35 / 31-Jan-35		
202	01-Feb-35 / 28-Feb-35		
203	01-Mar-35 / 31-Mar-35		
204	01-Apr-35 / 30-Apr-35		
205	01-May-35 / 31-May-35		
206	01-Jun-35 / 30-Jun-35		
207	01-Jul-35 / 31-Jul-35		
208	01-Aug-35 / 31-Aug-35		
209	01-Sep-35 / 30-Sep-35		
210	01-Oct-35 / 31-Oct-35		
211	01-Nov-35 / 30-Nov-35		
212	01-Dec-35 / 31-Dec-35		
213	01-Jan-36 / 31-Jan-36		
214	01-Feb-36 / 29-Feb-36		
215	01-Mar-36 / 31-Mar-36		
216	01-Apr-36 / 30-Apr-36		
217	01-May-36 / 31-May-36		
218	01-Jun-36 / 30-Jun-36		
219	01-Jul-36 / 31-Jul-36		
220	01-Aug-36 / 31-Aug-36		
221	01-Sep-36 / 30-Sep-36		
222	01-Oct-36 / 31-Oct-36		
223	01-Nov-36 / 30-Nov-36		
224	01-Dec-36 / 31-Dec-36		
225	01-Jan-37 / 31-Jan-37		
226	01-Feb-37 / 28-Feb-37		
227	01-Mar-37 / 31-Mar-37		
228	01-Apr-37 / 30-Apr-37		
229	01-May-37 / 31-May-37		

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COLUMN A	COLUMN B		
Contract Month *n*	**Contract Month *m***		
230	01-Jun-37 / 30-Jun-37		
231	01-Jul-37 / 31-Jul-37		
232	01-Aug-37 / 31-Aug-37		
233	01-Sep-37 / 30-Sep-37		
234	01-Oct-37 / 31-Oct-37		
235	01-Nov-37 / 30-Nov-37		
236	01-Dec-37 / 31-Dec-37		
237	01-Jan-38 / 31-Jan-38		
238	01-Feb-38 / 28-Feb-38		
239	01-Mar-38 / 31-Mar-38		
240	01-Apr-38 / 30-Apr-38		
241	01-May-38 / 31-May-38		
242	01-Jun-38 / 30-Jun-38		
243	01-Jul-38 / 31-Jul-38		
244	01-Aug-38 / 31-Aug-38		
245	01-Sep-38 / 30-Sep-38		
246	01-Oct-38 / 31-Oct-38		
247	01-Nov-38 / 30-Nov-38		
248	01-Dec-38 / 31-Dec-38		
249	01-Jan-39 / 31-Jan-39		
250	01-Feb-39 / 28-Feb-39		
251	01-Mar-39 / 31-Mar-39		
252	01-Apr-39 / 30-Apr-39		
253	01-May-39 / 31-May-39		
254	01-Jun-39 / 30-Jun-39		
255	01-Jul-39 / 31-Jul-39		
256	01-Aug-39 / 31-Aug-39		
257	01-Sep-39 / 30-Sep-39		
258	01-Oct-39 / 31-Oct-39		
259	01-Nov-39 / 30-Nov-39		
260	01-Dec-39 / 31-Dec-39		
261	01-Jan-40 / 31-Jan-40		
262	01-Feb-40 / 29-Feb-40		

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COLUMN A	COLUMN B		
Contract Month *n*	**Contract Month *m***		
263	01-Mar-40 / 31-Mar-40		
264	01-Apr-40 / 30-Apr-40		
265	01-May-40 / 31-May-40		
266	01-Jun-40 / 30-Jun-40		
267	01-Jul-40 / 31-Jul-40		
268	01-Aug-40 / 31-Aug-40		
269	01-Sep-40 / 30-Sep-40		
270	01-Oct-40 / 31-Oct-40		
271	01-Nov-40 / 30-Nov-40		
272	01-Dec-40 / 31-Dec-40		
273	01-Jan-41 / 31-Jan-41		
274	01-Feb-41 / 28-Feb-41		
275	01-Mar-41 / 31-Mar-41		
276	01-Apr-41 / 30-Apr-41		
277	01-May-41 / 31-May-41		
278	01-Jun-41 / 30-Jun-41		
279	01-Jul-41 / 31-Jul-41		
280	01-Aug-41 / 31-Aug-41		
281	01-Sep-41 / 30-Sep-41		
282	01-Oct-41 / 31-Oct-41		
283	01-Nov-41 / 30-Nov-41		
284	01-Dec-41 / 31-Dec-41		
285	01-Jan-42 / 31-Jan-42		
286	01-Feb-42 / 28-Feb-42		
287	01-Mar-42 / 31-Mar-42		
288	01-Apr-42 / 30-Apr-42		
289	01-May-42 / 31-May-42		
290	01-Jun-42 / 30-Jun-42		
291	01-Jul-42 / 31-Jul-42		
292	01-Aug-42 / 31-Aug-42		
293	01-Sep-42 / 30-Sep-42		
294	01-Oct-42 / 31-Oct-42		
295	01-Nov-42 / 30-Nov-42		

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COLUMN A	COLUMN B		
Contract Month *n*	**Contract Month *m***		
296	01-Dec-42 / 31-Dec-42		
297	01-Jan-43 / 31-Jan-43		
298	01-Feb-43 / 28-Feb-43		
299	01-Mar-43 / 31-Mar-43		
300	01-Apr-43 / 30-Apr-43		
301	01-May-43 / 31-May-43		
302	01-Jun-43 / 30-Jun-43		
303	01-Jul-43 / 31-Jul-43		
304	01-Aug-43 / 31-Aug-43		
305	01-Sep-43 / 30-Sep-43		
306	01-Oct-43 / 31-Oct-43		
307	01-Nov-43 / 30-Nov-43		
308	01-Dec-43 / 31-Dec-43		
309	01-Jan-44 / 31-Jan-44		
310	01-Feb-44 / 29-Feb-44		
311	01-Mar-44 / 31-Mar-44		
312	01-Apr-44 / 30-Apr-44		
313	01-May-44 / 31-May-44		
314	01-Jun-44 / 30-Jun-44		
315	01-Jul-44 / 31-Jul-44		
316	01-Aug-44 / 31-Aug-44		
317	01-Sep-44 / 30-Sep-44		
318	01-Oct-44 / 31-Oct-44		
319	01-Nov-44 / 30-Nov-44		
320	01-Dec-44 / 31-Dec-44		
321	01-Jan-45 / 31-Jan-45		
322	01-Feb-45 / 28-Feb-45		
323	01-Mar-45 / 31-Mar-45		
324	01-Apr-45 / 30-Apr-45		
325	01-May-45 / 31-May-45		
326	01-Jun-45 / 30-Jun-45		
327	01-Jul-45 / 31-Jul-45		
328	01-Aug-45 / 31-Aug-45		

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COLUMN A	COLUMN B		
Contract Month *n*	**Contract Month *m***		
329	01-Sep-45 / 30-Sep-45		
330	01-Oct-45 / 31-Oct-45		
331	01-Nov-45 / 30-Nov-45		
332	01-Dec-45 / 31-Dec-45		
333	01-Jan-46 / 31-Jan-46		
334	01-Feb-46 / 28-Feb-46		
335	01-Mar-46 / 31-Mar-46		
336	01-Apr-46 / 30-Apr-46		
337	01-May-46 / 31-May-46		
338	01-Jun-46 / 30-Jun-46		
339	01-Jul-46 / 31-Jul-46		
340	01-Aug-46 / 31-Aug-46		
341	01-Sep-46 / 30-Sep-46		
342	01-Oct-46 / 31-Oct-46		
343	01-Nov-46 / 30-Nov-46		
344	01-Dec-46 / 31-Dec-46		
345	01-Jan-47 / 31-Jan-47		
346	01-Feb-47 / 28-Feb-47		
347	01-Mar-47 / 31-Mar-47		
348	01-Apr-47 / 30-Apr-47		
349	01-May-47 / 31-May-47		
350	01-Jun-47 / 30-Jun-47		
351	01-Jul-47 / 31-Jul-47		
352	01-Aug-47 / 31-Aug-47		
353	01-Sep-47 / 30-Sep-47		
354	01-Oct-47 / 31-Oct-47		
355	01-Nov-47 / 30-Nov-47		
356	01-Dec-47 / 31-Dec-47		
357	01-Jan-48 / 31-Jan-48		
358	01-Feb-48 / 29-Feb-48		
359	01-Mar-48 / 31-Mar-48		
360	01-Apr-48 / 30-Apr-48		
361	01-May-48 / 31-May-48		

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APPENDIX B: DEDUCTION FACTORS

VEHICLE KILOMETRES AVAILABILITY FAILURE DEDUCTION - TABLE 1 (APPLICABLE TO SERVICE LEVELS 1-3A)

Availability Ratio	Deduction Factor	Availability Ratio	Deduction Factor	Availability Ratio	Deduction Factor
100.0%		94.9%		89.8%	
99.9%		94.8%		89.7%	
99.8%		94.7%		89.6%	
99.7%		94.6%		89.5%	
99.6%		94.5%		89.4%	
99.5%		94.4%		89.3%	
99.4%		94.3%		89.2%	
99.3%		94.2%		89.1%	
99.2%		94.1%		89.0%	
99.1%		94.0%		88.9%	
99.0%		93.9%		88.8%	
98.9%		93.8%		88.7%	
98.8%		93.7%		88.6%	
98.7%		93.6%		88.5%	
98.6%		93.5%		88.4%	
98.5%		93.4%		88.3%	
98.4%		93.3%		88.2%	
98.3%		93.2%		88.1%	
98.2%		93.1%		88.0%	
98.1%		93.0%		87.9%	
98.0%		92.9%		87.8%	
97.9%		92.8%		87.7%	
97.8%		92.7%		87.6%	
97.7%		92.6%		87.5%	
97.6%		92.5%		87.4%	
97.5%		92.4%		87.3%	
97.4%		92.3%		87.2%	
97.3%		92.2%		87.1%	
97.2%		92.1%		87.0%	
97.1%		92.0%		86.9%	
97.0%		91.9%		86.8%	
96.9%		91.8%		86.7%	
96.8%		91.7%		86.6%	
96.7%		91.6%		86.5%	
96.6%		91.5%		86.4%	
96.5%		91.4%		86.3%	
96.4%		91.3%		86.2%	
96.3%		91.2%		86.1%	
96.2%		91.1%		86.0%	
96.1%		91.0%		85.9%	
96.0%		90.9%		85.8%	
95.9%		90.8%		85.7%	
95.8%		90.7%		85.6%	
95.7%		90.6%		85.5%	
95.6%		90.5%		85.4%	
95.5%		90.4%		85.3%	
95.4%		90.3%		85.2%	
95.3%		90.2%		85.1%	
95.2%		90.1%		85.0%	
95.1%		90.0%		84.9%	
95.0%		89.9%		84.8%	

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VEHICLE KILOMETRES AVAILABILITY FAILURE DEDUCTION - TABLE 1 (CONT.)

Availability Ratio	Deduction Factor
84.7%	
84.6%	
84.5%	
84.4%	
84.3%	
84.2%	
84.1%	
84.0%	
83.9%	
83.8%	
83.7%	
83.6%	
83.5%	
83.4%	
83.3%	
83.2%	
83.1%	
83.0%	
82.9%	
82.8%	
82.7%	
82.6%	
82.5%	
82.4%	
82.3%	
82.2%	
82.1%	
82.0%	
81.9%	
81.8%	
81.7%	
81.6%	
81.5%	
81.4%	
81.3%	
81.2%	
81.1%	
81.0%	
80.9%	
80.8%	
80.7%	
80.6%	
80.5%	
80.4%	
80.3%	
80.2%	
80.1%	
80.0%	
79.9%	
79.8%	
79.7%	

Availability Ratio	Deduction Factor
79.6%	
79.5%	
79.4%	
79.3%	
79.2%	
79.1%	
79.0%	
78.9%	
78.8%	
78.7%	
78.6%	
78.5%	
78.4%	
78.3%	
78.2%	
78.1%	
78.0%	
77.9%	
77.8%	
77.7%	
77.6%	
77.5%	
77.4%	
77.3%	
77.2%	
77.1%	
77.0%	
76.9%	
76.8%	
76.7%	
76.6%	
76.5%	
76.4%	
76.3%	
76.2%	
76.1%	
76.0%	
75.9%	
75.8%	
75.7%	
75.6%	
75.5%	
75.4%	
75.3%	
75.2%	
75.1%	
75.0%	
74.9%	
74.8%	
74.7%	
74.6%	

Availability Ratio	Deduction Factor
74.2%	
74.1%	
74.0%	
73.9%	
73.8%	
73.7%	
73.6%	
73.5%	
73.4%	
73.3%	
73.2%	
73.1%	
73.0%	
72.9%	
72.8%	
72.7%	
72.6%	
72.5%	
72.4%	
72.3%	
72.2%	
72.1%	
72.0%	
71.9%	
71.8%	
71.7%	
71.6%	
71.5%	
71.4%	
71.3%	
71.2%	
71.1%	
71.0%	
70.9%	
70.8% or below	

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TABLE 2 - VEHICLE KILOMETRES AVAILABILITY FAILURE DEDUCTION (APPLICABLE TO SERVICE LEVELS 4-9)

Availability Ratio	Deduction Factor	Availability Ratio	Deduction Factor	Availability Ratio	Deduction Factor
100.0%		94.9%		89.8%	
99.9%		94.8%		89.7%	
99.8%		94.7%		89.6%	
99.7%		94.6%		89.5%	
99.6%		94.5%		89.4%	
99.5%		94.4%		89.3%	
99.4%		94.3%		89.2%	
99.3%		94.2%		89.1%	
99.2%		94.1%		89.0%	
99.1%		94.0%		88.9%	
99.0%		93.9%		88.8%	
98.9%		93.8%		88.7%	
98.8%		93.7%		88.6%	
98.7%		93.6%		88.5%	
98.6%		93.5%		88.4%	
98.5%		93.4%		88.3%	
98.4%		93.3%		88.2%	
98.3%		93.2%		88.1%	
98.2%		93.1%		88.0%	
98.1%		93.0%		87.9%	
98.0%		92.9%		87.8%	
97.9%		92.8%		87.7%	
97.8%		92.7%		87.6%	
97.7%		92.6%		87.5%	
97.6%		92.5%		87.4%	
97.5%		92.4%		87.3%	
97.4%		92.3%		87.2%	
97.3%		92.2%		87.1%	
97.2%		92.1%		87.0%	
97.1%		92.0%		86.9%	
97.0%		91.9%		86.8%	
96.9%		91.8%		86.7%	
96.8%		91.7%		86.6%	
96.7%		91.6%		86.5%	
96.6%		91.5%		86.4%	
96.5%		91.4%		86.3%	
96.4%		91.3%		86.2%	
96.3%		91.2%		86.1%	
96.2%		91.1%		86.0%	
96.1%		91.0%		85.9%	
96.0%		90.9%		85.8%	
95.9%		90.8%		85.7%	
95.8%		90.7%		85.6%	
95.7%		90.6%		85.5%	
95.6%		90.5%		85.4%	
95.5%		90.4%		85.3%	
95.4%		90.3%		85.2%	
95.3%		90.2%		85.1%	
95.2%		90.1%		85.0%	
95.1%		90.0%		84.9%	
95.0%		89.9%		84.8%	

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VEHICLE KILOMETRES AVAILABILITY FAILURE DEDUCTION - TABLE 2 (CONT.)

Availability Ratio	Deduction Factor
84.7%	
84.6%	
84.5%	
84.4%	
84.3%	
84.2%	
84.1%	
84.0%	
83.9%	
83.8%	
83.7%	
83.6%	
83.5%	
83.4%	
83.3%	
83.2%	
83.1%	
83.0%	
82.9%	
82.8%	
82.7%	
82.6%	
82.5%	
82.4%	
82.3%	
82.2%	
82.1%	
82.0%	
81.9%	
81.8%	
81.7%	
81.6%	
81.5%	
81.4%	
81.3%	
81.2%	
81.1%	
81.0%	
80.9%	
80.8%	
80.7%	
80.6%	
80.5%	
80.4%	
80.3%	
80.2%	
80.1%	
80.0%	
79.9%	
79.8%	
79.7%	

Availability Ratio	Deduction Factor
79.6%	
79.5%	
79.4%	
79.3%	
79.2%	
79.1%	
79.0%	
78.9%	
78.8%	
78.7%	
78.6%	
78.5%	
78.4%	
78.3%	
78.2%	
78.1%	
78.0%	
77.9%	
77.8%	
77.7%	
77.6%	
77.5%	
77.4%	
77.3%	
77.2%	
77.1%	
77.0%	
76.9%	
76.8%	
76.7%	
76.6%	
76.5%	
76.4%	
76.3%	
76.2%	
76.1%	
76.0%	
75.9%	
75.8%	
75.7%	
75.6%	
75.5%	
75.4%	
75.3%	
75.2%	
75.1%	
75.0%	
74.9%	
74.8%	
74.7%	
74.6%	

Availability Ratio	Deduction Factor
74.5%	
74.4%	
74.3%	
74.2%	
74.1%	
74.0%	
73.9%	
73.8%	
73.7%	
73.6%	
73.5%	
73.4%	
73.3%	
73.2%	
73.1%	
73.0%	
72.9%	
72.8%	
72.7%	
72.6%	
72.5%	
72.4%	
72.3%	
72.2%	
72.1%	
72.0%	
71.9%	
71.8%	
71.7%	
71.6%	
71.5%	
71.4%	
71.3%	
71.2%	
71.1%	
71.0%	
70.9%	
70.8% or below	

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TABLE 3 - STATION AVAILABILITY FAILURE DEDUCTION (APPLICABLE TO SERVICE LEVELS 1-3A)

Availability Ratio	Deduction Factor	Availability Ratio	Deduction Factor	Availability Ratio	Deduction Factor
100.0%		94.9%		89.8%	
99.9%		94.8%		89.7%	
99.8%		94.7%		89.6%	
99.7%		94.6%		89.5%	
99.6%		94.5%		89.4%	
99.5%		94.4%		89.3%	
99.4%		94.3%		89.2%	
99.3%		94.2%		89.1%	
99.2%		94.1%		89.0%	
99.1%		94.0%		88.9%	
99.0%		93.9%		88.8%	
98.9%		93.8%		88.7%	
98.8%		93.7%		88.6%	
98.7%		93.6%		88.5%	
98.6%		93.5%		88.4%	
98.5%		93.4%		88.3%	
98.4%		93.3%		88.2%	
98.3%		93.2%		88.1%	
98.2%		93.1%		88.0%	
98.1%		93.0%		87.9%	
98.0%		92.9%		87.8%	
97.9%		92.8%		87.7%	
97.8%		92.7%		87.6%	
97.7%		92.6%		87.5%	
97.6%		92.5%		87.4%	
97.5%		92.4%		87.3%	
97.4%		92.3%		87.2%	
97.3%		92.2%		87.1%	
97.2%		92.1%		87.0%	
97.1%		92.0%		86.9%	
97.0%		91.9%		86.8%	
96.9%		91.8%		86.7%	
96.8%		91.7%		86.6%	
96.7%		91.6%		86.5%	
96.6%		91.5%		86.4%	
96.5%		91.4%		86.3%	
96.4%		91.3%		86.2%	
96.3%		91.2%		86.1%	
96.2%		91.1%		86.0%	
96.1%		91.0%		85.9%	
96.0%		90.9%		85.8%	
95.9%		90.8%		85.7%	
95.8%		90.7%		85.6%	
95.7%		90.6%		85.5%	
95.6%		90.5%		85.4%	
95.5%		90.4%		85.3%	
95.4%		90.3%		85.2%	
95.3%		90.2%		85.1%	
95.2%		90.1%		85.0% or below	
95.1%		90.0%			
95.0%		89.9%			

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TABLE 4 - STATION AVAILABILITY FAILURE DEDUCTION (APPLICABLE TO SERVICE LEVELS 4-9)

Availability Ratio	Deduction Factor	Availability Ratio	Deduction Factor	Availability Ratio	Deduction Factor
100.0%		94.9%		89.8%	
99.9%		94.8%		89.7%	
99.8%		94.7%		89.6%	
99.7%		94.6%		89.5%	
99.6%		94.5%		89.4%	
99.5%		94.4%		89.3%	
99.4%		94.3%		89.2%	
99.3%		94.2%		89.1%	
99.2%		94.1%		89.0%	
99.1%		94.0%		88.9%	
99.0%		93.9%		88.8%	
98.9%		93.8%		88.7%	
98.8%		93.7%		88.6%	
98.7%		93.6%		88.5%	
98.6%		93.5%		88.4%	
98.5%		93.4%		88.3%	
98.4%		93.3%		88.2%	
98.3%		93.2%		88.1%	
98.2%		93.1%		88.0%	
98.1%		93.0%		87.9%	
98.0%		92.9%		87.8%	
97.9%		92.8%		87.7%	
97.8%		92.7%		87.6%	
97.7%		92.6%		87.5%	
97.6%		92.5%		87.4%	
97.5%		92.4%		87.3%	
97.4%		92.3%		87.2%	
97.3%		92.2%		87.1%	
97.2%		92.1%		87.0%	
97.1%		92.0%		86.9%	
97.0%		91.9%		86.8%	
96.9%		91.8%		86.7%	
96.8%		91.7%		86.6%	
96.7%		91.6%		86.5%	
96.6%		91.5%		86.4%	
96.5%		91.4%		86.3%	
96.4%		91.3%		86.2%	
96.3%		91.2%		86.1%	
96.2%		91.1%		86.0%	
96.1%		91.0%		85.9%	
96.0%		90.9%		85.8%	
95.9%		90.8%		85.7%	
95.8%		90.7%		85.6%	
95.7%		90.6%		85.5%	
95.6%		90.5%		85.4%	
95.5%		90.4%		85.3%	
95.4%		90.3%		85.2%	
95.3%		90.2%		85.1%	
95.2%		90.1%		85.0% or below	
95.1%		90.0%			
95.0%		89.9%			

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APPENDIX C: FAILURE POINTS

Section 1. Failure Points Applicable to Vehicle Kilometres Availability Failures

1.1 Failure Points shall be awarded in each Contract Month based on the Aggregate Vehicle Kilometres Availability Ratio calculated for that Contract Month, in accordance with the table, below.

Aggregate Vehicle Kilometres Availability Ratio for Contract Month *n*	Failure Points Awarded for Contract Month *n*
98.0% and above	
97.0% - 97.9%	
96.0% - 96.9%	
95.0% - 95.9%	
94.0% - 94.9%	
93.0% - 93.9%	
92.0% - 92.9%	
91.0% - 91.9%	
90.0% - 90.9%	
89.0% - 89.9%	
88.0% - 88.9%	
87.0% - 87.9%	
86.0% - 86.9%	
85.0% - 85.9%	
Below 84.9%%	

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Section 2. Failure Points Applicable to System Events

2.1 Failure Points shall be awarded in each Contract Month based on any System Events occurring during that Contract Month, in accordance with the table, below. The maximum aggregate amount of Failure Points to be awarded in respect of System Events for any one day shall be.

System Event	Failure Points Applied
On any single Weekday during a Contract Month, the Aggregate Vehicle Kilometres Availability Ratio for either (a) morning Peak Period service (06:30 to 09:00) or (b) afternoon Peak Period service (14:45 to 18:00) is less than %.	per occurrence. For clarity, each Peak Period which fails to meet the % service standard shall result in awarding Failure Points, such that Project Co could be awarded Failure Points in respect of morning Peak Period service and a further in respect of afternoon Peak Period service.
On any single day during a Contract Month, the Aggregate Vehicle Kilometres Availability Ratio for that day is less than %	per occurrence.

Section 3. Failure Points Applicable to Station Availability Failures

3.1 Failure Points shall be awarded in each Contract Month based on the Aggregate Station Availability Ratio calculated for that Contract Month, in accordance with the table, below.

Aggregate Station Availability Ratio for Contract Month *n*	Failure Points Awarded for Contract Month *n*
98.0% - 99.0%	
97.0% - 97.9%	
96.0% - 96.9%	
95.0% - 95.9%	
94.0% - 94.9%	
93.0% - 93.9%	
92.0% - 92.9%	
91.0% - 91.9%	

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Aggregate Station Availability Ratio for Contract Month *n*	Failure Points Awarded for Contract Month *n*
90.0% - 90.9%	
89.0% - 89.9%	
88.0% - 88.9%	
87.0% - 87.9%	
86.0% - 86.9%	
85.0% - 85.9%	
Below 84.9%%	

Section 4. Failure Points Applicable to Quality Failures and Service Failures in respect of Service Levels 1-3:

Category	FPs	Application
Minor Quality Failure		Per Quality Failure
Medium Quality Failure		
Major Quality Failure		
Minor Service Failure		Per Service Failure
Medium Service Failure		
Major Service Failure		

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Section 5. Failure Points Applicable to Quality Failures and Service Failures in respect of Service Levels 3a-9:

Table A - General

Category	FPs	Application
Minor Quality Failure		Per Quality Failure
Medium Quality Failure		
Major Quality Failure		
Minor Service Failure		Per Service Failure
Medium Service Failure		
Major Service Failure		

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APPENDIX D: STATION GROUPS

Group 1 Stations	Group 2 Stations	Group 3 Stations
• Tunney's Pasture • Downtown West • Downtown East • Rideau Centre • Hurdman • Blair • Lincoln Fields Station • Baseline Station • Bayshore Station • Moodie Station • Place d'Orleans Station • Trim Station	• Bayview • Campus • St. Laurent • Iris Station • Pinecrest Station • Montreal Road Station • Jeanne d'Arc Station	• Lebreton • Lees • Train Station • Cyrville • Westboro Station • Dominion Station • Cleary Station • New Orchard Station • Queensview Station • Orleans Boulevard Station

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SCHEDULE 21

[Intentionally Deleted]

SCHEDULE 22

VARIATION PROCEDURE

1. VARIATIONS

1.1 Definitions

(a) The following terms shall have the following meanings:

(i) "**City Work**" has the meaning given in Section 1.7(a) of this Schedule 22.

(ii) "**Direct Cost**" has the meaning given in Appendix A of this Schedule 22.

(iii) "**Estimate**" has the meaning given in Section 1.4(a) of this Schedule 22.

(iv) "**Project Co Variation Notice**" has the meaning given in Section 2.1(a) of this Schedule 22.

(v) "**Variation**" means a variation, addition, reduction, substitution, omission, modification, deletion, removal or other change to the whole or any part of the Project Scope, including in relation to the whole or any part of the Highway Work, the Works or the Maintenance Services.

(vi) "**Variation Confirmation**" has the meaning given in Section 1.8(a)(ii) of this Schedule 22.

(vii) "**Variation Directive**" means a written instruction which is issued on a form designated as a "Variation Directive Form" and signed by the City Representative directing Project Co to immediately proceed with a Variation pending the finalization and issuance of a Variation Confirmation for that Variation.

(viii) "**Variation Enquiry**" has the meaning given in Section 1.3(a) of this Schedule 22.

1.2 General

(a) The City has the right from time to time to propose and require Project Co to carry out and implement a Variation, including those that may be recommended by the Works Committee pursuant to Section 11.2(b)(viii), or the Maintenance Committee pursuant to Section 12.2(b)(v), of the Project Agreement, and any such Variation shall be subject to the provisions of this Schedule 22, provided that the City shall not be permitted to withdraw a Variation Enquiry (nor will a Variation Enquiry be deemed to have been withdrawn) with respect to those circumstances specified in the Project Agreement for which the City is obligated to proceed with a Variation.

(b) The City shall be obligated to proceed with a Variation in certain circumstances specified in this Project Agreement, and any such Variation shall be subject to the provisions of this Schedule 22.

(c) Project Co will not be entitled to any payment, compensation or extension of time for a Variation except to the extent provided in a Variation Confirmation or Variation Directive in accordance with this Schedule 22.

1.2A Variations re: Highway Work

(a) The City, through the Consultant, without invalidating this Project Agreement, may make Variations in the Scope of the Highway Work consisting of additions, deletions, or other revisions to the Highway Work by Variation Confirmation or Variation Directive.

(b) Project Co shall not perform a Variation in the Scope of the Highway Work without a Variation Confirmation or Variation Directive. This requirement is of the essence and it is the express intention of the parties that any claims by Project Co for a change in the Highway Milestone Payment and/or Highway Contract Time shall be barred unless there has been strict compliance with the requirements of this Schedule 22 except to the extent otherwise permitted under Sections 40.2 or 41.2 of the Project Agreement. No course of conduct or dealing between the parties, no express or implied acceptance of alteration or additions to the Highway Work and no claims that the City has been unjustly enriched by any alteration or addition to the Highway Work, whether in fact there is any such unjust enrichment or not, shall be the basis of a claim for additional payment under the Project Agreement or a claim for any extension of the Highway Contract Time.

(c) Supplemental Instructions are subject to the provisions of the Contract Documents and will not result in a Variation Confirmation or a Variation Directive. Any actions taken by Project Co in response to such instructions are at Project Co's risk and included in the Highway Milestone Payment and in the Highway Contract Time.

(d) Any adjustment to the Highway Contract Time shall only be to the extent that the critical path of the Highway Construction Schedule is affected by the change to the Highway Work and Project Co shall not be entitled to claim any ownership of the Schedule Cushion.

(e) If there is an increase or a decrease in the Cost of the Highway Financing as a result of a Variation Confirmation, the Highway Milestone Payment and the Highway Final Payment shall be increased or decreased such that the total increase or decrease to the Highway Milestone Payment and the Highway Final Payment is equal to the increase or decrease to the Cost of the Highway Financing. Project Co shall provide the calculation of the increase or decrease in the Cost of the Highway Financing, together with a certificate of the Lenders verifying such calculation. Where the increase in the Cost of the Highway Financing includes breakage costs, but the impact of the Variation Confirmation on the Cost of the Highway Financing could also be accommodated without incurring breakage costs, calculations for both options shall be provided to the City, together with a certificate of the Lenders addressed to Project Co (which will

expressly provide that the certificate may be relied upon by the City) verifying such calculations. The City shall, in its Discretion, within 5 Business Days of receiving such certificate from the Lenders, select its preferred option by providing written notice to Project Co and the Lenders. For greater certainty, the increases or decreases in the Cost of the Highway Financing shall be calculated in a commercially reasonable manner and in accordance with the Lenders' standard banking practices and the Lending Agreements, and without regard to the identity of the party paying such costs and expenses and, with respect to any swap breakage costs or gains, such costs or gains shall be calculated in accordance with standard market practices. The City may, in its Discretion, elect to apply any portion of the Schedule Cushion to any extension of the Highway Contract Time otherwise determined under a Variation Confirmation, with the result that such extension of the Highway Contract Time shall be reduced or eliminated, as the case may be, by the number of days of the Schedule Cushion that the City has elected to apply, and the determination of the increase in the Cost of the Highway Financing associated with such Variation Confirmation shall be recalculated based on the remaining extension of the Highway Contract Time, if any, under such Variation Confirmation after such application by the City of the Schedule Cushion. If a Variation Confirmation gives rise to a net benefit to Project Co through a reduction of the Cost of the Highway Financing, then Project Co shall pay any net benefit received by Project Co to the City.

(f) If the City requires Project Co to proceed with a Variation in the Scope of the Highway Work prior to the City and Project Co agreeing upon the adjustment in the Highway Milestone Payment and the Highway Final Payment and in the Highway Contract Time, the City, through the Consultant, shall issue a Variation Directive in accordance with Section 1.12.

(g) A Variation Directive in respect of the Highway Work can only be used by the City to direct a Variation in the Scope of the Highway Work which is within the general scope of the Contract Documents.

(h) Upon receipt of a Variation Directive, Project Co shall proceed promptly with the Variation in the Scope of the Highway Work, in which case, any adjustment to the Highway Milestone Payment and Highway Final Payment shall be determined as set forth in Section 1.12.

(i) If the City and Project Co do not reach agreement on the cost of the Variation, the adjustment in the Highway Contract Time, or in the method of determining them, the adjustment shall be referred to the Consultant for initial determination.

(j) If at any time after the commencement of the Highway Work directed by a Variation Directive, the City and Project Co reach agreement on the cost of the Variation and the adjustment to the Highway Contract Time, this agreement shall be recorded in a Variation Confirmation signed by the City and Project Co.

(k) The Consultant shall copy the Lenders' Agent on all Variation Confirmations, Variation Directives and Supplemental Instructions that it issues on behalf of the City in respect of Highway Work.

1.3 Variation Enquiry

(a) If the City proposes or is obligated pursuant to the terms of this Project Agreement or Applicable Law to initiate a Variation it shall deliver to Project Co a written notice of the proposed Variation (a "**Variation Enquiry**").

(b) A Variation Enquiry shall:

(i) describe the proposed Variation with sufficient detail to enable Project Co to prepare a detailed Estimate;

(ii) in the event that the proposed Variation will require a Capital Expenditure, state whether the City intends to pay for the Variation by way of lump sum payment or payments, adjustment to the Monthly Service Payments (and, if applicable, with a request for Project Co to obtain financing for all or part of the Variation), or a combination thereof; and

(iii) provide a preliminary indication of any provisions of this Project Agreement (including the Output Specifications or the Project Co Proposal Extracts) that will be affected by the proposed Variation, as well as the amendments to this Project Agreement (including the Output Specifications or the Project Co Proposal Extracts) that may be necessary to accommodate the Variation.

1.4 Delivery of Estimate

(a) As soon as practicable and in any event within 15 Business Days after receipt of a Variation Enquiry, or such longer period as the Parties agree acting reasonably, Project Co shall deliver its detailed breakdown, estimate and other information (an "**Estimate**") prepared in accordance with and meeting the requirements of Section 1.6.

1.5 Project Co Grounds for Objection

(a) Project Co may only refuse to deliver an Estimate if Project Co can demonstrate to the City's satisfaction, acting reasonably, within the period for delivery of an Estimate specified or agreed pursuant to Section 1.4(a), that:

(i) the implementation of the Variation would materially and adversely affect the health and safety of any person;

(ii) the implementation of the Variation would:

(A) infringe Applicable Law;

(B) cause to be revoked any of the existing Permits, Licences or Approvals required by Project Co to perform the activities within the Project Scope, and any such Permit, Licence or Approval is not, using commercially reasonable efforts, capable of amendment or renewal; or

(C) require any new Permits, Licences or Approvals for Project Co to perform the activities within the Project Scope, any of which will not, using commercially reasonable efforts by Project Co or the City, as applicable, be obtainable;

(iii) the proposed Variation would have a material and adverse effect on performance of the activities within the Project Scope (except those activities within the Project Scope which have been specified as requiring amendment in the Variation Enquiry) in a manner not compensated pursuant to this Schedule 22;

(iv) the implementation of the Variation would be a departure from Good Industry Practice (Works) or Good Industry Practice (Highway);

(v) the City does not have the legal power or capacity to require the Variation to be implemented or to do anything envisaged by this Schedule 22 in respect of or in connection with the Variation;

(vi) the Variation would, if implemented, result in a change in the essential nature of the System or the Highway, as applicable;

(vii) the Variation Enquiry does not comply with the requirements of Section 1.3 (including a failure to include adequate information therein to enable Project Co to prepare an Estimate in respect thereof);

(viii) in the case of a Variation relating to the Works or the Highway Work, the time specified for commencement and/or completion of such Variation cannot be achieved by Project Co despite commercially reasonable efforts; or

(ix) in the case of a Variation relating to the Maintenance Services, the time specified for implementation of such Variation cannot be achieved by Project Co despite commercially reasonable efforts.

(b) If Project Co refuses to provide an Estimate on the grounds set out in Section (a), Project Co shall, within the period for delivery of an Estimate specified or agreed pursuant to Section 1.4(a), deliver to the City a written notice specifying the grounds upon which Project Co rejects the Variation and the details thereof.

1.6 Estimate Requirements

(a) Unless the City in a Variation Enquiry requires only specified limited information, each Estimate shall include the following information, sufficient to demonstrate to the City's reasonable satisfaction:

(i) the steps Project Co will take to implement the Variation, in such detail as is reasonable and appropriate in the circumstances;

(ii) any impact on the Scheduled Milestone Acceptance Dates, the Scheduled Substantial Completion Date and the Required Revenue Service Availability

Date, the Highway Substantial Completion Date and any other schedule impact on the provision of the System or the Highway, and completion of the Design and Construction Works (including for certainty, any impact of the proposed Variation after taking into consideration other Variations);

(iii) any impact on the performance of the Project Scope and any other impact on this Project Agreement (including for certainty, any impact of the proposed Variation after taking into consideration other Variations);

(iv) any impact on expected usage of utilities, including those identified in Schedule 20 – Payment Mechanism, for the current Contract Year and subsequent Contract Years;

(v) any amendments to this Project Agreement (including Schedule 20 – Payment Mechanism) or any Project Document required as a consequence of the Variation, the objective of such amendments being to ensure that (save for the obligation of the City to make payments or altered payments in respect of the Variation) the Parties are in no better and no worse position in relation to the Project than they would have been in if the Variation had not been implemented and, in particular, that there will be no material adverse change to the risk profile of the Project as a result of the Variation;

(vi) any impact on the Direct Costs of Project Co and each Subcontractor, including:

(A) any Capital Expenditure that will be incurred, reduced or avoided and the impact on Project Co's cash flows from incurring, reducing or avoiding such costs (whether financed by Project Co or the City); and

(B) any other costs that will be incurred, reduced or avoided and the impact on Project Co's cash flows from incurring, reducing or avoiding such costs;

(vii) either:

(A) a confirmation that the proposed Variation will not affect Project Co's existing financing or that Project Co's existing financing is adequate to implement the Variation; or

(B) if new or additional financing is required to implement the Variation, an indication as to the availability of such new or additional financing and the cost and terms of such new or additional financing;

(viii) Project Co's confirmation that the projected internal rate of return on any additional equity capital required to finance the Variation will be the Base Case Equity IRR;

(ix) Project Co's preliminary indication of the potential increase or decrease, if any, of the Monthly Service Payments, with such amount calculated by reference to the

relevant parts of the Financial Model to demonstrate the impact of the proposed Variation;

(x) any Permits, Licences and Approvals that must be obtained or amended for the Variation to be implemented, and the latest date by which Project Co must receive a Variation Confirmation and Project Co or the City, as applicable, must obtain or amend such Permits, Licences and Approvals for the Estimate to remain valid; and

(xi) the proposed methods of certification of any construction or operational aspect of the Project Scope required by the Variation if not covered by the provisions of this Project Agreement,

in each case, together with such supporting information and justification as is reasonably required.

(b) In preparing its Estimate, Project Co shall include sufficient information to demonstrate to the City's satisfaction, acting reasonably, that:

(i) Project Co has used or has obliged each Subcontractor (or will oblige any Subcontractor not yet selected) to use commercially reasonable efforts, including the use of competitive quotes or tenders (if appropriate or required by Sections 1.6(c) and 1.6(e)), to minimize any increase in costs and to maximize any reduction in costs;

(ii) except as otherwise set out herein, all costs of Project Co and each Subcontractor are limited to Direct Costs;

(iii) Project Co, the Construction Contractors, the Highway Contractor and the Maintenance Contractor, shall charge only the margins for overhead and profit as set out in Appendix B hereto (such margins each calculated on the basis of the applicable Direct Costs so that no margin of Project Co, the Construction Contractors or the Maintenance Contractor is calculated on any other margin of Project Co, the Construction Contractors or the Maintenance Contractor), and no other margins or mark-ups;

(iv) the margins for overheads and profit as set out in Appendix B hereto as applicable to Project Co's Direct Costs shall only be chargeable on Direct Costs of Project Co, such that Project Co shall not charge any margins on any amounts charged by the Construction Contractors or the Maintenance Contractor;

(v) all costs of providing Project Scope, including Capital Expenditures, reflect:

(A) labour rates applying in the open market to providers of services similar to those required by the Variation;

(B) any and all changes in the Output Specifications, as applicable, arising out of the proposed Variation; and

(C) any and all changes in risk allocation;

(vi) the full amount of any and all expenditures that have been reduced or avoided (including for any Capital Expenditure) and that all such expenditures, including all applicable margins for overhead and profit anticipated to be incurred but for the Variation, have been taken into account and applied in total to reduce the amount of all costs; and

(vii) Project Co has mitigated or will mitigate the impact of the Variation, including on the Works Schedule, the Highway Construction Schedule, the performance of the activities within the Project Scope, the expected usage of utilities, and the Direct Costs to be incurred.

(c) Project Co will use commercially reasonable efforts to obtain the best value for money when procuring any work, services, supplies, materials or equipment required by the Variation and will comply with all Good Industry Practice (Works) or Good Industry Practice (Highway) in relation to any such procurement, to a standard no less than Project Co would apply if all costs incurred were to its own account without recourse to the City, including using commercially reasonable efforts to mitigate such costs.

(d) As soon as practicable, and in any event not more than 15 Business Days after the City receives an Estimate, Project Co and the City shall discuss and seek to agree on the Estimate, including any amendments to the Estimate agreed to by the Parties.

(e) If the City would be required by Applicable Law or any policy applicable to the City to competitively tender any contract in relation to the proposed Variation, the City may require Project Co to seek and evaluate competitive tenders for the proposed Variation in accordance with such Applicable Law or policy.

(f) the City may modify a Variation Enquiry in writing at any time for any matter relating to the Estimate or the discussions in relation thereto, in which case Project Co shall, as soon as practicable and in any event not more than 10 Business Days after receipt of such modification, notify the City in writing of any consequential changes to the Estimate.

(g) If the Parties cannot agree on an Estimate pursuant to Section 1.6(d), then any Dispute will be determined in accordance with Schedule 27 – Dispute Resolution Procedure.

1.7 City's Right to Perform

(a) In respect of the entire System, after Revenue Service Availability, the City shall have the right to perform the subject matter of a proposed Variation ("**City Work**") itself, or through others contracting directly with the City, without compensation to Project Co, except as specifically stated herein.

(b) The City shall indemnify and save Project Co harmless from and against any and all loss or expense which may be suffered, sustained or incurred by Project Co as a direct result

of, in respect of, or arising out of the performance by the City, or any third party, of the City Work, including, without limitation, any loss or expense related to any adverse impacts on the Project Scope.

1.8 Variation Confirmation

(a) As soon as practicable, and in any event within 15 Business Days after the later of the date the Estimate was delivered and the date the Estimate was either agreed to or any Dispute in respect thereof was determined in accordance with Schedule 27 – Dispute Resolution Procedure, the City shall either:

(i) subject to Section 1.2(b) and Section 1.8(e), withdraw the Variation Enquiry by written notice to Project Co; or

(ii) issue a written confirmation (the "**Variation Confirmation**") of the Estimate, including any agreed modifications thereto or any modifications resulting for the determination of a Dispute in respect thereof, which Variation Confirmation may be subject to Project Co obtaining financing pursuant to Section 1.9.

(b) If the City does not issue a Variation Confirmation within such 15 Business Days, then, subject to Section 1.8(e), the Variation Enquiry shall be deemed to have been withdrawn.

(c) Upon the Variation Confirmation being issued, and if applicable upon Project Co obtaining financing pursuant to Section 1.9:

(i) the Parties shall as soon as practicable thereafter do all acts and execute all documents to amend this Project Agreement necessary to implement the Variation, including in respect of any required extension of time and including provision for payment to Project Co as provided in Section 1.10;

(ii) Project Co shall implement the Variation as provided for in the Variation Confirmation, and subject to amendments pursuant to Section 1.8(c)(i), all provisions of this Project Agreement applicable to the Project Scope shall apply to the Project Scope as thereby changed and no additional claim with respect to the Variation or Variation Confirmation will be considered; and

(iii) payment in relation to the Variation shall be as provided for in Section 1.10 and pursuant to any amendments pursuant to Section 1.8(c)(i).

(d) If a Variation Confirmation is subject to Project Co obtaining financing pursuant to Section 1.9, then the Variation Confirmation shall not be effective until:

(i) Project Co obtains such financing acceptable to the City in its Discretion; or

(ii) the City in its Discretion waives such requirement.

(e) Except as hereinafter provided, until a Variation Confirmation has been issued:

(i) the determination of whether or not to proceed with a Variation shall at all times be at the City's Discretion, despite any Dispute or any other matter in relation to a Variation being referred to or determined in accordance with Schedule 27 – Dispute Resolution Procedure; and

(ii) the City may at any time withdraw a Variation Enquiry and, subject to Section 1.8(f), the City shall not be obligated to Project Co in respect of a Variation until such time as the City in its Discretion issues a Variation Confirmation and, if applicable, Project Co has obtained the financing requested by the City or the City has waived such requirement,

provided that the City may not withdraw a Variation Enquiry in circumstances where the City is obligated pursuant to the terms of this Project Agreement to proceed with a Variation. In such circumstances Schedule 27 – Dispute Resolution Procedure shall be employed to finalize any aspects of the Variation which cannot otherwise be agreed to in accordance with the terms of this Schedule 22.

(f) If a Variation Confirmation is not issued for any Variation Enquiry in respect of which Project Co has used commercially reasonable efforts to produce a fair and accurate Estimate, the City shall reimburse Project Co for all Direct Costs reasonably and properly incurred by Project Co in connection with preparing the Estimate.

1.9 Financing

(a) If Project Co in its Estimate confirms that existing financing is not available to pay for the proposed Variation and if the City requests Project Co to obtain financing for a Variation, then a Variation Confirmation may be issued subject to Project Co obtaining financing. In such event, Project Co shall use commercially reasonable efforts to obtain the requested financing on terms satisfactory to Project Co, the Lenders and the City, provided that, prior to the Revenue Service Availability Date, Project Co shall not be required to seek financing from any source other than the Lenders.

(b) If Project Co has used commercially reasonable efforts to obtain the requested financing but has been unable to obtain an offer of financing on terms reasonably satisfactory to Project Co and the City within 60 days of the date that the City issues the Variation Confirmation, then Project Co shall have no further obligation to obtain financing for the Variation and any Variation Confirmation subject to financing shall no longer have any effect unless the City, in its Discretion, waives the requirement for financing or unless the City is obligated to proceed with the Variation pursuant to the terms of this Project Agreement.

(c) If Project Co obtains an offer of financing on terms reasonably satisfactory to Project Co, Project Co shall provide the City with details of such financing, and the City shall, in its Discretion, determine whether Project Co should proceed with such financing. If the City determines that Project Co should not proceed with such financing, then Project Co shall have no further obligation to obtain financing for the Variation and any Variation

Confirmation subject to financing shall no longer have any effect unless the City, in its Discretion, waives the requirement for financing or unless the City is obligated to proceed with the Variation pursuant to the terms of this Project Agreement.

(d) The City may at any time withdraw the requirement for Project Co to use commercially reasonable efforts to obtain financing, after which Project Co shall have no further obligation to obtain financing for the Variation and any Variation Confirmation subject to financing shall no longer have any effect unless the City in its Discretion waives the requirement for financing or unless the City is obligated to proceed with the Variation pursuant to the terms of this Project Agreement.

(e) If the City waives the requirement for financing or if Project Co has no further obligation to obtain financing for the Variation pursuant to Sections 1.9(b), 1.9(c) or 1.9(d), then Project Co shall proceed with the Variation as set out in the Variation Confirmation and the City shall pay for the Variation as provided for in Section 1.10(a)(iii).

1.10 Payment

(a) If a Variation Confirmation has been issued and is not subject to financing, or if the requirement for financing has been satisfied by Project Co or has been waived by the City, a price adjustment for the Variation, as set out in the Estimate and as adjusted and confirmed by the Variation Confirmation, shall be made as follows:

(i) in respect of the Highway Work only, in accordance with Section 1.2A;

(ii) the Monthly Service Payments shall be adjusted as set out in the Variation Confirmation; and

(iii) payment for Capital Expenditures as set out in the Variation Confirmation and not financed by Project Co shall be paid as follows:

(A) the City shall pay such Capital Expenditures in lump sum payments based on a payment schedule agreed by the City and Project Co, acting reasonably, to reflect the amount and timing of the Capital Expenditures to be incurred by Project Co in carrying out the Variation to the extent borne by the City; and

(B) where payment for part of the Variation reflects the carrying out of, or specific progress towards, an element within the Variation, Project Co shall provide satisfactory evidence confirming that the part of the Variation corresponding to each occasion when payment is due under the payment schedule has been duly carried out.

In the event the City and Project Co fail to agree as to the terms of the payment schedule, the payment schedule shall be determined in accordance with Schedule 27 – Dispute Resolution Procedure, provided that, where all or any part of the Variation is being carried out by a third party under a contract with Project Co, subject to the terms of any contract between Project Co and that third party in relation to the implementation of the

Variation having been approved by the City (such approval not to be unreasonably withheld or delayed), the process under Schedule 27 – Dispute Resolution Procedure shall determine a payment schedule which would enable Project Co to be funded by the City in time to make payments to that third party in accordance with its contract with Project Co.

(b) The City shall make payment to Project Co within 20 Business Days of receipt by the City of invoices presented to the City in accordance with the agreed payment schedule accompanied (where applicable) by the relevant evidence that the relevant part of the Variation has been carried out.

(c) Payments by the City in respect of a Variation shall be subject to applicable holdback provisions of the CLA, as applicable.

(d) Project Co shall not be entitled to any amount in excess of the amount of the Estimate confirmed in the Variation Confirmation.

(e) Upon request by Project Co, the City shall provide to Project Co copies of any consent or approval issued by the City in connection with a proposed Variation.

1.11 Reduction in Project Scope

(a) If a Variation involves any reduction in Project Scope which results in savings in Direct Costs to Project Co, such savings shall result in a reduction in the compensation payable to Project Co under this Project Agreement in an amount equal to such reduction in Direct Costs, and Project Co shall compensate the City by way of a reduction in the Monthly Service Payments.

1.12 Variation Directive

(a) If an Estimate is not promptly agreed upon by the City and Project Co or if there is a Dispute in relation thereto or if the City, in its Discretion, requires a Variation to be implemented prior to issuing a Variation Confirmation, then the City may issue a Variation Directive and, following receipt of the Variation Directive:

(i) Project Co shall promptly proceed with the Variation;

(ii) the determination of the valuation and time extensions, if any, required in connection with such Variation, shall be made as soon as reasonably possible after commencement of the implementation of the Variation; and

(iii) pending final determination of the valuation and time extensions, if any, required in connection with such Variation, the Consultant (if such Variation is in respect of matters relating to the Highway Work), the Independent Certifier (if such Variation is in respect of other matters prior to Final Completion) or the City Representative, as applicable and, in each case, acting reasonably, shall determine the valuation in accordance with Appendices A and B hereto, with any Dispute to be determined in accordance with Schedule 27 – Dispute Resolution Procedure,

provided that, the City shall fund all Variations implemented by way of a Variation Directive as provided for in Section 1.10(a)(iii).

2. PROJECT CO VARIATIONS

2.1 General

(a) Project Co shall deliver to the City a written notice (a "**Project Co Variation Notice**") for each Variation proposed by Project Co.

2.2 Project Co Variation Notice

(a) A Project Co Variation Notice shall:

(i) set out details of the proposed Variation in sufficient detail to enable the City to evaluate it in full;

(ii) specify Project Co's reasons for proposing the Variation;

(iii) indicate all reasonably foreseeable implications of the Variation, including whether there are any costs or cost savings to the City, and whether an adjustment to the Monthly Service Payments is required; and

(iv) indicate the latest date by which a Variation Enquiry must be issued.

(b) If the City, in its Discretion, elects to consider the Variation proposed by Project Co, the City may issue to Project Co a Variation Enquiry and the procedure set out in Section 1 will apply.

3. SMALL WORKS

3.1 General

(a) After the Revenue Service Availability Date, Project Co shall carry out all Small Works requested by the City.

(b) If Small Works are requested by the City, Project Co shall, within 10 Business Days of each such request and prior to carrying out the Small Works, provide the City with a price for carrying out the Small Works.

(c) If Project Co's price is accepted by the City, in its Discretion, Project Co shall carry out the Small Works for such price.

(d) the City may at any time, in its Discretion, including if the City does not accept the price proposed by Project Co pursuant to Section 3.1(b), issue a Variation Enquiry or Variation Directive in respect of such Small Works, in which event the provisions of this Schedule 22, other than this Section 3, shall apply.

(e) Project Co's price shall include only its Direct Costs, as calculated in accordance with Appendix A, together with applicable margins as set out in Appendix B.

3.2 Project Co to Minimize Inconvenience

(a) Project Co shall notify the City of the estimated duration of any Small Works so that the City and Project Co can agree upon a convenient time for carrying out the same, so as to minimize and mitigate inconvenience and disruption to the City. Project Co shall use commercially reasonable efforts to minimize the duration of any Small Works.

APPENDIX A

CALCULATION OF DIRECT COSTS

1. DIRECT COSTS

1.1 Subject to Section 1.2 of this Appendix A, the term "Direct Cost" means the cumulative total, without duplication, of only the following amounts, as paid or incurred by Project Co or each Subcontractor, as applicable, to the extent that they specifically relate to, and are attributable to, the Variation under which Project Co is expressly entitled to its Direct Cost and would not otherwise have been incurred:

(i) wages and benefits paid for labour in the direct employ of Project Co or each Subcontractor while performing that part of the activities within the Project Scope on the Site or the Highway Site;

(ii) salaries, wages and benefits of Project Co's or each Subcontractor's personnel when stationed at the Site office or the Highway Site office in whatever capacity employed, or personnel engaged at shops or on the road, in expediting the production or transportation of materials or equipment;

(iii) salaries, wages and benefits of Project Co's or each Subcontractor's office personnel engaged in a technical capacity;

(iv) without limiting Sections 1.1(i), 1.1(ii) and 1.1(iii) of this Appendix A, contributions, assessments or taxes incurred for such items as employment insurance, provincial health insurance, workers' compensation, and Canada Pension Plan, insofar as such costs are based on the wages, salaries, or other remuneration paid by Project Co or any Project Co Party to employees pursuant to Sections 1.1(i), 1.1(ii) and 1.1(iii) of this Appendix A, but excluding for certainty all income taxes on such wages, salaries and other remuneration;

(v) travel and subsistence expenses of Project Co's or each Subcontractor's officers or employees referred to in Sections 1.1(i), 1.1(ii) and 1.1(iii) of this Appendix A;

(vi) the cost of materials (including hand tools which have a retail value of $2,000 or less), products, supplies, equipment, temporary services and facilities, including transportation and maintenance thereof, which are consumed in the performance of the Variation;

(vii) the rental costs of all tools (excluding hand tools which have a retail value of $2,000 or less), machinery, and equipment used in the performance of the Variation, whether rented from or provided by Project Co or others, including installation, minor repair and replacement, dismantling, removal, transportation and delivery costs thereof;

(viii) deposits lost;

(ix) the amount of all Subcontracts with Subcontractors;

(x) the amount paid for any design services;

(xi) the cost of third party quality assurance required by the City, such as independent inspection and testing services;

(xii) charges levied by Governmental Authorities, but excluding fines or penalties not related to the implementation of the Variation;

(xiii) subject to Section 1.1(iv) of this Appendix A, Taxes (and without limiting the obligation of the City to pay HST payable by it under this Project Agreement), but excluding:

(A) HST;

(B) taxes imposed on Project Co or a Subcontractor based on or measured by income or profit or otherwise imposed under the *Income Tax Act* (Canada), the *Income Tax Act* (Ontario) or any similar statute in any other jurisdiction;

(C) capital taxes based on or measured by the capital of Project Co or a Subcontractor;

(D) taxes relating to withholdings on any payments by Project Co or a Subcontractor; and

(E) taxes relating to any business or activity other than the business or activities related to, and conducted for, the purposes of the Project Scope;

(xiv) the cost of removal and disposal of contaminants, hazardous substances, waste products and debris for which Project Co is not responsible under this Project Agreement;

(xv) termination payments which are required under Applicable Law to be made to employees of Project Co reasonably and properly incurred by Project Co arising as a direct result of any Variation reducing the Project Scope, except to the extent that such termination payments are provided for in contracts of employment, agreements or arrangements that were not entered into in the ordinary course of business and on commercial arm's length terms;

(xvi) the cost of financing, including additional financing costs related to any delay caused by the implementation of the Variation;

(xvii) the cost of competitively tendering any contract in relation to the proposed Variation which is required by Applicable Law or any policy applicable to the City;

(xviii) the cost of any additional insurance or performance security required or approved by the City;

(xix) the cost of obtaining all Project Co Permits, Licences and Approvals; and

(xx) reasonable fees and disbursements of Project Co's legal advisors.

1.2 The Direct Cost otherwise payable shall be subject to and limited by the following:

(i) the Direct Cost shall be net of all discounts, rebates and other price reductions and benefits, which relate to the Direct Cost incurred;

(ii) the amount paid for materials, products, supplies and equipment incorporated into the Project Scope as a result of the Variation shall not exceed commercially competitive rates available in the Province of Ontario for such materials, products, supplies and equipment from arms-length third party suppliers;

(iii) the amount paid for any design services included in the Direct Cost, whether provided by Project Co's personnel, consultants, manufacturers or manufacturers' consultants, for hourly paid personnel shall not exceed two times the actual salary received by those personnel (actual salary to be inclusive of all benefits, statutory remittances and holidays), and for salaried personnel, the actual salary per hour shall be calculated by dividing the annual salary (inclusive of all benefits, statutory remittances and holidays) by 2,080 hours;

(iv) the amount paid for machinery and equipment rental costs shall not exceed the prevailing competitive commercial rate for which such equipment or machinery can be obtained in Ottawa, Ontario; and

(v) the Direct Cost shall not include any cost incurred due to the failure on the part of Project Co to exercise reasonable care and diligence in its attention to the prosecution of that part of the Project Scope.

APPENDIX B

APPLICABLE MARGINS

Party	Total Overhead and Profit Margin (as % of Direct Cost)		
	For projects under $100,000	***For projects between $100,000 and $1,000,000***	***For projects over $1,000,000***
Project Co (Own Work)	5%	4%	2.75%
Construction Contractor (Own Work)	15%	10%	8%
Construction Contractor (Subcontracted Work)	10%	7%	5%
Maintenance Contractor (Own Work)	15%	10%	8%
Maintenance Contractor (Subcontracted Work)	10%	7%	5%
Project Co (Own Work) re: Civic Works	2.75%	2.75%	2.75%
Subcontractor (Own Work) re: Civic Works	2.75%	2.75%	2.75%

Subject to Section 1.2A(e) of this Schedule 22, where the City elects to apply all or any portion of the number of days of the Schedule Cushion, the applicable overhead and profit margin shall be reduced by twenty percent (20%) and applied to the entire scope of the applicable Variation.

SCHEDULE 23

COMPENSATION ON TERMINATION

1. DEFINITIONS

1.1 Definitions

The following terms shall have the following meanings:

(a) "**Adjusted Estimated Fair Value**" means the Estimated Fair Value adjusted as follows:

(i) where, in respect of any Contract Month or part of a Contract Month from the Termination Date to the Compensation Date, the Post Termination Maintenance Amount is a negative number, the aggregate amount by which all such negative Post Termination Maintenance Amounts are negative shall be set off against and shall reduce the Estimated Fair Value (whether or not such amounts have been set off by the City pursuant to Section 3.3(f) of this Schedule 23);

(ii) the aggregate of the following amounts shall be deducted, without duplication, from the Estimated Fair Value;

(A) the Post Termination Maintenance Amounts actually paid by the City to Project Co prior to the Compensation Date;

(B) the Tender Costs; and

(C) amounts that the City is entitled to set off or deduct; and

(iii) the aggregate of the following amounts shall be added, without duplication, to the Estimated Fair Value:

(A) all credit balances on any bank accounts held by or on behalf of Project Co on the date that the Estimated Fair Value is calculated; and

(B) any insurance proceeds and other amounts owing to Project Co (and which Project Co is entitled to retain), to the extent not included in Section 1.1(a)(iii)(A) of this Schedule 23,

to the extent that:

(C) Sections 1.1(a)(iii)(A) and 1.1(a)(iii)(B) of this Schedule 23 have not been directly taken into account in calculating the Estimated Fair Value; and

(D) the City has received such amounts in accordance with this Project Agreement.

(b) "**Adjusted Highest Qualifying Tender Price**" means the price offered by the Qualifying Tenderer (if any) with the highest tender price, adjusted as follows:

(i) where, in respect of any Contract Month or part of a Contract Month from the Termination Date to the Compensation Date, the Post Termination Maintenance Amount is a negative number, the aggregate amount by which all such negative Post Termination Maintenance Amounts are negative shall be set off against and shall reduce such highest tender price (whether or not such amounts have been set off by the City pursuant to Section 3.3(f) of this Schedule 23);

(ii) the aggregate of the following amounts shall be deducted, without duplication, from such highest tender price:

(A) the Post Termination Maintenance Amounts actually paid by the City to Project Co prior to the Compensation Date;

(B) the Tender Costs; and

(C) amounts that the City is entitled to set off or deduct; and

(iii) the aggregate of the following amounts shall be added, without duplication, to such highest tender price:

(A) all credit balances on any bank accounts held by or on behalf of Project Co on the date that the highest priced Qualifying Tender is received; and

(B) any insurance proceeds and other amounts owing to Project Co (and which Project Co is entitled to retain), to the extent not included in Section 1.1(b)(iii)(A) of this Schedule 23,

to the extent that:

(C) Sections 1.1(b)(iii)(A) and 1.1(b)(iii)(B) of this Schedule 23 have not been directly taken into account in that Qualifying Tender; and

(D) The City has received such amounts in accordance with this Project Agreement.

(c) "**Compensation Date**" means either:

(i) if Section 3.3 of this Schedule 23 applies, the earlier of:

(A) the date that the New Agreement is entered into; and

(B) the date on which the City pays the Adjusted Highest Qualifying Tender Price to Project Co; or

(ii) if Section 3.4 of this Schedule 23 applies, the date that the Adjusted Estimated Fair Value has been agreed or determined.

(d) "**Discount Rate**" means a rate equal to ((A + B) / C) + D, where:

A = the product of the outstanding principal amount of debt funded under the Lending Agreements on the date of calculation and the rate of interest applicable to such amount as shown in the Financial Model at Financial Close.

B = the product of the Equity Capital as at Financial Close and the Base Case Equity IRR.

C = the sum of the outstanding principal amount of debt funded under the Lending Agreements on the date of calculation and the Equity Capital as at Financial Close.

D = the yield to maturity on a benchmark Government of Canada bond of the same maturity as the average life of the outstanding principal amount of debt funded under the Lending Agreements on the date of calculation, minus the yield to maturity on a benchmark Government of Canada bond of the same maturity as the average life of the outstanding principal amount of debt funded under the Lending Agreements as shown in the Financial Model at Financial Close.

(e) "**Employee Termination Payments**" means termination payments which are required under Applicable Law to be made to employees of Project Co or any Project Co Party as a direct result of terminating this Project Agreement (provided that Project Co or the relevant Project Co Party shall take commercially reasonable steps to mitigate its loss) and provided that, in calculating such amount, no account should be taken of any liabilities and obligations of Project Co or the relevant Project Co Party arising out of:

(i) contracts of employment or other agreements or arrangements entered into by Project Co or the relevant Project Co Party to the extent that such contracts of employment, agreements or arrangements were not entered into in connection with the Project; or

(ii) contracts of employment or other agreements or arrangements entered into by Project Co or the relevant Project Co Party other than in the ordinary course of business and on commercial arm's length terms, save to the extent that amounts would have arisen if such contracts or other agreements or arrangements had been entered into in the ordinary course of business and on commercial arm's length terms.

(f) "**Estimated Fair Value**" means the amount determined in accordance with Section 3.4 of this Schedule 23.

(g) "**City Default Termination Sum**" has the meaning given in Section 2.1(b) of this Schedule 23.

(h) "**Invoice Date**" means the date that is the later of:

(i) the date on which the City receives an invoice from Project Co for the relevant termination sum; and

(ii) the date on which the City receives the supporting evidence required pursuant to Section 8.1(a) of this Schedule 23.

(i) "**Junior Debt Amount**" means, at any time, the then outstanding principal amount of debt funded under the terms of the Lending Agreements by the Junior Lenders to Project Co, together with all interest accrued thereon at that time. For greater certainty, the Junior Debt Amount includes any amount funded under the terms of the Lending Agreements which has a fixed return without equity participation, step-up rights or rights to share in Project Co's excess cash flow and a coupon equal to or less than 150% of the coupon payable to the Senior Lenders and excludes the Junior Debt Makewhole. For greater certainty, as of the date of this Project Agreement, there are no Junior Lenders and there is no Junior Debt Amount.

(j) "**Junior Debt Makewhole**" means, at any time, any amount (other than the Junior Debt Amount) then due and payable to the Junior Lenders under the Lending Agreements, including any "**make whole**" payments, breakage fees (less any breakage benefits) and all other fees, costs and expenses reasonably and properly incurred which Project Co is obligated to pay to the Junior Lenders pursuant to the Lending Agreements.

(k) "**Lending Agreements**" means any or all of the agreements or instruments to be entered into by Project Co or any of its Affiliates relating to the financing of the Project Scope, including, for greater certainty, the Credit Agreement, the Security Documents, any interest rate hedging arrangements entered into between Project Co and any hedge providers in connection with the foregoing and any agreements or instruments to be entered into by Project Co or any of its Affiliates relating to the rescheduling of their indebtedness in respect of the financing of the Project Scope or the refinancing of the Project Scope.

(l) "**Liquid Market**" means that there are 2 or more willing parties (each of whom is capable of being a Suitable Substitute (as defined in the Lenders' Direct Agreement) and of meeting the Qualification Criteria) in the market for agreements in Canada for the provision of operation and maintenance services (and if the Termination Date occurs prior to Revenue Service Availability, design and construction services) to systems similar to the System under an alternative financing and procurement or similar model (where such agreements are the same as or similar to this Project Agreement) such that the retendering process in Section 3.3 of this Schedule 23 can reasonably be expected to result in a highest Qualifying Tender price broadly in the range of values that would reasonably be expected to be achieved calculating the Estimated Fair Value under Section 3.4 of this Schedule 23.

(m) "**Market Value Availability Deduction Amount**" means for any Contract Month or part of a Contract Month, an amount equal to the Deductions for Availability Failures that were made from the Monthly Service Payment under the Payment Mechanism in the Contract Month immediately preceding the Termination Date, less an amount equal to Deductions for Availability Failures that were made for Vehicle Availability Failures or Station Availability Failures (as defined in Schedule 20 – Payment Mechanism) which

were unavailable at the Termination Date but which have subsequently become available, whether as a result of the City incurring Rectification Costs or otherwise.

(n) "**Maximum Monthly Service Payment**" means the Monthly Service Payments payable at any time before any Deductions under the Payment Mechanism but allowing for indexation under the Payment Mechanism.

(o) "**New Agreement**" means an agreement on substantially the same terms and conditions as this Project Agreement as at the Termination Date, but with the following amendments:

(i) if the Project Agreement is terminated prior to the Revenue Service Availability Date, then the Longstop Date shall be extended by a period to allow a New Project Co to achieve Revenue Service Availability prior to such extended Longstop Date;

(ii) any accrued Failure Points shall be cancelled;

(iii) the term of such agreement shall be equal to the term from the Termination Date until the Expiry Date; and

(iv) any other amendments which do not adversely affect Project Co.

(p) "**New Project Co**" means the person who has entered or who will enter into the New Agreement with the City.

(q) "**Non-Default Termination Sum**" has the meaning given in Section 4.1(b) of this Schedule 23.

(r) "**Post Termination Maintenance Amount**" means, for the purposes of Section 3.3 of this Schedule 23, for the whole or any part of a Contract Month for the period from the Termination Date to the Compensation Date, an amount equal to the Maximum Monthly Service Payment which would have been payable under this Project Agreement had this Project Agreement not been terminated, less an amount equal to the aggregate (without double counting) of:

(i) the Market Value Availability Deduction Amount for that Contract Month; and

(ii) the Rectification Costs incurred by the City in that Contract Month.

(s) "**Prohibited Acts Termination Sum**" has the meaning given to it in Section 5.1(b) of this Schedule 23.

(t) "**Qualification Criteria**" means the criteria that the City requires tenderers to meet as part of the Tender Process, which (subject to compliance with Applicable Law) shall include the following:

(i) that the tenders confirm acceptance of the New Agreement terms;

(ii) that the tenderers have, and are able to demonstrate on an indicative basis on request, the financial ability to pay the lump sum tendered;

(iii) that tenderers may only bid on the basis of a single lump sum payment to be paid by the tenderer;

(iv) that the tenderer is experienced in performing the Maintenance Services or similar services;

(v) that the technical solution proposed by the tenderers is capable of delivery and the tenderer is technically capable of delivery of the Project Scope; and

(vi) any other tender criteria established by the City, acting reasonably.

(u) "**Qualifying Tender**" means a tender that meets all of the Qualification Criteria.

(v) "**Qualifying Tenderer**" means a tenderer who submits a Qualifying Tender.

(w) "**Rectification Costs**" means, for the purposes of any Termination Date that occurs after the Revenue Service Availability Date, an amount equal to the reasonable and proper costs incurred by the City in a particular Contract Month or part of a Contract Month in ensuring that the Maintenance Services are carried out.

(x) "**Senior Debt Amount**" means, at any time, the then outstanding principal amount of debt funded under the terms of the Lending Agreements by the Senior Lenders to Project Co, together with all interest accrued thereon at that time, provided that at any time where any portion of the interest payable to the Senior Lenders under the Lending Agreements is subject to an interest rate hedging agreement between Project Co and a hedge provider, accrued interest in respect of such portion of the interest payable to the Senior Lenders shall be calculated based on the fixed rate payable by Project Co as specified in such hedging agreement, without regard to whether such fixed rate is payable to a Senior Lender or to the hedge provider under such hedging agreement, and all references to interest payable to the Senior Lenders under this Agreement shall be construed accordingly. For greater certainty, the Senior Debt Amount excludes the Senior Debt Makewhole.

(y) "**Senior Debt Makewhole**" means, (i) at any time, any amount (other than the Senior Debt Amount) then due and payable to the Senior Lenders under the Lending Agreements with respect to the Senior Debt Amount, including any "**make whole**" payments, breakage fees (less any breakage benefits), and all other fees, costs and expenses reasonably and properly incurred which Project Co is obligated to pay to the Senior Lenders pursuant to the Lending Agreements with respect to the Senior Debt Amount; and (ii) any swap breakage fees (less breakage benefits), if any, then due and payable by Project Co to a hedge provider under a hedging agreement entered into with respect to the Senior Debt Amount.

(z) "**Subcontractor Losses**" means, subject to Project Co's obligations under this Project Agreement to limit any compensation to Subcontractors:

(i) the amount reasonably and properly payable by Project Co to the Construction Contractor under the terms of the applicable Contract as a direct result of the termination of this Project Agreement (including any reasonable commercial breakage fee), provided that such amount shall be reduced to the extent that Project Co or the Subcontractors fail to take commercially reasonable steps to mitigate such amount; and

(ii) if applicable, the amount reasonably and properly payable by Project Co to the Maintenance Contractor under the terms of the Maintenance Contract as a direct result of the termination of this Project Agreement (including any reasonable commercial breakage fee), provided that such amount shall be reduced to the extent that Project Co or the Subcontractors fail to take commercially reasonable steps to mitigate such amount,

provided that, in both cases, no account should be taken of any liabilities and obligations of Project Co to the Subcontractors arising out of:

(iii) any loss of overhead or profit of such Subcontractor relating to any period or costs after the Termination Date (save to the extent the same are properly included in any reasonable commercial breakage fee set out in any of the Ancillary Documents);

(iv) agreements or arrangements entered into by Project Co or the Subcontractors to the extent that such agreements or arrangements were not entered into in connection with those parties' obligations in relation to the Project; or

(v) (agreements or arrangements entered into by Project Co or the Subcontractors other than in the ordinary course of business and on commercial arm's length terms, save to the extent that amounts would have arisen if such agreements or arrangements had been entered into in the ordinary course of business and on commercial arm's length terms.

(aa) "**Tender Costs**" means the reasonable and proper costs of the City incurred in carrying out the Tender Process or in connection with any calculation of the Estimated Fair Value.

(bb) "**Tender Process**" means the process by which the City requests tenders from any parties interested in entering into a New Agreement, evaluates the responses from those interested parties and enters into a New Agreement with a new Project Co, in accordance with Section 3.3 of this Schedule 23.

(cc) "**Tender Process Monitor**" has the meaning given in Section 3.3(g) of this Schedule 23.

2. COMPENSATION ON TERMINATION FOR THE CITY DEFAULT OR CONVENIENCE

2.1 Compensation

(a) If Project Co terminates this Project Agreement pursuant to Section 46 of this Project Agreement or the City terminates this Project Agreement pursuant to Section 47.3 of this Project Agreement, the City shall pay to Project Co the City Default Termination Sum.

(b) The "**City Default Termination Sum**" shall be an amount equal to the aggregate of:

(i) the Senior Debt Amount and the Senior Debt Makewhole;

(ii) the Junior Debt Amount and the Junior Debt Makewhole;

(iii) any amount payable by the City to Project Co in accordance with Sections 43.2(b) and 44.2(b) of this Project Agreement;

(iv) the Employee Termination Payments and the Subcontractor Losses;

(v) any reasonable costs properly incurred by Project Co to wind up its operations; and

(vi) an amount which, if paid on the Termination Date and taken together with all dividends and other Distributions paid on or made in respect of the Equity Capital on or before the Termination Date and taking account of the actual timing of all such payments, but, in any event, excluding all amounts (whether for costs, overhead, profit or otherwise) after the Termination Date, gives a nominal internal rate of return to the Termination Date equal to the Base Case Equity IRR on the amount paid for the Equity Capital (to the extent that such Equity Capital has been applied by Project Co for the purposes of the Project);

LESS, the aggregate (without double counting) of the following, to the extent it is a positive amount:

(vii) all credit balances on any bank accounts held by or on behalf of Project Co on the Termination Date and the value of any insurance proceeds due to Project Co or to which Project Co would have been entitled had insurance been maintained in accordance with the requirements of this Project Agreement (save where such insurance proceeds are to be applied in reinstatement, restoration or replacement, or, in the case of third party legal liability, in satisfaction of the claim, demand, proceeding or liability or where the City is required to procure insurances and to make proceeds available to Project Co under this Project Agreement and it has failed to do so) or sums due and payable from third parties other than sums wholly unrelated to the Project Scope, the Project and this Project Agreement (but only when received from third parties) but excluding any claims under any Subcontracts or claims against other third parties which have not been determined or have been determined but not yet paid, provided that, in such case, Project Co shall assign any such rights and claims under the Subcontracts or claims against other third parties (other than claims against other third parties wholly unrelated to the Project Scope, the Project and this Project Agreement) to the City and, at no

additional cost to Project Co, give the City reasonable assistance in prosecuting such claims;

(viii) to the extent realized before the Invoice Date, the market value of any other assets and rights of Project Co (other than those transferred to the City pursuant to this Project Agreement) less liabilities of Project Co properly incurred in carrying out its obligations under this Project Agreement as at the Termination Date, provided that no account should be taken of any liabilities and obligations of Project Co arising out of:

(A) agreements or arrangements entered into by Project Co to the extent that such agreements or arrangements were not entered into in connection with Project Co's obligations in relation to the Project; or

(B) agreements or arrangements entered into by Project Co other than in the ordinary course of business and on commercial arm's length terms, save to the extent that liabilities and obligations would have arisen if such agreements or arrangements had been entered into in the ordinary course of business and on commercial arm's length terms; and

(ix) amounts which the City is entitled to set off pursuant to Section 34.13(a)(i) of this Project Agreement,

provided that the City Default Termination Sum shall never be less than the aggregate of the Senior Debt Amount, the Senior Debt Makewhole, the Junior Debt Amount and the Junior Debt Makewhole.

(c) To the extent that such assets and rights referred to in Section 2.1(b)(viii) of this Schedule 23 are not realized and applied pursuant thereto, Project Co shall, on payment of the City Default Termination Sum, assign such assets and rights to the City.

(d) The City shall pay the City Default Termination Sum in accordance with Section 8 of this Schedule 23.

3. COMPENSATION FOR PROJECT CO DEFAULT

3.1 Compensation

(a) Save and except where Sections 5 or 6 of this Schedule 23 apply, if the City terminates this Project Agreement pursuant to Section 45 of this Project Agreement, the City shall pay to Project Co either the Adjusted Highest Qualifying Tender Price according to the retendering procedure set out in Section 3.3 of this Schedule 23 or the Adjusted Estimated Fair Value according to the no retendering procedure set out in Section 3.4 of this Schedule 23, as applicable.

3.2 Retendering Election

(a) The City shall be entitled to retender the provision of the Project Scope in accordance with Section 3.3 of this Schedule 23 and the provisions thereof shall apply if:

(i) The City notifies Project Co on or before the date falling 30 days after the Termination Date; and

(ii) there is a Liquid Market,

but, otherwise, the City shall require a determination in accordance with the no retendering procedure set out in Section 3.4 of this Schedule 23 and the provisions thereof shall apply.

(b) Until it is determined that the basis for determining the compensation to Project Co will be the no retendering procedure set out in Section 3.4 of this Schedule 23, Project Co shall continue to perform the Maintenance Services and the City shall pay Project Co in accordance with Section 3.3(e) of this Schedule 23.

3.3 Retendering Procedure

(a) The objective of the Tender Process shall be to enter into a New Agreement with a Qualifying Tenderer.

(b) The City shall commence the Tender Process promptly after delivering the notice pursuant to Section 3.2(a) of this Schedule 23 and use commercially reasonable efforts to complete the Tender Process as soon as practicable.

(c) The City shall, as soon as reasonably practicable, notify Project Co of the Qualification Criteria and the other requirements and terms of the Tender Process, including the timing of the Tender Process and shall act reasonably in setting such requirements and terms.

(d) Project Co authorizes the release of any information by the City under the Tender Process which would otherwise be prevented under Section 52 of this Project Agreement that is reasonably required as part of the Tender Process.

(e) Project Co shall continue to perform the Maintenance Services, and, for all or any part of a Contract Month falling within the period from the Termination Date to the Compensation Date, the City shall pay to Project Co:

(i) the Post Termination Maintenance Amount for each completed Contract Month, on or before the date falling 20 Business Days after the end of that Contract Month; and

(ii) the Post Termination Maintenance Amount for the period from the end of the last completed Contract Month until the Compensation Date, on or before the date falling 30 days after the Compensation Date.

(f) If any Post Termination Maintenance Amount is negative, then the amount by which the Post Termination Maintenance Amount is negative shall be carried forward and may be set off against any future positive Post Termination Maintenance Amounts.

(g) Project Co may, at its own cost, appoint a person (the "**Tender Process Monitor**") to monitor the Tender Process for the purpose of monitoring and reporting to Project Co and the Lenders on the City's compliance with the Tender Process. The Tender Process Monitor shall enter into a confidentiality agreement with the City in a form acceptable to the City and shall be entitled to attend all meetings relating to the Tender Process, inspect copies of all the tender documentation and bids and make representations to the City as to compliance with the Tender Process. The City shall not be bound to consider or act upon such representations. The Tender Process Monitor will not disclose confidential information to Project Co or the Lenders but shall be entitled to advise Project Co and the Lenders on whether it considers that the City has acted in accordance with the Tender Process and correctly determined the Adjusted Highest Qualifying Tender Price.

(h) As soon as practicable after tenders have been received, the City shall, acting reasonably, review and assess the Qualifying Tenders and shall notify Project Co of the Adjusted Highest Qualifying Tender Price.

(i) If Project Co refers a Dispute relating to the Adjusted Highest Qualifying Tender Price to dispute resolution in accordance with Schedule 27 – Dispute Resolution Procedure, the City shall, irrespective of such Dispute, be entitled to enter into a New Agreement.

(j) The City shall pay the Adjusted Highest Qualifying Tender Price in accordance with Section 8 of this Schedule 23.

(k) The City may elect, by notice to Project Co at any time prior to the City ascertaining the Adjusted Highest Qualifying Tender Price, to follow the no retendering procedure set out in Section 3.4 of this Schedule 23. In addition, the City shall follow such no retendering procedure if:

(i) only one Qualifying Tender is received; or

(ii) a New Agreement has not been entered into and compensation paid under Section 8.2 of this Schedule 23 on or before the date falling 18 months after the Termination Date.

(l) Project Co may give written notice to the City at any time after the Termination Date and prior to the date for receipt of Qualifying Tenders that a Liquid Market does not exist (or shall not exist on the date for receipt of Qualifying Tenders). If the City is in agreement with such notice, the provisions of Section 3.4 of this Schedule 23 shall apply. If the City provides a written response within 10 Business Days of receipt of such notice stating that it is in disagreement with that notice or if no written response is provided by the City within such 10 Business Day period, the matter shall be referred for determination in accordance with Schedule 27 – Dispute Resolution Procedure.

3.4 No Retendering Procedure

(a) Subject to Section 3.4(b) of this Schedule 23, if the provisions of this Section 3.4 apply, Project Co shall not be entitled to receive any Post Termination Maintenance Amount.

(b) If the City elects to require a determination in accordance with this Section 3.4 after it has elected to follow the procedure set out in Section 3.3 of this Schedule 23, then the City shall continue to pay to Project Co each Post Termination Maintenance Amount until the Compensation Date in accordance with Section 3.3 of this Schedule 23.

(c) In determining the Estimated Fair Value, the Parties shall be obliged to follow the principles set out below:

(i) All forecast amounts should be calculated in nominal terms as at the Termination Date. Where relevant, adjustments for forecast inflation between the date of calculation and the forecast payment date(s), as set out in this Project Agreement, will be made and, if made, will use an assumed inflation rate of 2% per annum.

(ii) The Estimated Fair Value shall be calculated using the following formula (without double counting):

(A - B - C) - D

Where:

A = the present value of the following payments to the extent that, as at the Termination Date, such payments have not yet been paid and are forecast to be made from the Termination Date to the Expiry Date, assuming that no Deductions will be made over that period, discounted at the Discount Rate: the Milestone Payments, the Highway Milestone Payment, the Highway Final Payment, the Revenue Service Availability Payment, any unpaid amounts in respect of the completed Civic Works that are due to Project Co pursuant to Section 20.13 of the Project Agreement and the Monthly Service Payments.

B = a contingency amount based on a reasonable risk assessment of any cost overruns that may reasonably arise (including in respect of any matter referred to in this Section 3.4(c)(ii) of this Schedule 23) whether or not forecast in the relevant base case and represented in the Financial Model as of the date of Financial Close, discounted at the Discount Rate.

C = the present value of the costs of obtaining or performing the Maintenance Services reasonably forecast to be incurred by the City from the Termination Date to the Expiry Date to the standard required, discounted at the Discount Rate.

D = any rectification costs (including Rectification Costs) reasonably required to perform the activities within the Project Scope to the standard required, including, if applicable, to complete the Design and Construction Works and the Highway Work, any costs reasonably forecast to be incurred by the City for up-front

finance fees and related costs (excluding principal and interest payments) that would not arise at the time or in the future had the termination not occurred, and any other additional operating costs required to restore operating services standards less (to the extent that such sums are included in any calculation of rectification costs (including Rectification Costs) for the purposes of this item D), the aggregate of:

(A) any insurance proceeds received or which will be received pursuant to policies maintained in accordance with Schedule 25 – Insurance and Performance Security Requirements; and

(B) amounts payable by the City in respect of Capital Expenditures under this Project Agreement which have not been paid,

discounted at the Discount Rate.

(iii) The amount of (A - B - C) as defined in Section 3.4(c)(ii) of this Schedule 23 shall be no greater than the Non-Default Termination Sum.

(iv) All costs referred to in Section 3.4(c)(ii) of this Schedule 23 are to be forecast at a level that will deliver the Maintenance Services and perform the other activities within the Project Scope to the standards required by this Project Agreement and to achieve the full Monthly Service Payments (without Deductions).

(v) The calculation will take into consideration the obligations of the Parties with respect to allowances and payments under this Project Agreement.

(d) If the Parties cannot agree on the Estimated Fair Value, then the Estimated Fair Value shall be determined in accordance with Schedule 27 – Dispute Resolution Procedure.

(e) The City shall pay the Adjusted Estimated Fair Value in accordance with Section 8 of this Schedule 23.

4. CONSEQUENCES OF NON-DEFAULT TERMINATION AND TERMINATION BY THE CITY FOR RELIEF EVENT

4.1 Consequences

(a) If the City terminates this Project Agreement pursuant to Section 47.1 of this Project Agreement or if either Party terminates this Project Agreement pursuant to Section 47.2 of this Project Agreement, the City shall pay to Project Co the Non-Default Termination Sum.

(b) The "**Non-Default Termination Sum**" shall be an amount equal to the aggregate of:

(i) the Senior Debt Amount and the Senior Debt Makewhole;

(ii) the Junior Debt Amount;

(iii) any amount payable by the City to Project Co in accordance with Sections 43.2(b) and 44.2(b) of this Project Agreement;

(iv) the Employee Termination Payments and the Subcontractor Losses (but excluding therefrom any claims for loss of profit); and

(v) an amount equal to the Equity Capital as at Financial Close, less all dividends and other Distributions paid on or made in respect of the Equity Capital on or before the Termination Date, provided that where such amount is negative, it shall be deemed instead to be zero;

LESS, the aggregate (without double counting) of the following, to the extent it is a positive amount:

(vi) all credit balances on any bank accounts held by or on behalf of Project Co on the Termination Date and the value of any insurance proceeds due to Project Co or to which Project Co would have been entitled had insurance been maintained in accordance with the requirements of this Project Agreement (save where such insurance proceeds are to be applied in reinstatement, restoration or replacement, or, in the case of third party legal liability, in satisfaction of the claim, demand, proceeding or liability or where the City is required to procure insurances and to make proceeds available to Project Co under this Project Agreement and it has failed to do so) or sums due and payable from third parties other than sums wholly unrelated to the Project Scope, the Project and this Project Agreement (but only when received from third parties) but excluding any claims under any Subcontracts or claims against other third parties which have not been determined or have been determined but not yet paid, provided that, in such case, Project Co shall assign any such rights and claims under the Subcontracts or claims against other third parties (other than claims against other third parties wholly unrelated to the Project Scope, the Project and this Project Agreement) to the City and, at no additional cost to Project Co, give the City reasonable assistance in prosecuting such claims; and

(vii) to the extent realized before the Invoice Date, the market value of any other assets and rights of Project Co (other than those transferred to the City pursuant to this Project Agreement) less liabilities of Project Co properly incurred in carrying out its obligations under this Project Agreement as at the Termination Date, provided that no account should be taken of any liabilities and obligations of Project Co arising out of:

(A) agreements or arrangements entered into by Project Co to the extent that such agreements or arrangements were not entered into in connection with Project Co's obligations in relation to the Project; or

(B) agreements or arrangements entered into by Project Co other than in the ordinary course of business and on commercial arm's length terms, save to the extent that liabilities and obligations would have arisen if such

agreements or arrangements had been entered into in the ordinary course of business and on commercial arm's length terms; and

(viii) amounts which the City is entitled to set off pursuant to Section 34.13(a)(i) of this Project Agreement,

provided that the Non-Default Termination Sum shall never be less than the aggregate of the Senior Debt Amount, the Senior Debt Makewhole and the Junior Debt Amount.

(c) To the extent that such assets and rights referred to in Section 4.1(b)(vii) of this Schedule 23 are not realized and applied pursuant thereto, Project Co shall, on payment of the Non-Default Termination Sum, assign such assets and rights to the City.

(d) The City shall pay the Non-Default Termination Sum in accordance with Section 8 of this Schedule 23.

5. CONSEQUENCES OF TERMINATION FOR PROHIBITED ACTS

5.1 Consequences

(a) If the City terminates this Project Agreement as a result of a Project Co Event of Default for failing to comply with Section 60 of this Project Agreement, the City shall pay to Project Co the Prohibited Acts Termination Sum.

(b) The "**Prohibited Acts Termination Sum**" shall be an amount equal to the aggregate of:

(i) the Senior Debt Amount and the Senior Debt Makewhole;

(ii) any amount payable by the City to Project Co in accordance with Sections 43.2(b) and 44.2(b) of this Project Agreement; and

(iii) the following amounts calculated in respect of a Contractor, if the Contractor is not responsible for a Prohibited Act, and which Project Co can demonstrate will be paid directly to such persons:

(A) the Employee Termination Payments; and

(B) as applicable, the Contractor's out-of-pocket costs incurred as a direct result of termination of this Project Agreement (excluding any breakage fees and overhead and profit of the Contractor);

LESS, the aggregate (without double counting) of the following, to the extent it is a positive amount:

(iv) all credit balances on any bank accounts held by or on behalf of Project Co on the Termination Date and the value of any insurance proceeds due to Project Co or to which Project Co would have been entitled had insurance been maintained in accordance with the requirements of this Project Agreement (save where such

insurance proceeds are to be applied in reinstatement, restoration or replacement, or, in the case of third party legal liability, in satisfaction of the claim, demand, proceeding or liability or where the City is required to procure insurances and to make proceeds available to Project Co under this Project Agreement and it has failed to do so) or sums due and payable from third parties other than sums wholly unrelated to the Project Scope, the Project and this Project Agreement (but only when received from third parties) but excluding any claims under any Subcontracts or claims against other third parties which have not been determined or have been determined but not yet paid, provided that, in such case, Project Co shall assign any such rights and claims under the Subcontracts or claims against other third parties (other than claims against other third parties wholly unrelated to the Project Scope, the Project and this Project Agreement) to the City and, at no additional cost to Project Co, give the City reasonable assistance in prosecuting such claims;

(v) to the extent realized before the Invoice Date, the market value of any other assets and rights of Project Co (other than those transferred to the City pursuant to this Project Agreement) less liabilities of Project Co properly incurred in carrying out its obligations under this Project Agreement as at the Termination Date, provided that no account should be taken of any liabilities and obligations of Project Co arising out of:

(A) agreements or arrangements entered into by Project Co to the extent that such agreements or arrangements were not entered into in connection with Project Co's obligations in relation to the Project; or

(B) agreements or arrangements entered into by Project Co other than in the ordinary course of business and on commercial arm's length terms, save to the extent that liabilities and obligations would have arisen if such agreements or arrangements had been entered into in the ordinary course of business and on commercial arm's length terms; and

(vi) amounts which the City is entitled to set off pursuant to Section 34.13(a)(i) of this Project Agreement, provided that the City shall only set off amounts which are due to the City by Project Co pursuant to the terms of this Project Agreement if and to the extent the Prohibited Acts Termination Sum exceeds the Senior Debt Amount.

(c) To the extent that such assets and rights referred to in Section 5.1(b)(v) of this Schedule 23 are not realized and applied pursuant thereto, Project Co shall, on payment of the Prohibited Acts Termination Sum, assign such assets and rights to the City.

(d) The City shall pay the Prohibited Acts Termination Sum in accordance with Section 8 of this Schedule 23.

6. CONSEQUENCES OF TERMINATION FOR BREACH OF REFINANCING

6.1 Consequences

(a) If the City terminates this Project Agreement as a result of a Project Co Event of Default for failing to comply with Section 7.3 of this Project Agreement or Schedule 28 – Refinancing or the Lender assigns, transfers or otherwise disposes of any right, title or interest it may have in, or obligations it may have pursuant to, the Security Documents in breach of the Lenders' Direct Agreement, the City shall pay to Project Co a termination sum equivalent to, and calculated in accordance with Sections 5.1(b)(i), (ii), (iii), (iv) and (v) of this Schedule 23, less amounts which the City is entitled to set off pursuant to Section 34.13(a)(i) of this Project Agreement.

(b) The City shall pay such termination sum in accordance with Section 8 of this Schedule 23.

7. CONSEQUENCES OF TERMINATION BY PROJECT CO FOR RELIEF EVENT

7.1 Consequences

(a) If Project Co terminates this Project Agreement pursuant to Section 47.1 of this Project Agreement, the City shall pay to Project Co a termination sum equivalent to the greater of (i) an amount calculated and payable in accordance with, the Prohibited Acts Termination Sum; and (ii) the Adjusted Estimated Fair Value calculated in accordance with this Schedule 23.

(b) The City shall pay such termination sum in accordance with Section 8.1 or 8.3 of this Schedule 23, as applicable.

8. GENERAL

8.1 Payment and Interest Following Non-Project Co Default Termination

(a) In respect of the termination payments to be made pursuant to any of Sections 2, 4, 5, 6 or 7 of this Schedule 23, as soon as practicable after, and, in any event, within 30 days after, the Termination Date, Project Co shall give to the City an invoice for the relevant termination sum and sufficient supporting evidence, reasonably satisfactory to the City, justifying the amount of the relevant termination sum including a detailed breakdown of each of the individual items comprising such sum.

(b) The City shall pay to Project Co:

(i) the relevant termination sum within 60 days after the Invoice Date; and

(ii) The City shall indemnify Project Co as provided in Section 56.2(c) of this Project Agreement in respect of any damages suffered or incurred as a result of the relevant termination sum (or any part of such sum that remains outstanding) not being received on the Termination Date:

(A) in an amount equivalent to the No Default Payment Compensation Amount for the period from (but excluding) the Termination Date to (and including) the date which is 60 days after the Invoice Date; and

(B) thereafter, in an amount equivalent to the Payment Compensation Amount until the date of payment.

(c) In respect of the termination payments to be made pursuant to any of Sections 4, 5, 6 or 7 of this Schedule 23, if the applicable termination sum is negative, the City shall have no obligation to make any payment to Project Co and Project Co shall also thereafter indemnify the City as provided in Section 56.1(e) of this Project Agreement in respect of any damages suffered or incurred on such amount on the basis that the due date for the payment of the negative termination sum amount was the date 60 days after the Invoice Date until the date of payment in an amount equivalent to the Payment Compensation Amount.

8.2 Payment and Interest Following Project Co Default – Retendering Procedure

(a) Following the retendering procedure set out in Section 3.3 of this Schedule 23, the City shall pay to Project Co the Adjusted Highest Qualifying Tender Price no later than the date falling 30 days after the later of:

(i) the date on which the City enters into the New Agreement with the New Project Co; and

(ii) if Project Co has, pursuant to Section 3.3(i) of this Schedule 23, referred a Dispute relating to the Adjusted Highest Qualifying Tender Price to be resolved in accordance with Schedule 27 – Dispute Resolution Procedure, the date on which the Dispute is finally determined, provided that the City shall pay the undisputed amount on the date referred to in Section 8.2(a)(i) of this Schedule 23,

and the City shall indemnify Project Co as provided in Section 56.2(c) of this Project Agreement on the Adjusted Highest Qualifying Tender Price on the basis that the due date for the payment of the Adjusted Highest Qualifying Tender Price was the date on which the City enters into the New Agreement with the New Project Co:

(i) in an amount equivalent to the No Default Payment Compensation Amount from the due date up to (and including) the date following 30 days from after the later of the dates determined under Sections 8.2(a)(i) and (ii) of this Schedule 23 (and for clarity, on such portions of the Adjusted Highest Qualifying Tender Price in the circumstance described in paragraph (ii) above); and

(ii) thereafter, in an amount equivalent to the Payment Compensation Amount until the date of payment.

(b) If the Adjusted Highest Qualifying Tender Price is negative, the City shall have no obligation to make any payment to Project Co and Project Co shall, on the date of the New Agreement, pay the City the amount by which such termination sum is negative, failing which Project Co shall also thereafter indemnify the City as provided in Section 56.1(e) of this Project Agreement in respect of any damages suffered or incurred on such amount on the basis that the due date for the payment of the negative termination

sum amount was the date of the New Agreement in an amount equivalent to the Payment Compensation Amount until the date of payment.

8.3 Payment and Interest Following Project Co Default – No Retendering Procedure

(a) If the City follows the no retendering procedure set out in Section 3.4 of this Schedule 23, the City shall pay to Project Co the Adjusted Estimated Fair Value no later than the date falling 60 days after the date on which the Adjusted Estimated Fair Value has been agreed or determined in accordance with Section 3.4 of this Schedule 23, together with interest on such amount calculated in accordance with Section 8.1(b)(ii) of this Schedule 23.

(b) If the Adjusted Estimated Fair Value is negative, the City shall have no obligation to make any payment to Project Co and Project Co shall, on the Compensation Date, pay the City the amount by which the Adjusted Estimated Fair Value is negative, failing which Project Co shall also thereafter indemnify the City as provided in Section 56.1(e) of this Project Agreement in respect of any damages suffered or incurred on such amount on the basis that the due date for payment of the negative Adjusted Estimated Fair Value was the date of the New Agreement in an amount equivalent to the Payment Compensation Amount until the date of payment.

8.4 Costs

(a) The costs and expenses to be taken into account in the calculation of all termination sums due pursuant to this Schedule 23 shall only be such costs and expenses to the extent that they are reasonable and proper in quantum and shall have been or will be reasonably and properly incurred.

8.5 Undisputed Amounts

(a) If the calculation of any termination amount is disputed then any undisputed amount shall be paid in accordance with this Section 8 of this Schedule 23 and the disputed amount shall be dealt with in accordance with Schedule 27 – Dispute Resolution Procedure.

8.6 Outstanding Debt Amounts

(a) The City shall be entitled to rely on a certificate of the Lenders' Agent as conclusive as to the Senior Debt Amount, the Senior Debt Makewhole, the Junior Debt Amount and the Junior Debt Makewhole, as applicable, outstanding or payable at any relevant time.

(b) If a receipt or other acknowledgement is given by the Lenders' Agent acknowledging or otherwise confirming receipt of payment or payments in respect of the Senior Debt Amount, the Senior Debt Makewhole, the Junior Debt Amount and the Junior Debt Makewhole, as applicable, such receipt or other acknowledgement shall discharge the City's obligation to pay such portion of compensation due to Project Co that is equal to the amount acknowledged or confirmed.

SCHEDULE 24

EXPIRY TRANSITION PROCEDURE

1. INDEPENDENT INSPECTOR

1.1 Not less than 90 months prior to the Expiry Date, the Parties shall agree upon and, in accordance with the City procurement policies, engage an independent and suitably qualified and experienced person (the "**Independent Inspector**") to carry out inspections of the System pursuant to this Schedule 24.

1.2 Project Co and the City shall share equally the responsibility for the payment of all fees and costs of the Independent Inspector.

1.3 In the event of the Independent Inspector's engagement being terminated otherwise than for full performance, the Parties shall liaise and cooperate with each other in order to appoint a replacement as soon as reasonably practicable, and in any event within 10 Business Days of the termination of the last Independent Inspector's engagement.

1.4 In the event the Parties fail to agree upon the identity of the Independent Inspector either pursuant to Section 1.1 or Section 1.3 of this Schedule 24 by the specified deadline, then the Independent Inspector shall be selected as follows:

(a) each Party shall within 10 Business Days thereafter select three independent and suitably qualified and experienced persons that would be acceptable to that Party as the Independent Inspector, and shall provide notice thereof to the other Party; and

(b) if the Parties have both selected a common person, then such common person shall be the Independent Inspector; or

(c) if the Parties have not selected a common person, then the Independent Inspector shall be selected in accordance with Schedule 27 – Dispute Resolution Procedure.

2. CONDITION OF SYSTEM ON EXPIRY

2.1 Subject to the exceptions specified in Section 2.2 of this Schedule 24, on the Expiry Date:

(a) each element of the System and the Site (including the ground soil located on the Site) shall be in a condition which is consistent with due performance by Project Co of its obligations under this Project Agreement and, in particular, is consistent with the System having been maintained in accordance with the Maintenance and Rehabilitation Requirements, and, with respect to the Site and the ground soil located on the Site, does not deviate from the Pre-Existing Environmental Site Conditions by reason of any Contamination for which Project Co is responsible pursuant to this Project Agreement;

(b) each element of the System shall be in good operating order (normal wear and tear excepted) and capable of performing in accordance with the performance specifications and standards set out in the Expanded Output Specifications; and

(c) each element of the System shall comply with Appendix C of Schedule 15-3 Maintenance and Rehabilitation Requirements.

(collectively, the "**Expiry Transition Requirements**").

2.2 For greater certainty, this Schedule 24 shall not apply to any System Infrastructure to be maintained by the City in accordance with this Project Agreement.

3. SYSTEM INSPECTIONS

3.1 The Parties shall cause the Independent Inspector to perform an inspection of the System and to produce and deliver to each of the Parties a written report (a "**System Condition Report**") not less than 84 months prior to the Expiry Date that:

(a) identifies the condition of the System and each element of the System (subject to the exceptions specified in Section 2.2 of this Schedule 24) in relation to the Expiry Transition Requirements;

(b) assesses Project Co's business case related to capital replacement (which, for greater certainty, will include consideration of energy consumption), and provides the Independent Inspector's opinion on both the adequacy of Project Co's proposed strategy and the consistency of Project Co's proposed strategy with the Asset Management Plan;

(c) identifies any works required to ensure the System and each element of the System (subject to the exceptions specified in Section 2.2 of this Schedule 24) will meet the Expiry Transition Requirements on the Expiry Date (the "**Expiry Transition Works**"), and specifying the Contract Year in which each of those Expiry Transition Works would be required;

(d) specifies the Independent Inspector's estimate of the costs that would be required to perform the Expiry Transition Works (the "**Expiry Transition Works Costs**"); and

(e) details how the Expiry Transition Works Costs were calculated.

3.2 The Parties shall cause the Independent Inspector to perform another inspection of the System and produce and deliver to each of the Parties an updated System Condition Report (each a "**Revised System Condition Report**") on each anniversary of the date of the original System Condition Report.

3.3 The Asset Management Plan shall be amended and updated, as applicable, to include all Expiry Transition Works identified in either the System Condition Report or any Revised

System Condition Report not already included in the then current Asset Management Plan.

3.4 Project Co shall carry out the Expiry Transition Works at its own cost notwithstanding that the actual cost of the Expiry Transition Works may be higher than the Expiry Transition Works Costs.

3.5 Either Party may dispute the System Condition Report or any Revised System Condition Report, including the Expiry Transition Works and the Expiry Transition Works Costs, in accordance with Schedule 27 – Dispute Resolution Procedure. In the event that a final determination in accordance with Schedule 27 – Dispute Resolution Procedure specifies Expiry Transition Works or Expiry Transition Works Costs which are different than those set out in either the System Condition Report or any Revised System Condition Report, then either the System Condition Report or any Revised System Condition Report, as the case may be, shall be deemed to be amended accordingly, as amended pursuant to Section 3.3 of this Schedule 24, and all deductions and payments permitted or required by Section 4 of this Schedule 24, shall be adjusted accordingly.

4. PAYMENTS TO AND FROM ESCROW ACCOUNT

4.1 Following the date for delivery of the System Condition Report, for the purposes of Section 4.2 of this Schedule 24, the Parties shall review the amount of the Expiry Transition Works Costs and the level of capital expenditure Project Co has allocated to spend in the same period pursuant to the Financial Model (the "**Expiry Rehabilitation Costs**"). Where the Expiry Transition Works Costs are greater than the Expiry Rehabilitation Costs, the difference between the Expiry Transition Works Costs and the Expiry Rehabilitation Costs shall be apportioned equally over the Contract Months from the date the System Condition Report is to be delivered hereunder to the Expiry Date (each instalment being the "**Expiry Transition Amount**"). If the System Condition Report is delivered after the date for delivery hereunder, then the first instalment to be paid shall also include the amounts to be paid under the instalments that would have been payable prior to the date the System Condition Report is delivered. Where the Expiry Transition Works Costs are amended pursuant to Section 3.3 or 3.5 of this Schedule 24, the Parties agree that the Expiry Transition Amount shall be adjusted accordingly.

4.2 Subject to Sections 4.3 and 4.5 of this Schedule 24, the City may deduct the Expiry Transition Amount from each Monthly Service Payment, and pay into a separate interest bearing bank account, upon escrow terms acceptable to the Parties or in trust (the "**Escrow Account**"), the Expiry Transition Amount. If in any Contract Month, the Expiry Transition Amount is greater than the relevant Monthly Service Payment, the City may deduct the difference between the Expiry Transition Amount and the Monthly Service Payment from the next Monthly Service Payment or from such other Contract Month as otherwise agreed between the Parties.

4.3 The City shall not deduct any amount from a Monthly Service Payment as contemplated in Section 4.2 of this Schedule 24 if, at such time, the funds in the Escrow Account

exceed the value (based on the Expiry Transition Works Costs) of all or any part of the Expiry Transition Works (as amended) yet to be performed.

4.4 Project Co may from time to time, but not more often than once in any month, make written request for release of funds from the Escrow Account. The City shall consider such request within 10 Business Days and if the funds in the Escrow Account exceed the value (based on the Expiry Transition Works Costs) of all or any part of the Expiry Transition Works (as amended) yet to be performed, then the City shall pay the excess to Project Co from the Escrow Account within 10 Business Days thereafter, together with any interest that has accrued on such amount. Project Co shall include with its request all information reasonably required by the City to evaluate such request.

4.5 Following the date of any Revised System Condition Report, if the amount in the Escrow Account (being the deductions of the Expiry Transition Amount made since the System Condition Report) together with the deductions to be made from the remaining Monthly Service Payments is less than the value (based on the Expiry Transition Works Costs) of the remaining Expiry Transition Works (as amended) yet to be performed, then the City may deduct such shortfall, in equal instalments, from each remaining Monthly Service Payment until the Expiry Date, and pay each instalment into the Escrow Account and Section 4.4 of this Schedule 24 shall continue to apply until the Expiry Date.

4.6 As an alternative to the deductions permitted by Sections 4.2 and 4.5 of this Schedule 24 or the retention of any amount in the Escrow Account pursuant to the foregoing provisions of this Section 4 of this Schedule 24, Project Co may (and if, at any time, the amounts which the City is permitted to deduct pursuant to Sections 4.2 and 4.5 of this Schedule 24 are greater than the remaining Monthly Service Payments, Project Co shall), within 5 Business Days of a written request from the City, provide a bond or letter of credit (the "**Expiry Transition Security**") in favour of the City in an amount equal to the amounts which the City is permitted to deduct pursuant to Sections 4.2 and 4.5 of this Schedule 24, in a form and from a surety or bank, as applicable, acceptable to the City.

5. PROJECT CO NOT RELIEVED OF OBLIGATIONS

5.1 Notwithstanding:

(a) any agreement of the City to any Expiry Transition Works, Expiry Transition Works Costs or Expiry Transition Security;

(b) any participation of the City in any inspection under this Schedule 24; and

(c) the complete or partial carrying out of the Expiry Transition Works,

Project Co shall not be relieved or absolved from any obligation to conduct any other inspection or to perform any other works to the extent otherwise required by this Project Agreement, including without limitation the Output Specifications.

6. FINAL SYSTEM CONDITION REPORT

6.1 The Parties shall cause the Independent Inspector to perform an inspection of the System and to produce and deliver to each of the Parties a System Condition Report within 30 Business Days after the Expiry Date (the "**Final System Condition Report**") that documents whether the System met the Expiry Transition Requirements on the Expiry Date, as well as identifying any Expiry Transition Works and Expiry Transition Works Costs.

6.2 If the Final System Condition Report identifies any Expiry Transition Works, City may withdraw from the Escrow Account or call upon the Expiry Transition Security an amount equivalent to such Expiry Transition Works Costs, and the City shall pay any remaining funds in the Escrow Account (including any interest accrued) to Project Co and return any remaining Expiry Transition Security to Project Co.

6.3 Provided that the funds in the Escrow Account and/or the Expiry Transition Security is adequate to meet Project Co's obligations in respect of the Expiry Transition Works identified in the Final System Condition Report, following any withdrawal from the Escrow Account or call upon the Expiry Transition Security in accordance with Section 6.2, Project Co shall have no further liability with respect to such Expiry Transition Works.

If no Expiry Transition Works are identified in the Final System Condition Report, the City shall, within 20 Business Days of receipt by the City of the Final System Condition Report, pay the funds in the Escrow Account (including any interest accrued) to Project Co and return the Expiry Transition Security to Project Co, unless the City disputes the Final System Condition Report, in which case the Escrow Account and Expiry Transition Security shall be dealt with as determined in accordance with Schedule 27 – Dispute Resolution Procedure.

SCHEDULE 25

INSURANCE AND PERFORMANCE SECURITY REQUIREMENTS

ARTICLE 1
DESIGN AND CONSTRUCTION WORKS INSURANCE COVERAGE

1.1 Subject to Article 8 of this Schedule 25, from and after execution of this Project Agreement and, until the Revenue Service Availability Date, Project Co shall, at its own expense, obtain and maintain, or cause to be obtained and maintained, exclusively through the Infrastructure Ontario Construction Insurance Program (IOCIP) the following insurances as further described in Appendix A to this Schedule 25:

(a) "All Risks" Course of Construction Property, including Boiler and Machinery;

(b) "Wrap-Up" Commercial General Liability and Non-Owned Automobile Liability;

(c) Project Specific Professional Liability; and

(d) Project Specific Pollution Liability (combined Contractors' Pollution Liability and Pollution Legal Liability).

1.2 Subject to Article 8 of this Schedule 25, from and after execution of this Project Agreement, until the Revenue Service Availability Date, Project Co shall, at its own expense, obtain and maintain, or cause to be obtained and maintained, the following insurances as further described in Appendix A to this Schedule 25:

(a) Automobile Liability;

(b) Commercial General Liability and Non-Owned Automobile Liability (to be maintained by the Construction Contractors and each of the Subcontractors involved in the Design and Construction Works) with respect to off-Site operations and activities;

(c) Aircraft and Watercraft Liability (if any exposure);

(d) "All Risks" Marine Cargo (if any exposure);

(e) "All Risks" Contractors' Equipment;

(f) Comprehensive Crime; and

(g) WSIB.

ARTICLE 2
OPERATIONAL TERM INSURANCE COVERAGE

2.1 Subject to Article 8 of this Schedule 25, from and after the Revenue Service Availability Date and until the Termination Date, Project Co shall, at its own expense, obtain and maintain, or cause to be obtained and maintained, the following insurances as further described in Appendix A to this Schedule 25:

(a) "All Risks" Property;

(b) Boiler and Machinery;

(c) Commercial General Liability and Non-Owned Automobile Liability;

(d) Environmental Impairment (Pollution) Liability;

(e) Automobile Liability;

(f) Comprehensive Crime; and

(g) WSIB.

ARTICLE 3
NO LIMIT ON RECOVERY

3.1 Notwithstanding any other provision of this Project Agreement, it is hereby agreed that the limits of liability specified in this Schedule 25 for insurance policies, whether such policies are required to be obtained (or caused to be obtained) by the City or by Project Co, shall in no way limit Project Co's liability or obligations to the City or the City's liability or obligations to Project Co, as applicable.

ARTICLE 4
ADDITIONAL COVER

4.1 Without prejudice to the other provisions of this Schedule 25, the City and Project Co shall, at all relevant times and at their own expense, obtain and maintain, or cause to be obtained and maintained, those insurances which they are required to obtain and maintain, or cause to be obtained and maintained, by Applicable Law, or that they consider necessary.

4.2 The City reserves the right to require Project Co to purchase such additional insurance coverage as the City may reasonably require. The City also reserves the right to request such higher or lower limits of insurance or otherwise alter the types of coverage requirements, their minimum amounts and deductibles (taking into consideration such matters as the nature of the Maintenance Services and the Design and Construction Works, contract value, industry standards, and availability of insurance) as the City may reasonably require from time to time. Any additional costs of such additional and/or amended insurance shall be borne by the City and any cost savings resulting from the

implementation of such additional and/or amended insurance shall be for the account of the City.

ARTICLE 5
RESPONSIBILITY FOR DEDUCTIBLES

5.1 The Party responsible for the matter giving rise to a claim, to the extent responsible therefor, shall be responsible and liable for the payment of deductibles under any policy of insurance under which it is an insured party or under any policy of insurance Project Co is required to maintain (or cause to be maintained) under this Schedule 25. In the event that responsibility for the matter giving rise to the claim is indeterminable, the First Named Insured under the policy of insurance is responsible and liable for the payment of deductibles.

ARTICLE 6
COOPERATION WITH INSURER'S CONSULTANT

6.1 If an insurer or an insurer's appointed consultant, for underwriting purposes or as a term of an insurance policy, needs to review any part of the performance of this Project Agreement, then the City and Project Co shall, and shall require the City Parties and the Project Co Parties, respectively, to:

(a) cooperate with the insurer and its consultant, including providing them with such information and documentation as they may reasonably require; and

(b) allow the insurer and its consultant to attend meetings between Project Co and the City (or, as applicable, and if reasonably required by the insurer, between Project Co and those engaged by or through Project Co).

ARTICLE 7
BENCHMARKING OF INSURANCE COSTS

7.1 For purposes of this Article 7, the following terms shall have the following meanings:

(a) "**Insurance Payment**" means:

(i)

less

(ii) any Project Insurance Change.

(b) "**Insurance Review Date**" means each anniversary of the Relevant Insurance Inception Date, except where such date lies beyond the end of the Project Term, in which case the Insurance Review Date shall be the last renewal date of the Relevant Insurance prior to the Expiry Date.

(c) "**Insurance Review Period**" means a one year period from the Relevant Insurance Inception Date and each subsequent one year period commencing on the first anniversary of the Relevant Insurance Inception Date, except where the end of such period lies beyond the end of the Project Term, in which case the Insurance Review Period shall be the period from the end of the penultimate Insurance Review Period to the last day of the Project Term.

(d) "**Project Insurance Change**" means any net increase in the Relevant Insurance Cost relative to the cost of the relevant insurance at the Relevant Insurance Inception Date arising from:

(i) other than in respect of claims or re-ratings arising out of acts or omissions of the City, a City Party or a System User (for greater certainty, other than as a consequence of a breach by Project Co of its obligations under this Project Agreement), the claims history or re-rating of Project Co or any Project Co Party;

(ii) the effect of any change in deductible unless:

(1) such change is attributable to circumstances generally prevailing in the worldwide insurance market; and

(2) the deductible, further to such change, is either greater than or equal to the maximum deductibles set out in this Schedule 25; and

(3) in respect of the Relevant Insurance, such change is not attributable to claims made as the result of acts or omissions of Project Co or any Project Co Party; and

(iii) any other issue or factor other than circumstances generally prevailing in the worldwide insurance market.

(e) "**Relevant Insurance**" means all policies of insurance to be obtained (or caused to be obtained) by Project Co in accordance with Article 2 of this Schedule 25.

(f)

(g) "**Relevant Insurance Inception Date**" means the date on which the Relevant Insurance is first providing active insurance cover to Project Co and the City being a date no earlier than the Revenue Service Availability Date.

(h)

(i)

(j) "**Stage 2 East Incremental Premium Amount**" means all additional premiums, excluding Taxes and all broker's fees and commissions, payable by Project Co for the Relevant Insurance as a one-off payment as a result of reaching Stage 2 East

Substantial Completion, less any part of such cost which is attributable to the claims history of Project Co or any Project Co Party (other than claims arising out of the acts or omissions of the City, a City Party or a System User (for greater certainty, other than as a consequence of a breach by Project Co of its obligations under this Project Agreement)).

(k)

(l)

(m)

(n)

(o) "**Stage 2 West Incremental Premium Amount**" means all additional premiums, excluding Taxes and all broker's fees and commissions, payable by Project Co for the Relevant Insurance as a one-off payment as a result of reaching Stage 2 West Substantial Completion, less any part of such cost which is attributable to the claims history of Project Co or any Project Co Party (other than claims arising out of the acts or omissions of the City, a City Party or a System User (for greater certainty, other than as a consequence of a breach by Project Co of its obligations under this Project Agreement)).

(p)

7.2 No later than sixty (60) days prior to each Insurance Review Date, Project Co's insurance broker shall, at Project Co's sole cost and expense, prepare a report on behalf of both Project Co and the City (the "**Joint Insurance Cost Report**"), which contains the following information for the relevant Insurance Review Period:

(a)

(b)

(c) an assessment and quantification of each Project Insurance Change, together with the reasons therefor;

(d)

(e)

(f) evidence satisfactory to the City, acting reasonably, of any changes to circumstances generally prevailing in the Ontario insurance market that are claimed in connection with the determination of the Project Insurance Change.

7.3 No later than ninety (90) days prior to the Planned Revenue Service Availability Date for each of Stage 2 East and Stage 2 West (as defined in Section 5 of Part B of Schedule 20 – Payment Mechanism), Project Co's insurance broker shall, at Project Co's sole cost and

expense, prepare a report on behalf of both Project Co and the City (the "**Stage 2 Joint Insurance Cost Report**"), which contains the following information, with a level of detail and provision of supporting documentation to the City's reasonable satisfaction, for the relevant Insurance Review Period:

(a)

(b)

(c)

(d) the opinion of Project Co's insurance broker as to whether, and if so, to what extent, the Relevant Insurance Cost has increased for reasons attributable to the claims history of Project Co or any Project Co Party, specifying the impact of any claims made and quantifying the amount attributable to each factor.

7.4 The City will pay the Insurance Payment, Stage 2 East Initial Payment and the Stage 2 West Initial Payment in accordance with Schedule 20 - Payment Mechanism.

ARTICLE 8
UNINSURABLE RISKS

8.1 The term "**Uninsurable Risk**" means a risk, or any component of a risk, against which Project Co is required to insure pursuant to this Schedule 25 and for which, at any time after the date of this Project Agreement, either:

(a) the insurance required pursuant to this Schedule 25 (including the terms and conditions specified for such insurance herein) is not available in relation to that risk:

(i) where Applicable Laws require that the insurer must be licensed in the Province of Ontario to insure such a risk, by insurers licensed in the Province of Ontario; or

(ii) where Applicable Laws do not require that the insurer must be licensed in the Province of Ontario to insure such a risk, by any insurer otherwise permitted under the terms of this Project Agreement;

(b) the insurance premium payable or the terms and conditions for insuring that risk are such that the risk is not generally being insured against in the worldwide insurance market.

Project Co has the onus of demonstrating, to the City's reasonable satisfaction that the foregoing definition applies to a particular risk.

8.2 Project Co shall notify the City as soon as possible and, in any event, within 15 Business Days of becoming aware of same, that a risk, or any component of a risk, has become an

Uninsurable Risk, and shall provide the City with all relevant details in relation to such risk, including a copy of the relevant insurance policy.

8.3 Project Co and the City shall, as soon as possible following the provision of the notice referred to in Section 8.2 of this Schedule 25, meet to discuss, in good faith, the appropriate means by which the Uninsurable Risk should be managed and, if Project Co and the City are able to agree to alternative arrangements, the Uninsurable Risk shall be managed in accordance with such alternative arrangements.

8.4 In the event that Project Co and the City, each acting in good faith, are unable to agree to alternative arrangements with respect to the management of an Uninsurable Risk within 15 Business Days of the expiry of the period referred to in Section 8.2 of this Schedule 25, the City may, in its absolute discretion, either:

(a) elect to assume responsibility for the Uninsurable Risk and, in respect of the year in which the relevant risk becomes an Uninsurable Risk and every year thereafter, withhold, in equal instalments over the course of such year, from the payment or payments otherwise due to Project Co an amount equal to the annual premium (index linked) relating to the Uninsurable Risk as was current on the date immediately prior to the date on which the relevant risk became an Uninsurable Risk, in which case this Project Agreement shall continue in full force and effect; or

(b) terminate this Project Agreement in accordance with Section 47.2 of this Project Agreement as if such termination had occurred as a result of the Parties having failed to reach agreement in accordance with Section 47.2 of this Project Agreement following the occurrence of an event of Force Majeure, and, in accordance with the provisions of Schedule 23 – Compensation on Termination, pay to Project Co an amount equal to the Non-Default Termination Sum.

8.5 On the occurrence of an Uninsurable Risk, the City may, in its absolute discretion, either:

(a) pay to Project Co an amount equal to the insurance proceeds that would have been payable to Project Co in connection with such Uninsurable Risk had the relevant insurance continued to be available, in which case this Project Agreement shall continue in full force and effect; or

(b) terminate this Project Agreement in accordance with Section 47.2 of this Project Agreement as if such termination had occurred as a result of the Parties having failed to reach agreement in accordance with Section 47.2 of this Project Agreement following the occurrence of an event of Force Majeure, and, in accordance with the provisions of Schedule 23 – Compensation on Termination, pay to Project Co an amount equal to the Non-Default Termination Sum.

8.6 With respect to any Uninsurable Risk:

(a) Project Co shall continue to approach the insurance market on a regular basis and, in any event, at intervals of not less than 180 days and use reasonable efforts to obtain (or cause to be obtained) insurance to cover as much or all of the Uninsurable Risk as can be insured in the available insurance market from time to time; and

(b) Subject to Section 8.6(a) of this Schedule 25, Project Co shall be relieved of its obligation to maintain (or cause to be maintained) insurance in respect of the Uninsurable Risk.

8.7 Where a risk which was previously an Uninsurable Risk ceases to be so, Project Co shall, at its own expense, obtain and maintain, or cause to be obtained and maintained, insurance in accordance with the requirements of this Schedule 25 in respect of the risk and the provisions of this Article 8 shall no longer apply to such risk.

8.8 From and after the Revenue Service Availability Date, the Parties shall meet on an annual basis to review the scope of insurance coverage and deductibles provided in this Schedule 25, and may make mutually agreed changes thereto.

ARTICLE 9
TOTAL OR SUBSTANTIAL DESTRUCTION

9.1 In the event of damage to, or destruction of, all or substantially all of the System for which there is coverage under an insurance policy, any insurance proceeds received by Project Co shall first be applied so as to ensure the performance by Project Co of its obligations under this Project Agreement, including, where appropriate, the reinstatement, restoration or replacement of the System or any other assets, materials or goods necessary or desirable for the carrying out of the Project Scope, all in accordance with the terms of the Insurance Trust Agreement.

ARTICLE 10
SUBCONTRACTORS

10.1 Project Co shall require that all Subcontractors are covered by, or obtain, the insurance described in this Schedule 25, provided that Project Co shall determine the applicable limits to be obtained for such insurance. Project Co shall be solely responsible and liable for any damages which the City may suffer as a direct result of Project Co's failure to comply with the foregoing.

10.2 If Project Co receives notice that any Subcontractor employed by or through Project Co is not covered by any insurance required by this Schedule 25 to be obtained (or caused to be obtained) by Project Co, Project Co shall:

(a) ensure that such insurance coverage is put in place;

(b) remove the Subcontractor from the Site and ensure that such Subcontractor does not perform any further part of the Project Scope until after such insurance coverage is put in place; or

(c) if the Subcontractor cannot be covered by a particular policy as required by this Schedule 25, replace the Subcontractor with a new Subcontractor who can be covered by insurance required by this Schedule 25 or who can obtain the required insurance coverage; it being acknowledged by Project Co that the requirements and restrictions set forth in this Project Agreement regarding new and replaced Subcontractors shall be complied with.

ARTICLE 11
RENEWAL

11.1 Project Co shall provide to the City, HMQ and IO, at least 5 Business Days prior to the expiry date of any policy of insurance required to be obtained (or caused to be obtained) by Project Co pursuant to this Schedule 25, evidence of the renewal of each such policy satisfactory to the City, HMQ and IO, acting reasonably.

ARTICLE 12
NAMED AND ADDITIONAL INSUREDS AND WAIVER OF SUBROGATION

12.1 All insurance provided by Project Co, shall:

(a) include Project Co, the City, HMQ and IO and any other party specified in Appendix A of this Schedule 25 as Named Insureds to the extent specified in Appendix A of this Schedule 25 or as required pursuant to any agreement relating to the Project to which Project Co is a party;

(b) include the City, HMQ, IO, the Lenders, the Lenders' Agent and any other party specified in Appendix A of this Schedule 25 as Additional Insureds, or loss payees to the extent of their respective insurable interests to the extent specified in Appendix A of this Schedule 25 or as required pursuant to any agreement relating to the Project to which Project Co is a party;

(c) except with respect to the Automobile Liability, Comprehensive Crime and WSIB specified in Parts 1 and 2 of Appendix A to this Schedule 25, contain a waiver of subrogation as against the City, the City Parties and their respective shareholders, officials, directors, officers, employees, servants, consultants (other than design consultants) and agents;

(d) contain a breach of warranty provision whereby a breach of a condition by Project Co will not eliminate or reduce coverage for any other insured; and

(e) be primary insurance with respect to any similar coverage provided by any insurance obtained by or available to the City without any right of contribution of any insurance carried by the City.

12.2 Notwithstanding that the City includes each board commission or other subdivision, department or branch of the City and "**HMQ**" includes each ministry, agency, board or other subdivision, department or branch of HMQ, for purposes of this Schedule 25, including Appendix A hereto, certain department and branches of the City and certain

ministries and agencies of HMQ are listed as Named Insureds and/or Additional Insureds for greater certainty and for insurance evidence requirements.

ARTICLE 13
CERTIFICATES OF INSURANCE AND CERTIFIED COPIES OF POLICIES

13.1 Prior to the commencement of any part of the Design and Construction Works, Project Co will provide the City with certified copies of policies, confirming that the insurances specified in Section 1.1 have been obtained and are in full force and effect.

13.2 Prior to the commencement of any part of the Design and Construction Works, Project Co will provide the City with certificates of insurance or certified copies of policies, confirming that the insurances specified in Section 1.2 have been obtained and are in full force and effect. If certificates of insurance are provided, certified copies of the entire contents of all relevant insurance policies will be subsequently provided to the City no later than 90 days after execution of this Project Agreement.

13.3 Prior to the commencement of any part of the Maintenance Services, Project Co will provide the City with certificates of insurance or certified copies of policies, confirming that the insurances specified in Section 2.1 have been obtained and are in full force and effect. If certificates of insurance are provided, certified copies of the entire contents of all relevant insurance policies will subsequently be provided to the City no later than 90 days after the Revenue Service Availability Date; however specimen wordings of all such insurance policies, along with the corresponding summary of coverage, limits and deductibles, must be provided to the City no later than ninety (90) days prior to the Revenue Service Availability Date.

ARTICLE 14
FAILURE TO MEET INSURANCE REQUIREMENTS

14.1 If Project Co fails to obtain or maintain, or cause to be obtained and maintained, the insurance required by this Schedule 25, fails to furnish to the City a certified copy of each policy required to be obtained by this Schedule 25 or if, after furnishing such certified copy, the policy lapses, is cancelled, or is materially altered, then the City shall have the right, without obligation to do so, to obtain and maintain such insurance itself in the name of Project Co, and the cost thereof shall either, at the City's option, be payable by Project Co to the City on demand or be deducted by the City from the next payment or payments otherwise due to Project Co.

14.2 If coverage under any insurance policy required to be obtained (or caused to be obtained) by Project Co should lapse, be terminated or be cancelled, then, if directed by the City, all work by Project Co shall immediately cease until satisfactory evidence of renewal is produced.

ARTICLE 15
MODIFICATION OR CANCELLATION OF POLICIES

15.1 Except as noted in Appendix A to this Schedule 25, all insurance provided by Project Co shall contain endorsements confirming that the policy will not be cancelled, adversely reduced, adversely materially altered or adversely materially amended without the insurer(s) giving at least ninety (90) days prior written notice by registered mail, at the addresses specified, to the City, the Lenders and the Lenders' Agent. For greater certainty, the terms "adversely reduced", "adversely materially altered" and "adversely materially amended" as used in this provision shall mean any decrease or reduction in policy limits, aggregate limits or sub-limits (other than as a result of claims under the policy), any increase in any policy deductible or self-insured retention, any reduction in the policy coverage period, cancellation or suspension of coverage with respect to any insured parties from the time the policy was issued for that policy period, addition of any exclusions or restrictions from the time the policy was issued for that policy period and any reduction or restriction in the scope of coverage provided under the policy, in all cases when such adverse reduction, adverse material alteration or adverse material amendment is initiated by the insurer.

15.2 All insurance provided by Project Co shall contain endorsements confirming that, in the event of cancellation for non-payment of premium, the insurer(s) will give at least fifteen (15) days prior written notice by registered mail, at the addresses specified, to the City, the Lenders and the Lenders' Agent.

15.3 With respect to Maintenance Term insurances, only notice of cancellation will be required for the Automobile Liability and Comprehensive Crime described in Part 2 of Appendix A to this Schedule 25.

15.4 With respect to insurances described in Section 1.1(a), (b) and (d), Section 1.2(d) and Section 2.1(a), (b), (c) and (d), breach of any of the terms or conditions of the policies required to be provided by Project Co, or any negligence or wilful act or omission or false representation by an Insured under these policies, shall not invalidate the insurance with respect to the City, HMQ, IO, the Lenders or any other Insured, but only to the extent that such breach is not known to these parties.

ARTICLE 16
INSURERS

16.1 All policies of insurance to be obtained (or caused to be obtained) by Project Co in accordance with this Schedule 25 shall be issued by financially sound insurers acceptable to the City and the Lenders, acting reasonably, and, where required by statute, be licensed to insure such risk in the Province of Ontario.

16.2 To be eligible to provide insurance, an insurer must have the capacity to provide the particular insurance and shall have current ratings from time to time of either:

(a) a Financial Strength Rating of not lower than "A-" for three out of the previous five years but not lower than "B" at any time during those five years, and a Financial Size Category not lower than VII, such ratings being those established by A. M. Best Company (Best); or

(b) a Long-Term Financial Strength Rating of not lower than "A-" for three out of the past five years but not less than "BBB" at any time during those five years, a Short-Term Financial Strength Rating of not lower than "A-3" for three out of the previous five years and a Financial Enhancement Rating of not lower than "A-" for three out of the previous five years but not less than "BB+" at any time during those five years, such ratings being those established by Standard and Poor's (S&P); or

(c) if the insurer is not rated by Best or S&P, an insurer that is acceptable to the City and Lenders, acting reasonably, with respect to the insurances required by this Schedule 25.

ARTICLE 17
POLICY TERMS AND CONDITIONS

17.1 All policies of insurance to be obtained (or caused to be obtained) by Project Co in accordance with this Schedule 25 shall be in form and substance satisfactory to the City and its insurance advisors, acting reasonably.

17.2 To achieve the minimum limits for any type of insurance required under Appendix A, it is permissible to arrange the insurance under a single policy, or by a combination of primary, umbrella and/or excess policies.

ARTICLE 18
FAILURE TO COMPLY

18.1 Neither failure to comply nor full compliance by Project Co with the insurance provisions of this Schedule 25 shall relieve Project Co of its liabilities and obligations under this Project Agreement.

Appendix A – Insurance Requirements

Design and Construction Works Insurance – Part 1 Ottawa Light Rail Transit Project

From First Access to Site until the Revenue Service Availability Date (Insurance for Design and Construction Works)

Insurances to be provided, or caused to be provided, by Project Co and arranged through the IOCIP program

Type	Amount	Maximum Deductibles	Principal Cover
"All Risks" Course of Construction Property, including Boiler and Machinery	Value declared to be equal to $ limit of loss as per the 2013 probable maximum loss study, including Property of Every Description and all other property supplied by the City or City Parties for incorporation into the System. Delay in Start-up $, covering a 12-month indemnity period, including Contingent Delayed Start-Up related to losses at Suppliers' or Manufacturers' premises or other temporary storage locations ($ sub-limit) Soft Costs $ (representing the declared value of Recurring / Continuing Soft Costs) Extra and Expediting Expense (minimum $10 million sub-limit) Tunnel and subsurface structures – maximum percentage payable – Principal Extensions: • Replacement Cost Valuation (Property) • Most Recent Technology Replacement Cost Valuation (Equipment or Machinery, except Tunnel Boring Machines) • Tunnel Boring Machine Valuation Clause	3% of loss value / $500,000 minimum Earthquake $ Contractors' Equipment (Road Headers) $500,000 Flood and Water Damage $500,000 Underground losses $250,000 Testing and commissioning $100,000 All other losses 120 day waiting period applicable to time element coverages, underground losses 48 hour waiting period, off premises services 60 day waiting period applicable to all other time element coverages	"All Risks" Course of Construction Property Insurance covering the full insurable replacement cost of the Works including cold and hot testing / commissioning of Equipment including HVAC, Delay in Start-Up, Soft Costs with no early occupancy restriction. This coverage shall be primary with respect to the Project without right of contribution of any insurance carried by the City, HMQ, IO or the Lenders.

Type	Amount	Maximum Deductibles	Principal Cover
	• Flood (to policy limit with annual aggregate) • Natural or man-made earth movement, including earthquake, landslide or subsidence (to policy limit with an annual aggregate) • Electronic Data Processing equipment and media, including data restoration and re-creation costs • Transit • Unnamed locations • By-laws including Demolition, Increased Cost of Repairs and Replacement (subject to a $25 million sub-limit only with respect to existing or renovated buildings) • Debris Removal (minimum $15 million sub-limit) • Off Premises Services Interruption (minimum $15 million sub-limit) • Professional Fees (minimum $10 million sub-limit) • Fire Fighting Expenses (minimum $10 million sub-limit) • Valuable Papers (minimum $5 million sub-limit) • Accounts Receivable (minimum $5 million sub-limit) • Green Building and LEED Upgrades (subject to a $5 million sub-limit) • Defence Costs (subject to a $5 million sub-limit) • Contamination Clean-up or Removal (minimum $1 million sub-limit) • Ammonia Contamination		

Type	Amount	Maximum Deductibles	Principal Cover
	(minimum $1 million sub-limit) • LEED Rectification, Commissioning and Testing Expenses (subject to a $500,000 sub-limit) • Civil Authority Access Interruption (8 weeks) • Prevention of Ingress/Egress (8 weeks) • By-Laws including demolition and increased replacement / repair costs • Permission for Partial Use or Occupancy prior to Revenue Service Availability • Cost of Carrying Project Financing (12 Months), included in Delayed Start-Up coverage • Margin of Profit Extension for Contractors • Radioactive contamination caused by sudden and accidental release of radioactive isotopes (resulting from an accident) • Road Header Endorsement Permitted Exclusions: • Cyber risk • Mould, fungi and fungal derivatives • Faulty workmanship, materials construction, or design but resultant damage to be insured to a minimum LEG 2 standard • War risk • Terrorism • Nuclear or radioactive contamination, except radioactive isotopes intended		

Type	Amount	Maximum Deductibles	Principal Cover
	for scientific, medical, industrial or commercial use • Contractors' equipment (unless values declared and risk accepted by insurers – Road Header Endorsement noted) • Munich Re Endorsement 101 • Munich Re Endorsement 121		

Comments	• Named Insured includes Project Co, Lenders, Lenders' Agent, the Construction Contractor, all subcontractors, sub-subcontractors, consultants and sub-consultants, the City, HMQ and IO and as their respective interests may appear
	• No provision permitted allowing a coinsurance penalty
	• Insurance shall be primary without right of contribution of any other insurance carried by any Named Insured
	• Additional key extensions of coverage:
	  • Underground services, temporary works involved in the Project such as scaffolding, hoarding, etc., site preparation, including excavation and associated improvements, landscaping and property of others used in the construction of the Project
	  • Losses payable in accordance with the Insurance Trust Agreement
	  • Upon Revenue Service Availability, cover will cease and be replaced by All Risk Property and Boiler & Machinery Insurance – Maintenance Term
	  • Waiver of Subrogation against all Named and Unnamed Insureds, including but not limited to Project Co, the City, HMQ, IO, the Construction Contractor, all subcontractors, professional consultants (other than for their professional liability), Lenders, Lenders' Agent, as well as officers, directors and employees, servants, and agents of the foregoing
	  • Frost or freezing to concrete – but only resultant damage from a peril not otherwise excluded
	  • Liberalization Clause
	  • Errors and Omissions
	  • Breach of Conditions
	  • Interims Payments Clause		

Underwriters	Principal underwriters in compliance with Article 16 of this Schedule 25		

Design and Construction Works Insurance – Part 1 Ottawa Light Rail Transit Project

From First Access to Site until the Revenue Service Availability Date (Insurance for Design and Construction Works)

Insurances to be provided, or caused to be provided, by Project Co and arranged through the IOCIP program

Type	Amount	Maximum Deductibles	Principal Cover
Wrap-Up Commercial General Liability and Non-Owned Automobile Liability	$300 million each occurrence, and in the annual aggregate with respect to Broad Form Products and Completed Operations Sub-limits: • $300 million Non-Owned Automobile Liability • $300 million Sudden and Accidental Pollution and Hostile Fire Pollution Liability • $5 million "All Risks" Tenants' Legal Liability • $5 million Prairie or Forest Fire Fighting Expenses • $5 million Employee Benefits Administrative Errors and Omissions • $500,000 Contractors Rework • $100,000 Legal Liability for Damages To Non-Owned Automobiles (SEF 94) • $10,000/50,000 Medical Payments Principal Extensions: • Owner's and Contractor's Protective • Blanket Contractual (written and oral) • Direct and Contingent Employers Liability • Personal Injury (nil participation)	$250,000 per occurrence $250,000 per claim with respect to Contractors Rework $1,000 per claim with respect to each of SEF 94, Tenants Legal Liability, Prairie or Forest Fire Fighting Expenses and Employee Benefits Administrative Errors and Omissions	Wrap-Up Commercial General Liability and Non-Owned Automobile Liability insurance covering all construction operations on an occurrence basis against claims for Bodily Injury (including Death), Personal Injury, Property Damage (including Loss of Use), and including Products and Completed Operations Liability, extended for a period of not less than 24 months, effective from the Revenue Service Availability Date. Coverage shall be maintained continuously from the date of the first access to the Site, until the Revenue Service Availability Date, at which time the Products and Completed Operations extension will take effect. Pollution Liability – Sudden and Accidental and Hostile Fire Pollution coverage to be not less than IBC 2313 form (240 hours detection/240 hours notice coverage structure). This coverage shall be primary with respect to the Project without right of contribution of any insurance carried by the City, HMQ, IO or the Lenders.

Type	Amount	Maximum Deductibles	Principal Cover
	• Cross Liability and Severability of Interest with respect to each insured party • Blasting / demolition / excavating / underpinning / pile driving / shoring / caisson work / work below ground surface / tunnelling / grading and similar operations associated with the Works, as applicable • Elevator and Hoist Collision Liability • Liberalized Notice of Claim Requirement, i.e., requirement to report will commence when knowledge is held by a designated project person(s) – to be identified by Project Co • Non-Owned Automobile Liability • Tenants' Legal Liability (All Risks) – subject to sub-limit • Medical Expenses – subject to sub-limit • Prairie or Forest Fire Fighting Expenses – subject to sub-limit • Sudden and Accidental Pollution and Hostile Fire Pollution Liability – subject to sub-limit • Employee Benefits Administrative Errors and Omissions – subject to sub-limit • Contractors' Rework Coverage – subject to sub-limit • Permission for Unlicensed Vehicles (partial road use)		

Type	Amount	Maximum Deductibles	Principal Cover
	• Unlicensed Equipment • Loss of Use Without Property Damage • Loading and Unloading of Automobiles • Broad Form Property Damage • Broad Form Completed Operations • Intentional Injury, committed to Protect Persons or Property • Accident Benefits • Worldwide Territory, subject to suits being brought in Canada or the US Permitted Exclusions: • Injury to employees, where WSIB provides valid coverage • Property in the care, custody or control of the insured, except during the Broad Form Products and Completed Operations extension period • Operation of licensed motor vehicles, other than attached machinery, while used for its purpose or at the Project Site • Physical damage to the Project, except during Broad Form Products and Completed Operations extension period • Cyber risk • Mould, fungi and fungal derivatives • Professional liability of engineers, architects and other professional consultants • Nuclear or radioactive contamination, except release radioactive isotopes intended for scientific, medical, industrial or commercial use		

Type	Amount	Maximum Deductibles	Principal Cover
Comments	• Named Insured includes Project Co and its Affiliates, the City, HMQ, IO, the Lenders, Project Co parties involved in the Design and Construction Works, including the Construction Contractor, all subcontractors, sub-subcontractors, suppliers while working on Site, tradesmen while working on Site, engineers, architects, consultants and sub-consultants, (other than for professional liability), others as Additional Insureds, as may be required from time to time, arising from all operations and activities pertaining to the Design and Construction Works and the control and use of the Site • Her Majesty the Queen in Right of Ontario as represented by the Minister of Energy and Infrastructure is added as an Additional Insured • Directors, officers, shareholders, employees of the insured parties involved in the Design and Construction Works are covered as Additional Insureds • Insurance is primary without right of contribution of any other insurance carried by any Named Insured • Aggregate limits will be permitted for Products and Completed Operations, Prairie and Forest Fire Fighting Expenses, Sudden and Accidental Pollution and Hostile Fire Pollution Liability and Employee Benefits Administrative Errors & Omissions Liability; no policy general aggregate will be permitted • Professional service activities integral to the Project, but not covering engineers, architects or other professional consultants, i.e., incidental professional liability risk of a Named Insured and their employed professionals is to be covered, but not the professional liability of independent fee-for-service professional consultants, architects or engineers • Waiver of subrogation of insurers' rights of recovery against all Named and/or Additional Insureds, including Project Co, the City, HMQ, IO, Her Majesty the Queen in Right of Ontario as represented by the Minister of Energy and Infrastructure, the Construction Contractor, all subcontractors, sub-subcontractors, professional consultants, engineers and architects (other than for their professional liability), Lenders, Lenders' Agent, as well as officers, directors, employees, servants and agents of the foregoing		
Underwriters	Principal underwriters in compliance with Article 16 of this Schedule 25		

Design and Construction Works Insurance – Part 1 Ottawa Light Rail Transit Project

From First Access to Site until the Revenue Service Availability Date (Insurance for Design and Construction Works)

Insurances to be provided, or caused to be provided, by Project Co and arranged through the IOCIP program

Type	Amount	Maximum Deductibles	Principal Cover
Project Specific Professional Liability	$60 million minimum per claim / $60 million in the aggregate (inclusive of defense and related costs and supplementary payments) Principal Extensions: • Primary Insurance extension • Automatic addition of firms • Present, former partner, executive officer, director or shareholder of Named Insureds while acting within their scope of duties for the Named Insured • Any individuals or personal corporations retained by the Named Insured under a personal services contract • Claim defined as a written or oral demand for money or a written or oral allegation in breach in the rendering or failure to render professional services received by the Insured or Named Insured and resulting from a single error, omission or negligent act • Lawyer fees and associated expenses incurred in the investigation, defence, settlement, arbitration or litigation of claims	$500,000 per claim with respect to mitigation $250,000 per claim, all other losses	Project Specific Professional Liability Insurance in connection with the design and construction of the Project from beginning of first design, through the entire construction period, to the Revenue Service Availability Date plus coverage for an extended reporting period of not less than 36 months. This coverage shall be primary with respect to the System without right of contribution of any insurance carried by the City, HMQ, IO or the Lenders.

Type	Amount	Maximum Deductibles	Principal Cover
	• Duty to defend, even if the allegations are groundless, false or fraudulent • Worldwide territory, subject to suits brought in Canada • Mitigation of loss • Project Co Endorsement Permitted Exclusions: • Express warranties or guarantees • Estimates on profit, return • Faulty workmanship, construction or work which is alleged or in fact not constructed in accordance with the design of the Project or the construction documents • Design or manufacture of any good or products sold or supplied by the Named Insured • Terrorism • Nuclear Liability • Judgments and awards deemed uninsurable by law • Liability assumed under design contract, unless such liability would have attached to the Named Insured by law in the absence of such agreement • Punitive or exemplary damages, fines, penalties or interest or liquidated punitive or exemplary damages or fees • Refusal to employ, termination of employment, humiliation or discrimination on any basis or other		

Type	Amount	Maximum Deductibles	Principal Cover
	employment related practices or policies • Insured versus insured (first named insured versus insured exception)		
Comments	• Named Insured: Design-Build Contractor(s) (as appropriate), all engineers, architects, and other professional consultants that provide professional design services in connection with the Project (subject to reporting provision) • Professional services covered: All architectural, engineering, land surveying, environmental, landscape architectural, interior design/space planning, soil and material testing services, geotechnical services and procurement services, including their replacements and/or sub-consultants of any tier • Retroactive Date: Full retroactive coverage from date of first design activity • Policy to be non-cancelable except for premium non-payment, material misrepresentation or concealment of facts or a material breach of any condition of the policy		
Underwriters	Principal underwriters in compliance with Article 16 of this Schedule 25		

Design and Construction Works Insurance – Part 1 Ottawa Light Rail Transit Project

From First Access to Site until the Revenue Service Availability Date, (Insurance for Design and Construction Works)

Insurances to be provided, or caused to be provided, by Project Co and arranged through the IOCIP program

Type	Amount	Maximum Deductibles	Principal Cover
Project Specific Pollution Liability (combined Contractors' Pollution Liability and Pollution Legal Liability – Claims Made) Combined Limit subject to Pollution Legal Liability with a minimum $2 million sub-limit	$25 million per claim and in the aggregate for all claims, inclusive of defense and all costs and expenses Principal Extensions: • Hazardous Substances occurring at or emanating from the System or Site during the Policy Period • Microbial Matter (including Fungus/Mould) • Underground / above ground storage tanks • First Party Restoration and Clean-up Costs • Disposal Site Extension, including Transportation (reporting required) • Duty to Defend • Canada and US Territory • Contractual Liability • Emergency Response Costs Permitted Exclusions: • Terrorism • War • Intentional Non-compliance • Prior Knowledge • WSIB • Employers' Liability • Professional Liability • Nuclear Liability • Property Damage to Motor Vehicles during Transportation	$250,000 per claim inclusive of defense and all costs and expenses	Pollution Liability insurance covering third party bodily injury, property damage consequential loss or damage, including clean-up and restoration costs, both at the Site and Off-Site, as required. Extended Reporting Period: Minimum of 36 months after the Revenue Service Availability Date. This coverage shall be primary with respect to the System without right of contribution of any insurance carried by the City, HMQ, IO or the Lenders.

Type	Amount	Maximum Deductibles	Principal Cover
Comments	• Named Insured will include Project Co, its Affiliates, Project Co parties and all other parties engaged in the Works, including the Construction Contractor, all subcontractors, sub-subcontractors, consultants, and sub-consultants • The City, HMQ, IO and the Lenders will be identified as Additional Insureds, or insured clients of Project Co and its Affiliates • Her Majesty the Queen in Right of Ontario as represented by the Minister of Energy and Infrastructure is added as an Additional Insured • The directors, officers, shareholders, and employees of the foregoing shall be Additional Insureds		
Underwriters	Principal underwriters in compliance with Article 16 of this Schedule 25		

Design and Construction Works Insurance – Part 1 Ottawa Light Rail Transit Project

From first Access to Site until the Revenue Service Availability Date (Insurance for Design and Construction Works)

Insurances to be provided, or caused to be provided, by Project Co

Type	Amount	Maximum Deductibles	Principal Cover
Automobile Liability	$5 million (Minimum) for Project Co and Project Co's Construction Contractor vehicles $2 million (Minimum) for vehicles of any other contractor, subcontractors, sub-subcontractors, consultants, and sub-consultants, and workmen, tradesmen, or other persons working on or at the Site		Standard Ontario Owners Form For all vehicles operated by Project Co, the Construction Contractor, all subcontractors, sub-subcontractors, consultants and sub-consultants, operated in connection with the Project. Business Automobile Liability insurance covering third party property damage and bodily injury liability (including accident benefits) arising out of any licensed vehicle. Policies shall be endorsed to preclude cancellation, except upon 60 days prior written notice provided to the City, HMQ, IO and the Lenders.
Commercial General Liability and Non-Owned Automobile Liability For Project Co, the Construction Contractor, all subcontractors, sub-subcontractors, consultants and sub-consultants, including Direct and Contingent Employers Liability, Products and Completed Operations Liability, and Owner's and Contractor's Protective	$25 million each occurrence, and in the annual aggregate with respect to Broad Form Products and Completed Operations for Project Co and Project Co's Construction Contractor $5 million each occurrence, and in the annual aggregate with respect to Broad Form Completed Operations for any other contractor, subcontractors, sub-subcontractors, consultants, and sub-consultants, and workmen, tradesmen, or other persons involved in the Design and Construction Works In both instances, limits of liability may be structured as any combination of Primary plus supplementary layers and Umbrella and/or Excess, or Primary plus Umbrella and/or		Commercial General Liability insurance covering all operations on an occurrence basis against claims for Bodily Injury (including Death), Broad Form Property Damage (including Loss of Use), and including Broad Form Products and Completed Operations Liability. This Commercial General Liability Insurance will cover off-site activities connected to the project and Products and Completed Operations Liability beyond the "Wrap-Up" Commercial General Liability Insurance policy's Products and Completed Operations extension period. In respect of each Milestone, this insurance shall be maintained in effect during the Design and Construction Works and until twelve (12) months following the earlier of the termination of the insured's person's involvement in the Design and Construction Works and the date of issuance of the relevant Milestone Acceptance Certificate for each Milestone that constitutes part of the Design and Construction Works. Policies shall be endorsed to preclude cancellation, except upon 90 days prior written notice provided to the City, HMQ, IO and the Lenders.

Type	Amount	Maximum Deductibles	Principal Cover
extensions	Excess Sub-limits (Project Co and Project Co's Construction Contractor): • Full policy limits with respect to Non-Owned Automobile Liability • $1 million Prairie or Forest Fire Fighting Expenses Principal Extensions (required to be provided by the Project Co. and its Construction Contractor and shall be endeavoured to be provided by any other contractor, subcontractors, sub-subcontractors, consultants, and sub-consultants, and workmen, tradesmen, or other persons involved in the Design and Construction Works): • Owner's and Contractor's Protective • Blanket Contractual (written) • Direct and Contingent Employers Liability • Personal Injury (nil participation) • Cross Liability and Severability of Interest with respect to each insured party • Blasting / demolition / excavating / underpinning / pile driving / shoring / caisson work / work below ground surface / tunnelling/grading and similar operations associated with the Initial Works as applicable • Elevator and Hoist Collision Liability • Non-Owned Automobile		

Type	Amount	Maximum Deductibles	Principal Cover
	Liability • Prairie or Forest Fire Fighting Expenses – subject to sub-limit • Permission for Unlicensed Vehicles' (partial road use) • Unlicensed Equipment • Loss of Use Without Property Damage • Loading and Unloading of Automobiles • Broad Form Property Damage • Broad Form Completed Operations • Intentional Injury, committed to Protect Persons or Property • Worldwide Territory, subject to suits being brought in Canada or the US Permitted Exclusions: • Injury to employees, where WSIB provides valid coverage • Property in the care, custody or control of the insured, except as provided under Broad Form Products and Completed Operations • Operation of licensed motor vehicles, other than attached machinery, while used for its purpose or at the Site • Cyber risk • Mould, fungi and fungal derivatives • Professional liability of engineers, architects and other professional consultants • Nuclear or radioactive contamination, except release of radioactive isotopes		

Type	Amount	Maximum Deductibles	Principal Cover
	intended for scientific, medical, industrial or commercial use		
Comments	• The City, HMQ, IO and the Lenders will be identified as Additional Insureds or insured clients of Project Co and its Affiliates		
Underwriters	Principal underwriters in compliance with Article 16 of this Schedule 25		

From First Access to Site until the Revenue Service Availability Date (Insurance for Design and Construction Works)

Insurances to be provided, or caused to be provided, by Project Co

Type	Amount	Maximum Deductibles	Principal Cover
Aircraft and Watercraft Liability **(If any exposure)**	Minimum $50 million inclusive, including $10 million passenger hazard – Owned Aircraft Minimum $10 million inclusive – Non-Owned Aircraft Minimum $10 million inclusive Owned or Non-Owned Watercraft	To be determined	Policies shall be endorsed to preclude cancellation, except upon 90 days prior written notice provided to the City, HMQ, IO and the Lenders.
Comments	• The City, HMQ, IO and the Lenders will be identified as Additional Insureds or insured clients of Project Co and its Affiliates		
"All Risks" Ocean Marine Cargo **(if any exposure)**	100% Replacement Cost Valuation basis	$25,000 per claim	Property of every description destined for incorporation into the System, during marine transit, on a full replacement value basis, with no co-insurance provision. This coverage shall be primary with respect to the System without right of contribution of any insurance carried by the City, HMQ, IO or the Lenders.
Comments	• Named Insured includes Project Co, the City, HMQ, IO, Lenders, Lenders' Agent, the Construction Contractor, all subcontractors, sub-subcontractors, consultants and sub-consultants as their respective interests may appear		
"All Risks" Contractors' Equipment To cover Project Co, the Construction Contractor, subcontractors, sub-subcontractors consultants and sub-consultants	If Site equipment is three years old or less, the sum insured shall be equal to 100% of the replacement value of all contractors equipment used at the project. If Site equipment is more than three years old, actual cash value basis of loss settlement is acceptable.		All Risks coverage on all owned, rented, leased or borrowed contractors' equipment, used at the Site.
Comments	• Waiver of Subrogation rights against Project Co, the City, HMQ, IO, the Construction Contractor, all subcontractors, sub-subcontractors, consultants, sub-consultants, Lenders, Lenders' Agent, as well as officers, directors, shareholders and employees of the foregoing		

From First Access to Site until the Revenue Service Availability Date (Insurance for Design and Construction Works)

Insurances to be provided, or caused to be provided, by Project Co

Type	Amount	Maximum Deductibles	Principal Cover
Employee Dishonesty (Crime)	$1 million per loss		Employee Dishonesty insurance against the fraudulent/dishonest acts of employees of Project Co and its Affiliates including additional coverage for Broad Form Money and Securities, Money Orders and Counterfeit Paper, Depositors' Forgery, Computer Fraud and Funds Transfer Fraud, Audit Expenses and Credit Card Forgery. Insurance primary without right of contribution of any other insurance carried by the City, HMQ, IO or the Lenders.
Underwriters (All non-IOCIP Initial Works insurance to be provided or caused to be provided by Project Co)	Principal underwriters in compliance with Article 16 of this Schedule 25		
WSIB	In accordance with Ontario Act's established benefits and schedules	Not Applicable	(i) Project Co and its Affiliates shall obtain and maintain at Project Co's expense, WSIB Insurance, in accordance with the Province of Ontario requirements. (ii) Project Co shall ensure that satisfactory evidence of WSIB Insurance is provided by all Project Co Parties, including all other consultants, sub consultants, contractors, subcontractors, suppliers and tradesmen working at the Site. Prior to commencement of the Design and Construction Works, each of the foregoing shall provide satisfactory written confirmation of compliance, from the appropriate authority, including confirmation that all required assessments have been paid to date. Upon Milestone Acceptance of each Milestone, Project Co shall be provided with satisfactory written confirmation that all required assessments have been paid to date. On request, within 30 days of such request, Project Co shall deliver to the City evidence of the workers compensation coverage maintained by any person involved in the Design and Construction Works, or confirmation of that person's exemption from workers compensation coverage.

Maintenance Term Insurance – Part 2 Ottawa Light Rail Transit Project

From the Revenue Service Commencement Date until Termination Date (Insurance for Maintenance Term)

Insurance to be provided, or caused to be provided, by Project Co

Type	Amount	Maximum Deductibles	Principal Cover
"All Risk" Property	At Revenue Service Commencement Date, the Limit of Liability to be declared at the time but based on the 2013 probable maximum loss study loss limit of $ for all property associated with all Milestones, while on the Site or while in transit, including material and supplies destined for incorporation into the Project or intended to be used in the performance of Maintenance Services and all In-Contract Equipment At each of the Stage 2 East Substantial Completion Date and the Stage 2 West Substantial Completion Date, the Limit of Liability shall be adjusted to be an amount based on a probable maximum loss study conducted by Project Co and agreed upon by the City that takes into consideration all property associated with the entire System as at such date, while on the Site or while in transit, including material and supplies destined for incorporation into the Project or intended to be used in the performance of Maintenance Services and all In Contract Equipment	3% of loss value / $500,000 minimum Earthquake $500,000 Flood $250,000 All other losses 120 day waiting period applicable to time element coverages, underground losses 48 hour waiting period, off premises services 60 day waiting period applicable to all other time element coverages	All Risks Property insurance covering all property to be insured with a sum insured equivalent to the full replacement cost value of the property insured, and including necessary Business Interruption and Expediting Expenses. Coverage shall be maintained continuously from and after the Revenue Service Commencement Date and at all times thereafter until the Termination Date. Such insurance will include Inland Transportation, By-Laws and Off Premises coverage. This coverage shall be primary with respect to the Project without right of contribution of any insurance carried by the City, HMQ, IO or the Lenders.

Type	Amount	Maximum Deductibles	Principal Cover
	Business Interruption (Gross Revenue or Gross Profits Form), – 12 month period of indemnity – including interdependency and contingent coverage re losses at key supplier premises, property in transit or in storage off-site Extra and Expediting Expenses (minimum $10 million sub-limit) Principal Extensions: • Replacement Cost Valuation (Property) • Most Recent Technology Replacement Cost Valuation (Equipment or Machinery) • Flood (to policy limit with annual aggregate) • Natural or man-made earth movement, including earthquake, landslide or subsidence (to policy limit with annual aggregate) • Electronic Data Processing equipment and media, including data restoration and re-creation costs • Debris Removal (minimum $15 million sub-limit) • Transit (minimum $10 million sub-limit) • Unnamed locations (minimum $10 million sub-limit) • Professional Fees (minimum $10 million sub-limit) • Fire Fighting Expenses (minimum $10 million sub-limit) • Valuable Papers (minimum • $5 million sub-limit) • Accounts Receivable (minimum $5 million sub-limit)		

Type	Amount	Maximum Deductibles	Principal Cover
	• Contamination Clean-up or Removal (minimum $1 million sub-limit) • Civil Authority Access Interruption (minimum 8 weeks) • Prevention of Ingress/Egress (minimum 8 weeks) • Automatic Coverage for Newly Acquired Locations (90 day reporting period acceptable) • By-Laws including demolition and increased replacement / repair costs • Off Premises Services Interruption • Margin of profit extension for contractors • Joint Loss Agreement (if separate "All Risk" Property and Boiler and Machinery policies are arranged) Permitted Exclusions: • Cyber risk • Mould, fungi and fungal derivatives • Faulty workmanship, materials construction, design or latent defects but resultant damage to be insured • War risk • Terrorism • Nuclear or radioactive contamination, except radioactive isotopes intended for scientific, medical, industrial or commercial use		
Comments	• Named Insured will include Project Co, the City, HMQ, IO and the Lenders – Lenders will be covered as Loss Payee and Mortgagee • All loss proceeds payable to the Insurance Trustee in accordance with the Insurance Trust Agreement • No provision allowing a coinsurance penalty		

Type	Amount	Maximum Deductibles	Principal Cover
	• Waiver of Subrogation against all Named Insureds, including but not limited to Project Co, the Lenders, Lenders' Agent as well as officers, employees, servants and agents of the foregoing		
Underwriters	Principal underwriters in compliance with Article 16 of this Schedule 25		

Maintenance Term Insurance – Part 2 Ottawa Light Rail Transit Project

From the Revenue Service Commencement Date until Termination Date (Insurance for Maintenance Term)

Insurance to be provided, or caused to be provided, by Project Co

Type	Amount	Maximum Deductibles	Principal Cover
Boiler & Machinery	Limit of $100,000,000 each Accident to an Insured Object At Revenue Service Commencement Date, a $ Business Interruption Insurance limit included, subject to a 12 month period of indemnity At each of the Stage 2 East Substantial Completion Date and the Stage 2 West Substantial Completion Date, the Business Interruption Insurance limit and period of indemnity will be adjusted by Project Co to reflect its requirements for the entire System as at such date, in consultation with the City. If a covered accident to insured objects(s) causes an interruption to services or activities, the Business Interruption loss will include the costs of carrying the Project financing, during the affected period Sub-limits ($1 million each): • Ammonia Contamination • Automatic Coverage • Bylaws • Errors and Omissions • Expediting Expenses • Extra Expense • Hazardous Substances	$500,000 per claim, direct damage, underground $250,000 per claim, direct damage, all other losses 30 day waiting period applicable to time element coverages	Boiler & Machinery insurance on a Comprehensive Policy Form basis including HVAC on a full replacement cost basis, including all appropriate endorsements and extensions as well as necessary Business Interruption and Expediting and Extra Expense coverage. Coverage shall be maintained continuously from and after the Revenue Service Commencement Date or activation, whichever shall first occur, and at all times thereafter until the Termination Date. Boiler and Machinery Insurance may be arranged on a combined Property/Boiler and Machinery basis, subject to the Boiler and Machinery section of such a policy being arranged on a Comprehensive Form basis. This coverage shall be primary with respect to the Project without right of contribution of any insurance carried by the City, HMQ, IO or the Lenders.

Type	Amount	Maximum Deductibles	Principal Cover
	• Professional Fees • Water Damage		
Comments	• Named Insured will include Project Co, the City, HMQ, IO and the Lenders – Lenders will be covered as Loss Payee and Mortgagee • All loss proceeds payable to the Insurance Trustee in accordance with the Insurance Trust Agreement As nearly as possible, coverage will be structured to dovetail with the Property Insurance		
Underwriters	Principal underwriters in compliance with Article 16 of this Schedule 25		

Maintenance Term Insurance – Part 2 Ottawa Light Rail Transit Project

From the Revenue Service Commencement Date until Termination Date (Insurance for Maintenance Term)

Insurance to be provided, or caused to be provided, by Project Co

Type	Amount	Maximum Deductibles	Principal Cover
Commercial General Liability and Non-Owned Automobile Liability	At Revenue Service Commencement Date, $200 million each accident or occurrence and in the aggregate with respect to Products and Completed Operations At the Stage 2 East Substantial Completion Date, $250 million each accident or occurrence and in the aggregate with respect to Products and Completed Operations At the Stage 2 West Substantial Completion Date, $300 million each accident or occurrence and in the aggregate with respect to Products and Completed Operations Sub-limits: • At Revenue Service Commencement Date, $200 million Non-Owned Automobile Liability, unless coverage provided under automobile liability insurance • At the Stage 2 East Substantial Completion Date, $250 million Non Owned Automobile Liability, unless coverage provided under automobile liability insurance • At the Stage 2 West	$250,000 per occurrence	Commercial General Liability insurance covering all operations on an occurrence basis against claims for personal injury (including bodily injury and death), Broad Form Property Damage (including Loss of Use), and including Broad Form Products and Completed Operation Liability insurance. Coverage shall be maintained continuously from and after the Revenue Service Commencement Date and at all times thereafter until the Termination Date. Pollution Liability – Sudden and Accidental Pollution coverage to be not less than IBC 2313 form (120 hours detection/120 hours notice coverage structure). This coverage shall be primary with respect to the Maintenance Services without right of contribution of any insurance carried by the City, HMQ, IO or the Lenders.

Type	Amount	Maximum Deductibles	Principal Cover
	Substantial Completion Date, $300 million Non Owned Automobile Liability, unless coverage provided under automobile liability insurance • At Revenue Service Commencement Date, $25 million Sudden and Accidental Pollution and Hostile Fire Pollution • At the Stage 2 East Substantial Completion Date, $37 million Sudden and Accidental Pollution and Hostile Fire Pollution • At the Stage 2 West Substantial Completion DateDate, $50 million Sudden and Accidental Pollution and Hostile Fire Pollution • $5 million “All Risks” Tenants’ Legal Liability, if any exposure exists • $5 million Prairie or Forest Fire Fighting Expense • $5 million Employee Benefits Administrative Errors and Omission Liability • $100,000 Legal Liability for Damages To Non-owned Automobiles (SEF 94) , unless coverage provided under automobile liability insurance • $10,000/$50,000 Medical Payments Principal Extensions: • Owner’s and Contractor’s Protective • Blanket Contractual (written and oral)		

Type	Amount	Maximum Deductibles	Principal Cover
	• Direct and Contingent Employers Liability • Employee Benefits Administrative Errors and Omissions • Personal Injury (nil participation) • Cross Liability and Severability of Interest with respect to each insured party • Blasting / demolition / excavating / underpinning / pile driving / shoring / caisson work / work below ground surface / tunnelling / grading and similar operations, as applicable • Elevator and Hoist Collision Liability • Liberalized Notice of Claim Requirement, i.e., requirement to report will commence when knowledge is held by a designated project person(s) – to be identified by Project Co • Non-owned Automobile Tenants' Legal Liability (All Risks) – subject to sub-limit • Medical Expenses – subject to sub limit • Prairie or Forest Fire Fighting Expenses – subject to sub-limit • Sudden and Accidental Pollution and Hostile Fire Pollution – subject to sub-limit • Permission for unlicensed vehicles' partial road use • Unlicensed Equipment • Loss of Use Without Property Damage • Loading and Unloading of		

Type	Amount	Maximum Deductibles	Principal Cover
	Automobiles • Broad Form Property Damage • Broad Form Completed Operations • Intentional Injury, committed to Protect Persons or Property • Voluntary Compensation • Worldwide Territory, subject to suits being brought in Canada or the US Permitted Exclusions: • Injury to employees, where WSIB provides valid coverage • Property in the care, custody or control of the insured, except as provided under Broad Form Products and Completed Operations • Operation of licensed motor vehicles, other than attached machinery, while used for its purpose or at the Work site • Cyber risk • Mould, fungi and fungal derivatives • Professional liability of engineers, architects and other professional consultants • Asbestos • Nuclear or radioactive contamination, except radioactive isotopes intended for scientific, medical, industrial or commercial use		
Comments	• Named Insured includes Project Co and its Affiliates, the City, HMQ, IO, the Lenders, Project Co Parties involved in the Maintenance Services, including all contractors, subcontractors, sub-subcontractors, suppliers while working on the Site, tradesmen while working on the Site, engineers, architects, consultants and sub consultants, (other than for professional liability) and others as Additional Insureds, as may be required from time to time, arising from all operations and activities pertaining to Maintenance Services and the control and use of the Site • Directors, officers, shareholders, employees of the insured parties involved in the Maintenance Services are covered as Additional Insureds		

Type	Amount	Maximum Deductibles	Principal Cover
	• Insurance primary without right of contribution of any other insurance carried by any Named Insured • Aggregate limits will be permitted for Products and Completed Operations, Prairie and Forest Fire Fighting Expenses, Sudden and Accidental Pollution and Hostile Fire Pollution Liability and Employee Benefits Administrative Errors & Omissions Liability; no policy general aggregate will be permitted • Professional service activities integral to the Maintenance Services, but not covering engineers, architects or other professional consultants, i.e., incidental professional liability risk of a Named Insured and their employed professionals is to be covered, but not the professional liability of independent fee-for-service professional consultants, architects or engineers • Waiver of subrogation of insurers' rights of recovery against all Named and/or Additional Insureds, including Project Co, the City, HMQ, IO, all contractors, subcontractors, sub-subcontractors, professional consultants, engineers and architects (other than for their professional liability), Lenders, Lenders' Agent, as well as officers, directors, employees, servants and agents of the foregoing		
Underwriters	Principal underwriters in compliance with Article 16 of this Schedule 25		

Maintenance Term Insurance – Part 2 Ottawa Light Rail Transit Project

From the Revenue Service Commencement Date until Termination Date (Insurance for Maintenance Term)

Insurance to be provided, or caused to be provided, by Project Co

Type	Amount	Maximum Deductibles	Principal Cover
Environmental Impairment (Pollution) Liability	At Revenue Service Commencement Date, minimum $25 million per claim and in the aggregate for all claims, inclusive of defense and all costs and expenses At the Stage 2 East Substantial Completion Date, minimum $37 million per claim and in the aggregate for all claims, inclusive of defense and all costs and expenses At the Stage 2 West Substantial Completion Date, minimum $50 million per claim and in the aggregate for all claims, inclusive of defense and all costs and expenses Principal Extensions: • Hazardous Substances occurring at or emanating from the Maintenance Services or site during the Policy Period • Microbial Matter (including Fungus/Mould) • Biological Agents • Underground / above ground storage tanks • First Party Restoration and Clean-up • Duty to Defend • Contractual Liability	$250,000 per claim inclusive of defense and all costs and expenses	Pollution Liability insurance covering third party bodily injury and property damage liability, consequential loss or damage, including necessary clean-up costs, both at the Maintenance Services site and off-site, as required. Coverage is extended to include underground and above ground storage tanks. Coverage shall be maintained continuously from and after the Revenue Service Commencement Date and at all times thereafter until the Termination Date. This insurance shall include a twelve (12) month extended discovery period and reporting period provision in the event of termination of the Policy or in the event termination of the Project Agreement for any reason, including its expiration. This coverage shall be primary with respect to the Maintenance Services without right of contribution of any insurance carried by the City, HMQ, IO or the Lenders.

Type	Amount	Maximum Deductibles	Principal Cover
	Permitted Exclusions: • Terrorism • Intentional Non-Compliance • WSIB • War • Employers Liability • Nuclear Liability • Professional Liability		
Comments	• It is permissible for Project Co to extend the Design and Construction Works Pollution policy to include pollution events occurring during the Maintenance Services, on an annual basis throughout the Project Term (if available).		
Underwriters	Principal underwriters in compliance with Article 16 of this Schedule 25		

Maintenance Term Insurance – Part 2 Ottawa Light Rail Transit Project

From the Revenue Service Commencement Date until Termination Date (Insurance for Maintenance Term)

Insurance to be provided, or caused to be provided, by Project Co

Type	Amount	Maximum Deductibles	Principal Cover
Automobile Liability	$5 million (Minimum) for Project Co and Project Co's contractor vehicles $2 million (Minimum) for vehicles of any other contractor, subcontractors, sub-subcontractors, consultants, and sub-consultants, and workmen, tradesmen, or other persons working on or at the Maintenance Services site		Standard Ontario Owners Form For all vehicles operated by Project Co, all contractor, all subcontractors, sub-subcontractors, consultants, and sub-consultants operated in connection with the Maintenance Services. Coverage shall be maintained continuously from and after the Revenue Service Commencement Date and at all times thereafter until the Termination Date. Business Automobile Liability insurance covering third party property damage and bodily injury liability (including accident benefits) arising out of any licensed vehicle. Policies shall be endorsed to preclude cancellation, except upon 60 days prior written notice provided to the City, HMQ, IO and the Lenders.
Underwriters	Principal underwriters in compliance with Article 16 of this Schedule 25		
Comprehensive Crime	$1 million per extension		Comprehensive Crime insurance including coverage for Employee Dishonesty against the fraudulent/dishonest acts of employees of Project Co and its Affiliates, including additional coverage for Broad Form Money and Securities, Money Orders and Counterfeit Paper, Depositors' Forgery, Computer Fraud and Funds Transfer Fraud, Audit Expenses and Credit Card Forgery. Coverage shall be maintained continuously from and after the Revenue Service Commencement Date and at all times thereafter until the Termination Date. This coverage shall be primary with respect to the Maintenance Services without right of contribution of any insurance carried by the City, HMQ, IO or the Lenders.
Underwriters	Principal underwriters in compliance with Article 16 of this Schedule 25		

Maintenance Term Insurance – Part 2 Ottawa Light Rail Transit Project

From the Revenue Service Commencement Date until Termination Date (Insurance for Maintenance Term)

Insurance to be provided, or caused to be provided, by Project Co

Type	Amount	Maximum Deductibles	Principal Cover
WSIB	In accordance with Ontario Act's established benefits and schedules	Not Applicable	(i) Project Co and its Affiliates shall obtain and maintain at Project Co's expense, WSIB Insurance, in accordance with the Province of Ontario requirements. (ii) Project Co shall ensure that satisfactory evidence of WSIB Insurance is provided by all Project Co Parties, including all consultants, sub consultants, contractors, subcontractors, suppliers and tradesmen working at the Site. Prior to commencement of the Maintenance Services, each of the foregoing shall provide satisfactory written confirmation of compliance, from the appropriate authority, including confirmation that all required assessments have been paid to date. Upon completion of the Maintenance Services, Project Co shall be provided with satisfactory written confirmation that all required assessments have been paid to date. On request, within 30 days of such request, Project Co shall deliver to the City evidence of the WSIB coverage maintained by any person involved in the Maintenance Services or confirmation of that person's exemption from WSIB coverage.

SCHEDULE 26

RECORD PROVISIONS

1. GENERAL REQUIREMENTS

1.1 Project Co shall prepare, retain and maintain, at its own expense, all the records (including superseded records) referred to in this Schedule 26, as follows:

(a) in accordance with this Schedule 26;

(b) in accordance with the Project Agreement;

(c) in accordance with the requirements of Schedule 11;

(d) compatible with the City's records management systems;

(e) in a form that is capable of audit;

(f) having due regard to the guidelines and policies of the Office of the Information and Privacy Commissioner of Ontario;

(g) in accordance with the most stringent of Project Co's, the Construction Contractors' and the Maintenance Contractor's normal business practices;

(h) in accordance with Canadian GAAP;

(i) in chronological order; and

(j) in sufficient detail, in appropriate categories and generally in such a manner as to enable Project Co to comply with Project Co's obligations under Section 37 of this Project Agreement.

1.2 Project Co shall provide and keep updated technical documentation including manufacturing drawings to a level of detail suitable for assembly, maintenance, repairs, overhaul and operation. The technical documentation will also be used by the City or Independent Certifier to conduct design or safety audits and reviews. Technical documentation and manufacturing drawings shall record the final 'As-Built', installed, tested and commissioned system and shall provide sufficient information for the continued safe operation and maintenance of the System. For clarity, Project Co's obligations in this Section 1.2 shall apply only to documentation produced or maintained by Project Co pursuant to its obligations under this Agreement.

1.3 For all software Project Co shall provide sufficient information to allow a complete understanding of the functionality and interface requirements. The level of detail shall be sufficient to permit complete verification of all operational, reliability and safety criteria. All supporting design drawings and specifications shall identify the codes and standards with which the design is compliant. Software shall be formally managed using a source

code configuration management tool. For clarity, Project Co's obligations in this Section 1.3 shall apply only to documentation produced or maintained by Project Co pursuant to its obligations under this Agreement.

1.4 Project Co shall retain and maintain all records it generates and receives on their system or otherwise on the Site.

2. RECORDS MANAGEMENT PLAN

2.1 Project Co shall develop and implement a records management system in accordance with the requirements of this Schedule 26. The records management system shall, at a minimum, include the records management areas covered in Section 4 of this Schedule 26 and be consistent with the practices and principles of the ISO 9001:2008 Standard and any other applicable standards specified in this Schedule 26.

2.2 Project Co shall prepare and submit to the City Representative the records management plan outlining the records management system and procedures as per Schedule 10.

2.3 Project Co shall produce a configuration management plan, which will form part of the records management plan. The configuration management plan shall identify the methods and procedures that shall be used to achieve the requirements of the configuration management system. The plan shall identify how the interfaces with the multidiscipline teams, design, project construction, sub-suppliers, and management teams are controlled, and the associated procedures, systems and techniques employed to carry out this effectively and efficiently.

2.4 Project Co shall ensure that consultants or sub-contractors that are retained where there is a records management responsibility are informed of the document and data control requirements.

3. REQUIREMENTS FOR DOCUMENTS SUBMITTED TO THE CITY

3.1 Any drawings (including, without limitation, the As Built Drawings) required to be made or supplied pursuant to this Project Agreement shall be on the most updated version of the applicable software and editable in updated base software format, of a size appropriate to show the detail to be depicted clearly without magnifying aids, shall be consistent in size and format to drawings previously submitted by Project Co to the City, and shall conform to the Output Specifications and the City's computer-aided design and drafting standards. Where by prior agreement the City and Project Co have agreed to accept DVD or other storage media, Project Co shall make or supply drawings and other documents in such form as has been agreed by the Parties and shall include secure back up facilities.

3.2 Any drawings or documents that were supplied to the City then at a later date revised shall also be supplied to the City.

3.3 Records may, with the consent of the City, not to be unreasonably withheld or delayed, be stored in electronic form if the City has access thereto and will continue to have access

thereto, such that the City will be able to read, copy, download, and search same without licence or payment. Records shall also be available in such a fashion conducive to mass download/upload onto City records management systems.

4. RETENTION OF DOCUMENTS

4.1 Wherever practical, original records shall be retained and maintained in a hard copy form. Project Co may retain true copies of original records where it is not practical to retain original records.

4.2 Subject to Sections 4.3 and 4.4 of this Schedule 26, Project Co shall retain and maintain in safe storage, at its expense, all records referred to in this Schedule 26 for a minimum period of the greater of:

(a) the duration of the Project Agreement; and

(b) in respect of records before December 31, 2019, such period as ends on December 31, 2026,

or such longer period as required by Applicable Law.

4.3 Project Co shall notify the City if Project Co wishes to destroy any records referred to in this Schedule 26, or in respect of which the required period under Section 4.2 or under Applicable Law for their retention has expired. The Parties agree that:

(a) within 60 days of such notice, the City may elect to require Project Co to deliver such records to the City, in which case Project Co shall, at the expense of the City, deliver such records (with the exception of Sensitive Information) to the City in the manner and to the location as the City shall specify; or

(b) if the City fails to notify Project Co of its election pursuant to Section 4.3(a) of this Schedule 26 within such 60 day period, Project Co may, at its expense, destroy such records.

4.4 In the event of termination of this Project Agreement prior to or upon the Expiry Date, Project Co shall deliver all records that Project Co retains and maintains pursuant to this Schedule 26 to the City in the manner and to the location that the City shall reasonably specify. The City shall make available to Project Co all the records Project Co delivers pursuant to this Section 4.4 of this Schedule 26 subject to prior reasonable notice. Project Co may deliver true copies of original records required by:

(a) Applicable Law to remain with Project Co;

(b) Project Co in connection with its fulfilment of any outstanding obligations under this Project Agreement; or

(c) Project Co in connection with its fulfilment of any outstanding obligations under the Lending Agreements.

4.5 Where the termination of this Project Agreement arises:

(a) as a result of a City Event of Default or pursuant to Section 47.3 of this Project Agreement, then the costs of delivering the records and the costs for retaining such records in safe storage will be borne by the City; or

(b) for any other cause, then the costs of delivering the records and the costs for retaining such records in safe storage for a period of at least six years following the Termination Date (unless a longer period is required by Applicable Law), shall be borne by Project Co.

5. RECORDS TO BE KEPT

5.1 Without limiting any other requirement of this Project Agreement, Project Co shall prepare, retain and maintain at its own expense:

(a) this Project Agreement, its Schedules and the Project Documents, including all amendments to such agreements;

(b) all records relating to the appointment and replacement of the City Representative and the Project Co Representative;

(c) any documents, drawings (including, without limitation, the As Built Drawings) or submissions in accordance with Schedule 10 - Review Procedure;

(d) any documents relating to Development Approvals to be obtained by Project Co (or otherwise transferred to Project Co on completion of any part of the DB Co Works), and other Project Co Permits, Licences and Approvals, including any refusals and appeals relating to any applications;

(e) all records relating to any statutory inspections of the Project or the Site, including any tracks and roadways;

(f) any notices, reports, results and certificates relating to Milestone Acceptances, Substantial Completion, Revenue Service Availability and Final Completion of the Design and Construction Works and completion of the Project Co Commissioning;

(g) all operation and maintenance manuals;

(h) any documents relating to events of Force Majeure, Delay Events, Compensation Events, Relief Events and Excusing Causes;

(i) all formal notices, reports or submissions made to or received from the City in connection with the provision of the Maintenance Services, the monitoring of performance, the availability of the System Infrastructure, and payment adjustments;

(j) all certificates, licences, registrations or warranties related to the performance of the Maintenance Services;

(k) the invoices for Milestone Payments, the Revenue Service Availability Payment and Monthly Service Payments;

(l) all documents submitted in accordance with Schedule 22 – Variation Procedure;

(m) any documents related to decisions resulting from the Dispute Resolution Procedure;

(n) any documents related to a Project Co Change in Ownership or Change in Control;

(o) any documents relating to any Refinancing;

(p) all accounts for Taxes and transactions relating to Taxes, including in relation to HST applicable to the Project, but excluding any records for:

(i) Project Co's liabilities or payments under the *Income Tax Act* (Canada), the *Income Tax Act* (Ontario) or any similar statute in any other jurisdiction;

(ii) Project Co's liabilities or payments for capital taxes based on or measured by the capital of Project Co;

(iii) the withholdings of any payments by Project Co; or

(iv) any business or activity in addition to the business or activities related to, and conducted for, the purpose of the Project;

(q) the financial accounts of Project Co referred to in this Schedule 26;

(r) such documents as the City may reasonably require relating to Business Opportunities in which the City has a right or interest;

(s) all records required by Applicable Law (including in relation to health and safety matters) to be maintained by Project Co with respect to the activities within the Project Scope;

(t) any documents relating to insurance and insurance claims;

(u) all records relating to Project Intellectual Property, Developed Intellectual Property and Project Data and Drawings;

(v) all other records, documents, information, notices or certificates expressly required to be produced or maintained by Project Co pursuant to this Project Agreement; and

(w) all complaints, inquiries and suggestions received from third parties during the Construction Period and Project Co's responses.

5.2 Either Party may review the documents required to be prepared, retained and maintained by Project Co pursuant to this Schedule 26.

5.3 Prior to, or as soon as possible after, completion of the DB Co Works for each of the Stage 2 East System and the Stage 2 West System, the City shall transfer to Project Co, or ensure that DB Co transfers to Project Co, any equivalent or analogous documents prepared by DB Co as part of the DB Co Works and which Project Co reasonably needs to hold for the purposes of delivering its obligations in respect of Maintenance Services for the Stage 2 System.

6. ADDITIONAL SUBMITTAL REQUIREMENTS

6.1 Within 30 days after the end of each Contract Year, Project Co shall deliver to the City a report, as reasonably requested by the City in connection with the City's financial reporting, detailing to the best of Project Co's knowledge at the time of any such report any and all liabilities, claims and demands, including contingent liabilities, claims and demands, that Project Co has or may have against the City or that may be owing by the City to Project Co. The Parties acknowledge and agree that the contents of any such report or the failure to mention any matter in any such report shall not limit either Party's rights or remedies against the other Party as contemplated by this Project Agreement.

6.2 Project Co shall provide to the City not later than 30 days after the end of each fiscal quarter and 120 days after the end of each fiscal year, part or all of which falls in a Contract Year, a copy of Project Co's audited financial statements, in respect of that period, prepared in accordance with Applicable Law and Canadian GAAP, together with copies of all related auditors' reports and, to the extent publicly available, all related directors' reports and other notices and circulars to shareholders or partners, all of which documents, whether or not marked or identified as confidential or proprietary but subject to the exceptions contained in Section 52 of this Project Agreement, shall be treated by the City as Confidential Information of Project Co.

SCHEDULE 27

DISPUTE RESOLUTION PROCEDURE

1. GENERAL

1.1 All disputes, controversies, or claims arising out of or relating to any provision of this Project Agreement, or the alleged wrongful exercise or failure to exercise by a Party of a discretion or power given to that Party under this Project Agreement, or the interpretation, enforceability, performance, breach, termination, or validity of this Project Agreement, including, without limitation, this Schedule 27, or any matter referred to for resolution pursuant to this Schedule 27 (collectively and individually, a "**Dispute**") shall be resolved in accordance with the provisions of this Schedule 27.

1.2 The Parties agree that at all times, both during and after the Project Term, each of them will make bona fide efforts to:

(a) resolve by amicable negotiations any and all Disputes arising between them on a without prejudice basis; and

(b) subject to Section 1A.1, have all Disputes resolved at the lowest level of management before engaging the dispute resolution processes described in Sections 2 to 9 of this Schedule 27.

1.3 If the Parties are unable to resolve a Dispute at the lowest level of management pursuant to Section 1.2(b) of this Schedule 27, either Party may deliver to the City Representative or the Project Co Representative, as applicable, a written notice of dispute (the "**Notice of Dispute**"), which Notice of Dispute shall, subject to the terms of this Schedule 27 requiring resolution of a Dispute pursuant to a specific dispute resolution process set forth in this Schedule 27, initiate the dispute resolution process described in Sections 2 to 9 of this Schedule 27, as applicable, as more particularly described in this Schedule 27. To be effective, the Notice of Dispute must expressly state that it is a notice of dispute, set out the particulars of the matter in dispute, describe the remedy or resolution sought by the Party issuing the Notice of Dispute and be signed by the City Representative, if given by the City, or by the Project Co Representative, if given by Project Co.

1.4 Project Co agrees that any Claims made by it against any other contractors of the City, based (in whole or in part) as a result of any acts or omissions of other contractor(s) shall, in the first instance, be submitted to the City. The City shall then, with the assistance of Project Co, present the claim to the other contractor(s) for resolution under the terms of the applicable contract(s). Project Co has the full responsibility for the preparation of such claims and Project Co shall bear the complete expense of preparing and presenting its claim, including legal fees. Project Co agrees that it will not pursue or will stay any legal proceeding relating to the claim(s) with the exception of initiating legal proceedings to assert any statutory right to a lien under the CLA for a reasonable period of time to allow the City to reach a resolution acceptable to Project Co under the terms of the applicable contract. If such resolution has not been achieved within a reasonable period of time, Project Co may then proceed with any legal proceeding against the other

contractor of the City. Project Co shall proceed diligently with its Highway Work under Schedule 40 to the Project Agreement pending resolution of any such claim or dispute when directed to do so by City.

1A. AUTHORITY OF THE CONSULTANT IN RESPECT OF HIGHWAY WORK AND COVENTRY BRIDGE WORK

1A.1 Subject to the limitation set out in Section 8.2(s) of Schedule 40 – Highway Work, differences between the Parties as to the interpretation, application or administration of Schedule 40 – Highway Work or the Coventry Bridge Work or any other disagreement between the Parties including any disagreement as to any decision, finding or determination by the Consultant with respect to the Highway Work or the Coventry Bridge Work which are not resolved to the mutual satisfaction of the Parties in the first instance by findings of the Consultant subject to and as provided in Section 8.2 of Schedule 40 – Highway Work, shall be settled in accordance with the requirements of this Schedule 27.

1A.2 If the matter in dispute is not resolved promptly, the Consultant will give such instructions as in the Consultant's opinion are necessary for the proper performance of the Highway Work or the Coventry Bridge Work. The Parties shall act immediately according to such instructions, subject to Section 1A.3 of this Schedule 27, it being understood that by so doing neither Party will jeopardize any Claim they may have. If it is subsequently determined that such instructions were in error or at variance with the Contract Documents, Project Co shall be entitled to payment for carrying out such instructions as set out in accordance with a Variation issued by the Consultant in accordance with Schedule 22 – Variation Procedure.

1A.3 As time is of the essence, it is essential that performance of the Highway Work or the Coventry Bridge Work continue notwithstanding any Dispute that pertains in whole or in part to the interpretation, application or administration of Schedule 40 – Highway Work or Section 20.13 of the Project Agreement. In the event the Dispute is referred to an Adjudicator pursuant to Section 6, the Parties shall, notwithstanding Section 1A.2, comply with any decision of the Adjudicator including the payment of any amounts the Adjudicator determines are owing. For greater certainty the Parties will comply with the decision of the Adjudicator notwithstanding any referral of the Dispute to arbitration or to the courts in accordance this Schedule 27, until a final determination of the matter is made by any arbitrator or a court, as the case may be.

1A.4 The provisions of this Section 1A only apply to Disputes which relate in whole or in part to the interpretation, application or administration of Schedule 40 – Highway Work or the Coventry Bridge Work and the performance of the Highway Work or the Coventry Bridge Work.

2. AMICABLE RESOLUTION BY PARTY REPRESENTATIVES

2.1 On receipt of a Notice of Dispute, the City Representative and the Project Co Representative (collectively "**Party Representatives**" and individually "**Party**

Representative") shall each promptly and diligently make all reasonable bona fide efforts to resolve the Dispute. Each Party Representative shall provide to the other, on a without prejudice basis, frank, candid and timely disclosure of relevant facts, information and documents (except such documentation that is subject to legal privilege) as may be required or reasonably requested by the other to facilitate the resolution of the Dispute.

3. AMICABLE RESOLUTION BY SENIOR OFFICERS OF EACH PARTY

3.1 If, following the process referred to in Section 2 of this Schedule 27 (or as otherwise agreed to in writing by the Parties pursuant to Section 13.8 of this Schedule 27), a Dispute is not resolved by the Party Representatives within 10 Business Days after receipt by a Party of the applicable Notice of Dispute, or within such longer period of time as the Party Representatives may both expressly agree, then at any time after the expiry of such period of time either Party Representative may, by notice in writing to the other, refer the Dispute to an executive of a Party who:

(a) is in a position of authority above that of the City Representative or the Project Co Representative, as the case may be; and

(b) subject only to approval of the board of directors or similar governing body of the Party, has full authority to resolve and settle the Dispute.

3.2 Once a Dispute is referred to them, the executive of each Party shall promptly and diligently make all reasonable bona fide efforts to resolve the Dispute. All discussions and negotiations, and all documents exchanged, between them related to the Dispute shall be on a without prejudice basis to facilitate the resolution of the Dispute.

4. INDEPENDENT CERTIFIER

4.1 This Section 4 applies to all Disputes that fall within the description of Section 4.2 of this Schedule 27 that cannot be resolved as provided in Sections 2 and 3 of this Schedule 27 or as otherwise agreed to in writing by the Parties pursuant to Section 13.8 of this Schedule 27. For greater certainty, this Section 4 does not apply to any Disputes to the extent they relate to the interpretation, application or administration of Schedule 40 – Highway Work and the performance of the Highway Work or to any Disputes which shall be resolved pursuant to Section 14 of this Schedule 27.

4.2 All Disputes related to the Design and Construction Works and that:

(a) arise prior to, or otherwise in relation to, any Milestone Acceptance, Substantial Completion or Revenue Service Availability;

(b) relate to completion of Minor Deficiencies;

(c) relate to whether any proposed work constitutes a Variation;

(d) relate to a review of Estimates or any other matters relating to Variations as the Independent Certifier is entitled to review and determine pursuant to Section 39 of the Project Agreement;

(e) are referred to in the Project Agreement for determination by the Independent Certifier; or

(f) relate to the Certification Services or any Certification Service Variations (as those terms are defined in the Independent Certifier Agreement);

shall initially be submitted to the Independent Certifier for independent determination by the Independent Certifier within such period as may be specified in this Project Agreement, or if no period is specified, within 10 Business Days after submission to the Independent Certifier.

4.3 Without limiting any obligations of the Parties under the Independent Certifier Agreement, the Parties shall cooperate with the Independent Certifier and provide such information, records and documents as may be required by the Independent Certifier to make the determination within the period referred to in Section 4.2 of this Schedule 27.

4.4 The Independent Certifier's decision to issue or not to issue a particular Milestone Acceptance Certificate or a Revenue Service Availability Certificate shall be final and binding solely in respect of determining the relevant Milestone Payment Date, and the Revenue Service Availability Payment Date and a Dispute in relation to the relevant Milestone Payment Date or the Revenue Service Availability Payment Date shall not be subject to resolution pursuant to this Schedule 27. Save and except as aforesaid, the Independent Certifier's determinations are not binding on the Parties, and all Disputes in relation to the Independent Certifier's decisions shall be resolved pursuant to this Schedule 27, provided however that Sections 5 and 6 of this Schedule 27 shall not apply unless otherwise agreed by the Parties on terms acceptable to the Parties.

5. EXPERT DETERMINATION

5.1 If, following the process referred to in Section 2 and 3 of this Schedule 27 (or as otherwise agreed to in writing by the Parties pursuant to Section 13.8 of this Schedule 27), any Dispute as to:

(a) whether a Liquid Market exists;

(b) whether amendments proposed by potentially Qualifying Tenders to this Project Agreement or other Project Documents are material;

(c) the Adjusted Highest Qualifying Tender Price; or

(d) the determination of the Estimated Fair Value in accordance with Schedule 23 – Compensation on Termination of this Project Agreement,

has not been resolved within 10 Business Days after the date the Dispute was referred to the executives of the Parties for resolution by them, or within such longer period of time as the executives may expressly agree in writing in respect of a specific Dispute to allow them to continue their efforts to resolve the Dispute, then either Party may at any time thereafter, by written notice signed by their Party Representative and delivered to the other Party Representative, require that the Dispute be resolved on an expedited basis by a qualified and experienced expert (the "**Expert**").

5.2 The Expert shall be appointed as follows:

(a) if the Parties agree on the Expert, the Parties shall jointly appoint the Expert as soon as possible and, in any event, within 5 Business Days after delivery of the notice requiring that the Dispute be resolved by an Expert;

(b) if the Parties fail to agree or jointly appoint the Expert within such 5 Business Day period, either Party may apply to the Ontario Superior Court of Justice for appointment of the Expert, in which case the court shall appoint the Expert at the earliest opportunity from the list of potential Experts submitted by the Parties or, if either or both Parties fail to submit their list of potential Experts within 7 Business Days, the court may appoint such person as the Expert who meets the requirements set out in this Schedule 27 for qualifications and experience of the Expert.

5.3 No one shall be nominated or appointed to act as an Expert who is or was in any way interested, financially or otherwise, in the conduct of the Project Scope or in the business affairs of the City, Project Co, or any consultant, subconsultant or subcontractor of any of them.

5.4 Subject to the matters the Expert is authorized to determine pursuant to Section 5.1 of this Schedule 27, the Expert will be appointed on a Dispute by Dispute basis, with each Expert having the qualifications and experience relevant to the issues in the particular Dispute for which the Expert is appointed.

5.5 The Expert shall determine the appropriate process for timely and cost effective resolution of the Dispute and, without limiting the generality of the foregoing, the Expert has discretion to, among other things:

(a) solicit submissions and documents from both Parties, and impose deadlines for the receipt of such submissions;

(b) require some or all of the evidence to be provided by affidavit;

(c) direct either or both Parties to prepare and provide the Expert with such documents, test results or other things as the Expert may require to assist the Expert in the resolution of the Dispute and rendering of a decision;

(d) require either Party to supply or prepare for examination by the Expert and the other Party, any document or information the Expert considers necessary;

(e) inspect the Project Scope, giving reasonable notice to each Party of the time when, and the place where, the Expert intends to conduct any inspections;

(f) convene meetings of the Parties to have the Parties discuss the issues in Dispute in the presence of the Expert; and

(g) take, or require either or both Parties to take and provide to the Expert, such measurements, perform such tests, audit such processes and procedures, and take any and all such other measures and steps as the Expert considers necessary to make a final determination in the Dispute.

5.6 The Expert shall render a decision as soon as possible and, in any event, shall use all reasonable efforts to render a decision no later than 10 Business Days after the date of the appointment of the Expert, or such longer period of time as agreed to in writing by the Parties. The Expert shall give reasons or a summary of reasons for the Expert's decision.

5.7 The Expert shall keep all information about the Dispute confidential and shall not disclose such information to anyone other than the Parties.

5.8 Each Party shall bear its own costs of the process for resolution of the Dispute by the Expert. In addition, the costs of the Expert shall be borne equally by the Parties.

5.9 Subject to a right to require the Dispute to be arbitrated or litigated pursuant to Sections 7, 8 and 9 of this Schedule 27 by giving the required notices to arbitrate or litigate within the time periods specified therein, the Parties agree that the Expert's determination shall be final and binding on both Parties and not subject to appeal, adjudication, arbitration, litigation or any other dispute resolution process, and both Parties expressly waive all rights of appeal in connection with the Expert's determination. For greater certainty, the final determination by the Expert shall not be referred to an Adjudicator (as defined below) for determination under Section 6 of this Schedule 27.

6. ADJUDICATION

6.1 If, the Parties fail to resolve any Dispute through the process referred to in Section 2 and 3 of this Schedule 27 within 15 Business Days following referral of the Dispute to an executive in accordance with Section 3.1 (or such other period as may be agreed or expressly stipulated in respect of the relevant matter), it is not a Dispute referred to in Sections 4.2 and 5.1 of this Schedule 27 or a Dispute referred to arbitration or litigation pursuant to Sections 4.4 or 5.9 of this Schedule 27 (except as otherwise agreed to in writing by the Parties pursuant to Section 13.8 of this Schedule 27) and it is not a Dispute referred to in Section 14 of this Schedule 27, either Party may refer the Dispute to a single adjudicator selected in accordance with Section 6.2 of this Schedule 27 (the "**Adjudicator**").

6.2 The Adjudicator nominated by the Party issuing the Notice of Dispute shall be agreed between the Parties or, failing agreement, shall be determined by the Ontario Superior Court of Justice (following an application thereto by the Party issuing the Notice of Dispute) and shall:

(a) be independent of and at arm's length to Project Co, the City, the Lenders and any other person having an interest in the System, the Highway or any of the Project Documents; and

(b) if the Dispute arises during the Project Term, be familiar with the construction, operation and management of heavy civil transportation projects; and

(c) be a person who has the qualifications and experience with respect to the particular issues in Dispute.

6.3 The Adjudicator shall resolve the Dispute in accordance with the United Kingdom Construction Industry Council's *Model Adjudication Procedure* the terms of which are incorporated herein by reference, subject to the following modifications:

(a) within 7 Business Days of appointment in relation to a particular Dispute, the Adjudicator shall require the Parties to submit in writing their respective arguments; provided that, where necessary, the onus of proving that the System is operating in accordance with all relevant specifications and requirements set forth in the Project Agreement is on Project Co. The Adjudicator shall, in his Discretion, determine the procedure of the adjudication proceedings including without limitation, whether a hearing is necessary in order to resolve the Dispute;

(b) in any event, and subject to Section 6.4 of this Schedule 27, the Adjudicator shall provide to both Parties his written decision on the Dispute, within 10 Business Days of appointment (or within such other period as the Parties may agree after the reference). The Adjudicator shall give detailed reasons for the Adjudicator's decision. The Adjudicator shall be entitled to award compensation to a Party and shall be entitled to state the relief for such Party, which may include deeming the occurrence of any Relief Event, Delay Event, Compensation Event and/or Excusing Cause provided that such determination is, however, without prejudice to the City's rights with respect to the use of the Schedule Cushion. Unless otherwise provided for in this Schedule 27, the Adjudicator's decision shall be binding on the Parties, but not final;

(c) the Adjudicator's costs, including any legal fees, of any reference shall be borne as the Adjudicator shall specify or in default, equally by the Parties. In no circumstances shall the Adjudicator be entitled to order a successful or partially successful Party in an adjudication to pay more than one half of the Adjudicator's fees. Each Party shall bear its own costs arising out of the reference, including legal costs and the costs and expenses of any witnesses;

(d) the Adjudicator shall be deemed not to be an arbitrator but shall render his decision as an expert and the provisions of the *Arbitration Act* (Ontario) and the law relating to arbitration shall not apply to the Adjudicator or his determination or the procedure by which he reached his determination;

(e) the Adjudicator shall act impartially and may take the initiative in ascertaining the facts and the law. Unless otherwise expressly provided in this Project Agreement,

the Adjudicator shall have the power to open up, review and revise any opinion, certificate, instruction, determination or decision of whatever nature given under this Project Agreement. For greater certainty, the Independent Certifier's decision to issue or not to issue a particular Milestone Acceptance Certificate or a Revenue Service Availability Certificate shall be final and binding solely in respect of determining the relevant Milestone Payment Date or the Revenue Service Availability Payment Date, and the Consultant's decision to issue or not to issue the Highway Substantial Completion Certificate shall be final and binding solely in respect of determining the Highway Milestone Payment Date, as applicable, and a Dispute in relation to any Milestone Payment Date, including the Highway Milestone Payment Date, or the Revenue Service Availability Payment Date shall not be subject to resolution pursuant to this Schedule 27;

(f) the Adjudicator shall execute a non-disclosure agreement (the "**Non-Disclosure Agreement**") in a form satisfactory to the Parties, providing that, among other things, all information, data and documentation disclosed or delivered by a Party to the Adjudicator in consequence of or in connection with his appointment as the Adjudicator shall be treated as confidential and without prejudice to any potential litigation proceedings. The Adjudicator shall not, save except as expressly permitted by the Non-Disclosure Agreement, disclose to any person any such information, data or documentation, and all such information, data or documentation shall remain the property of the Party disclosing or delivering the same and all copies shall be returned to such Party on completion of the Adjudicator's mandate with respect to the Dispute; and

(g) the Adjudicator shall not be liable for anything done or omitted to be done in the discharge or purported discharge of his functions as Adjudicator unless the act or omission is in bad faith. Any employee or agent of the Adjudicator is similarly protected from liability.

6.4 Where it is determined by the Adjudicator that:

(a) corrective measures must be taken by Project Co to resolve a Dispute, those measures must be implemented by Project Co as soon as reasonably practical, without payment by the City unless (i) the Adjudicator determines otherwise; or (ii) that determination is subsequently reversed by a binding and final determination made in a court proceeding;

(b) corrective measures are not required to be taken by Project Co to resolve a Dispute, the City may, at its option, require corrective measures to be taken forthwith by Project Co, in which case those measures must be implemented by Project Co as soon as reasonably practical provided that the City undertakes to pay Project Co for Direct Costs, plus reasonable overhead and profit incurred by Project Co as such costs are so incurred; provided that no such costs should exceed the amount Project Co is entitled to receive pursuant to Schedule 22 – Variation Procedure thereby incurred upon completion of those corrective measures, but any such undertaking and payment shall be without prejudice to the

City's right to contest the determination made by the Adjudicator in a subsequent proceeding. The City shall provide Project Co such reasonable extensions of time in respect of Project Co's obligations under this Agreement necessary to allow Project Co to effect the corrective measures and such extension of time may be treated as a Delay Event or an Excusing Cause, as applicable, if so determined by the Adjudicator.

6.5 Subject to a right to require the Dispute to be arbitrated or litigated pursuant to Sections 7, 8 and 9 of this Schedule 27 by giving the required notices to arbitrate or litigate within the time periods specified therein, the Parties agree that the Adjudicator's determination is final and binding and not subject to appeal, arbitration, litigation or any other dispute resolution process, and both Parties expressly waive all rights of appeal in connection with the Adjudicator's determination.

7. REFERRAL OF DISPUTES TO ARBITRATION OR LITIGATION

7.1 If:

(a) the amount awarded by the Expert to a Party pursuant to Section 5 of this Schedule 27 or by the Adjudicator pursuant to Section 6 of this Schedule 27 is more than **$500,000** (index linked) in the aggregate or **$150,000** (index linked) in any one year;

(b) the Dispute involves issues other than monetary claims by one Party against the other Party and which a Party reasonably believes are material and significant to that Party; or

(c) a Notice of Dispute has been issued for a Dispute in relation to the Independent Certifier's decisions for which Section 4.4 of this Schedule 27 provides that Sections 5 and 6 of this Schedule 27 shall not apply to resolve such Dispute,

then, subject to the right of a Party to require litigation of the Dispute pursuant to Section 9.1 of this Schedule 27 or a consolidation of proceedings pursuant to Section 11 of this Schedule 27, either Party may, by written notice signed by their Party Representative, request that the Dispute be resolved by arbitration pursuant to Section 8 of this Schedule 27 upon the written consent of the other Party. Such notice will not be effective unless it indicates it is a notice to arbitrate, is signed by the Party Representative and is delivered to the other Party Representative within 15 Business Days after receipt of the Expert's determination, the Adjudicator's decision or the Notice of Dispute referred to in Section 7.1(c) of this Schedule 27, as applicable, and provided further that such notice expressly identifies the specific Dispute and determination of the Expert, decision of the Adjudicator or the Independent Certifier, or finding of the Consultant, subject to and as provided in Section 8.2 of Schedule 40 – Highway Work, as applicable, that is to be the subject of the arbitration.

7.2 If a Party is entitled to refer a Dispute to which Sections 5 or 6 of this Schedule 27 apply to arbitration or litigation pursuant to Sections 7.1 or 9.1 of this Schedule 27 then, unless the Parties otherwise expressly agree in writing, all information, documents and

submissions prepared by a Party for the Expert or the Adjudicator which are not business records that would otherwise be kept in the normal course of business by the Party for its business purposes, and all decisions and determinations by the Expert or the Adjudicator, shall be confidential and inadmissible in any arbitration or litigation proceeding. For greater certainty, neither the Expert nor the Adjudicator shall be called as a witness by either party in any arbitration or litigation proceeding.

8. RESOLUTION BY ARBITRATION

8.1 Upon the mutual written consent of the Parties,

(a) where the Parties fail to resolve a Dispute through the process set out in Sections 2, 3, 4, 5 and 6 (to the extent required) of this Schedule 27;

(b) all other requirements set out in this Schedule 27 have been satisfied; and

(c) it is not a Dispute to which Section 14 of this Schedule 27 applies,

such Dispute may be referred to arbitration in accordance with the *Arbitration Act, 1991* (Ontario) and this Section.

8.2 Disputes referred to arbitration shall be resolved by a single arbitrator unless one of the Parties, by notice in writing delivered to the other Party within 5 Business Days after a notice to arbitrate pursuant to Section 7.1 of this Schedule 27 has been delivered, expressly requires that the Dispute that is the subject of that notice to arbitrate be resolved by a three person arbitration tribunal, in which case that particular Dispute shall be resolved by a three person arbitration tribunal.

8.3 If the arbitration tribunal is comprised of a single arbitrator, the arbitrator shall be appointed as follows:

(a) if the Parties agree on the arbitrator, the Parties shall jointly appoint the arbitrator as soon as possible and in any event within 5 Business Days after delivery of the notice to arbitrate pursuant to Section 7 of this Schedule 27; and

(b) if the Parties fail to agree or jointly appoint the arbitrator within such 5 Business Day period, either Party may apply to the Ontario Superior Court of Justice for appointment of the arbitrator, in which case the court shall appoint the arbitrator at the earliest opportunity in accordance with the following:

(i) from the lists of potential arbitrators submitted to the court by the Parties, provided that potential arbitrators meeting the necessary qualifications and experience set out in this Schedule 27 are on the list; or

(ii) if one Party fails to submit its list of potential arbitrators to the court within 5 Business Days of a request from the court to submit a list, from the list submitted by the other Party provided that potential arbitrators

meeting the necessary qualifications and experience set out in this Schedule 27 are on the list of that other Party; or

(iii) if no list is submitted by either Party, or if the list or lists submitted do not include potential arbitrators with the necessary qualifications and experience, the court shall be entitled at its Discretion to appoint anyone who meets the requirements set out in this Schedule 27 for the qualifications and experience of the arbitrator.

8.4 If the arbitration tribunal is comprised of three arbitrators:

(a) the arbitrators shall be appointed as follows:

(i) each Party shall appoint one arbitrator no later than 5 Business Days after delivery of the notice to arbitrate pursuant to Section 7 of this Schedule 27;

(ii) if a Party fails to appoint an arbitrator within 5 Business Days after delivery of the notice to arbitrate, the other Party is entitled to apply to the Ontario Superior Court of Justice to appoint that arbitrator, in which case the court shall appoint that arbitrator at the earliest opportunity using a comparable process to that described in Section 8.3(b) of this Schedule 27;

(iii) the arbitrators appointed in accordance with the foregoing shall, within 5 Business Days after their appointment, jointly appoint a third arbitrator who shall also act as the chair of the arbitration tribunal and who, in addition to all other required qualifications, shall have experience in arbitration or judicial processes and procedures; and

(iv) if the two arbitrators appointed by the Parties fail to appoint a third arbitrator within the required time, either of the other two arbitrators may apply to the Ontario Superior Court of Justice for appointment of the third arbitrator, in which case the court shall appoint the third arbitrator at the earliest opportunity using a comparable process to that described in Section 8.3(b) of this Schedule 27; and

(b) the arbitrators appointed by the Parties shall at all times be neutral and act impartially and shall not act as advocates for the interests of the Party who appointed them.

8.5 All arbitrators must have qualifications and experience relevant to the issues in the Dispute and also have qualifications and experience as arbitrators.

8.6 No one shall be nominated or appointed to act as an arbitrator who is or was in any way interested, financially or otherwise, in the conduct of the Project Scope or in the business affairs of the City, Project Co, or any consultant, subconsultant or subcontractor of any of them.

8.7 The arbitrator(s) shall have the jurisdiction and power to:

(a) amend or vary any and all rules under the *Arbitration Act, 1991* (Ontario), including rules relating to time limits, either by express agreement of the Parties or, failing such agreement, as the arbitrator(s) consider appropriate and necessary in the circumstances to resolve the Dispute and render an award;

(b) require some or all of the evidence to be provided by affidavit;

(c) hold a hearing at which evidence and submissions are presented by the Parties;

(d) direct either or both Parties to prepare and provide the arbitrator(s) with such documents, test results or other things as the arbitrator(s) may require to assist them in the resolution of the Dispute and rendering of an award;

(e) require either Party to supply or prepare for examination by the arbitrator(s) and the other Party, any document or information the arbitrator(s) considers necessary;

(f) inspect the Project Scope, giving reasonable notice to each Party of the time when, and the place where, the arbitrator(s) intend(s) to conduct any inspections;

(g) award any remedy or relief that a court or judge of the Ontario Superior Court of Justice could order or grant subject to and in accordance with this Project Agreement, including, without limitation, interim orders, interim and permanent injunctions, and specific performance; and

(h) require either or both Parties to take and provide to the arbitrator(s) such measurements, perform such tests, perform such audits, or take any and all such other measures or steps as the arbitrator(s) consider necessary or desirable to aid them in making a fair and reasonable award.

8.8 The place of arbitration shall be Ottawa, Ontario. The language of the arbitration shall be English.

8.9 The costs of an arbitration are in the discretion of the arbitrator(s) who, in addition to any jurisdiction and authority under Applicable Law to award costs, has the jurisdiction and authority to make an order for costs on such basis as the arbitrator(s) considers appropriate in the circumstances, including to award actual legal fees and disbursements and expert witness fees, and to specify or order any or all of the following:

(a) the Party entitled to costs;

(b) the Party who must pay the costs;

(c) the amount of the costs or how that amount is to be determined; and

(d) how all or part of the costs must be paid.

8.10 In exercising discretion to award costs, however, the arbitrator(s) will take into account the desire of the Parties that costs should generally be awarded to each Party in proportion to the relative success that each Party has in the arbitration.

8.11 The award of the arbitrator(s) shall be final and binding upon both Parties, and both Parties expressly waive all rights of appeal in connection with the award of the arbitrator(s). Judgment may be entered upon the award in accordance with Applicable Law in any court having jurisdiction.

8.12 The Parties agree to and shall co-operate fully with the arbitrator(s) and proceed with the arbitration expeditiously, including in respect of any hearing, in order that an award may be rendered as soon as practicable by the arbitrator(s), given the nature of the Dispute. The arbitrator(s) shall render a decision as soon as possible and, in any event, shall use all reasonable efforts to render a decision no later than 20 Business Days after the date of the hearing, or such longer period of time as agreed to in writing by the Parties. If the arbitration tribunal is comprised of three arbitrators, the decision of a majority of the arbitration tribunal shall be deemed to be the decision of the arbitration tribunal, and where there is no majority decision, the decision of the chair of the arbitration tribunal shall be deemed to be the decision of the arbitration tribunal.

8.13 This Project Agreement, including this Schedule 27, constitutes an agreement to arbitrate that shall be specifically enforceable.

8.14 Any arbitrator appointed pursuant to this Section 8 of this Schedule 27 shall keep all information about the Dispute confidential and shall not disclose such information to anyone other than the Parties.

9. LITIGATION

9.1 Notwithstanding that a notice to arbitrate has been delivered pursuant to Section 7.1 of this Schedule 27, following receipt of the Expert's award or determination pursuant to Section 5 of this Schedule 27, or of the Adjudicator's award or determination pursuant to Section 6 of this Schedule 27, or if applicable a Notice of Dispute has been issued following receipt of a decision of the Independent Certifier if the Dispute is a Dispute in relation to the Independent Certifier's decisions for which Section 4.4 of this Schedule 27 provides that Sections 5 and 6 of this Schedule 27 shall not apply, if one or more of the following apply then either Party may elect, by written notice signed by their Party Representative, to require that the Dispute be referred to and resolved solely by litigation in the Ontario Superior Court of Justice, and both Parties agree to attorn to the exclusive jurisdiction of the courts of the Province of Ontario in respect of the Dispute:

(a) if the actual or potential total value or amount at issue in the Dispute (as determined by adding all claims and counterclaims) is more than $**500,000** (index linked) in the aggregate or $**150,000** (index linked) in any one year;

(b) if the Dispute concerns a Party's right to terminate the Project Agreement pursuant to the provisions of the Project Agreement or the validity of the Project Agreement; however, for greater certainty, any Dispute respecting compensation

arising out of Termination may be resolved by the process set out in Sections 5, 6 or 7 of this Schedule 27, as applicable; and/or

(c) it is not a Dispute to which Section 14 of this Schedule 27 applies.

Such notice will not be effective unless it indicates it is a notice to submit the Dispute to litigation, is signed by the Party Representative and is delivered to the other Party Representative within 15 Business Days after receipt of the Expert's determination, the Adjudicator's determination, or the Notice of Dispute referred to in Section 7.1(c) of this Schedule 27, as applicable, and provided further that such notice expressly identifies the specific Dispute and determination of the Adjudicator, Expert or Independent Certifier, or finding of the Consultant, subject to and as provided in Section 8.2 of Schedule 40 – Highway Work, as applicable, that is to be the subject of the litigation.

9.2 If neither Party delivers a notice of election to resolve a particular Dispute by litigation in the manner and within the time specified in Section 9.1 of this Schedule 27, then:

(a) provided that one Party has, in the manner and within the time period specified in Section 7.1 of this Schedule 27, given notice to the other Party of election to resolve that Dispute by arbitration, and subject to a consolidation of proceedings pursuant to Section 11 of this Schedule 27, that Dispute shall be resolved only by arbitration pursuant to Sections 8.2.2 to 8.14 of this Schedule 27; and

(b) subject to Section 9.2(a), where a Dispute was determined by the Expert, the Expert's determination is final and binding on both Parties and not subject to appeal, arbitration, litigation or any other dispute resolution process.

10. CONSOLIDATION OF PROJECT AGREEMENT ADJUDICATION, ARBITRATION AND LITIGATION

10.1 For all Disputes that arise in respect of any Milestone Acceptance or Substantial Completion prior to Revenue Service Availability or in respect of the entire System prior to Revenue Service Availability, unless:

(a) both Parties otherwise agree; or

(b) the issue in a particular Dispute arises in connection with the Review Procedure; or

(c) the issue in a particular Dispute is such that waiting until after a particular Milestone Acceptance, Substantial Completion or Revenue Service Availability as applicable, to resolve that Dispute will cause irreparable harm to one of the Parties; or

(d) the issue in a particular Dispute arises in connection with requirements of achieving or deficiencies in not achieving any Milestone Acceptance, Substantial Completion or Revenue Service Availability, as applicable; or

(e) in respect to a particular Dispute, the Dispute is consolidated with Third Party Disputes (as hereinafter defined) pursuant to Section 11 of this Schedule 27,

all adjudication, arbitral and litigation proceedings between the Parties prior to any Milestone Acceptance, Substantial Completion or Revenue Service Availability, as applicable, shall be stayed and consolidated into, as applicable, a single adjudication, arbitration and a single litigation proceeding, with the adjudication, arbitration and, if applicable, litigation, proceeding promptly and expeditiously after the applicable Milestone Acceptance, Substantial Completion or Revenue Service Availability, as applicable.

11. CONSOLIDATION WITH THIRD PARTY DISPUTES

11.1 Subject to Section 11.4 of this Schedule 27, if either Party is involved in an arbitration in the Province of Ontario with a third party ("**Third Party Arbitration**"), and if such Third Party Arbitration involves common factual or legal issues (including common issues of damages) which are also the subject of a Dispute between the Parties for which a Notice of Dispute has been given, then any arbitration of the Dispute between the Parties which includes those common factual, legal or damages issues ("**Project Agreement Arbitration**") shall be stayed, consolidated or joined with the Third Party Arbitration(s) but only if the City, Project Co and the other parties all agree or, failing their agreement, if a court in the Province of Ontario on application considers it just and convenient in all the circumstances that the Project Agreement Arbitration should be stayed or consolidated or joined with the Third Party Arbitration.

11.2 Subject to Section 11.4 of this Schedule 27, if either Party is involved in litigation in the Province of Ontario with a third party ("**Third Party Litigation**") and if:

(a) such Third Party Litigation involves common factual or legal issues (including common issues of damages) which are the subject of a Project Agreement Arbitration; and

(b) one of the Parties is brought directly into the Third Party Litigation as a party to that litigation,

then on the application of either Party to the court in the Province of Ontario having jurisdiction the court may, if it determines that it is just and convenient in all the circumstances, order a stay of either or both the Project Agreement Arbitration proceeding and Third Party Litigation, or order a joinder of the Project Agreement Arbitration and the Third Party Litigation. If such joinder is ordered, the Project Agreement Arbitration and the Third Party Litigation ordered to be joined by the court shall be determined by that court or by another court in Ontario such that the Project Agreement Arbitration and the Third Party Litigation shall be resolved in one forum. For purposes of the foregoing, joinder of the Project Agreement Arbitration and the Third Party Litigation shall be construed to include stays and conditional stays of issues in the Project Agreement Arbitration pending the commencement and completion of third party proceedings by one or both of the Parties in the Third Party Litigation.

11.3 In considering whether to order a stay, consolidation or joinder of a Project Agreement Arbitration with a Third Party Arbitration or Third Party Litigation, the court will be entitled to give substantial weight to the desire by the Parties that all Disputes which are related to Third Party Arbitration or Third Party Litigation be resolved in a single forum to avoid multiplicity of proceedings and the potential for contradictory findings of fact, liability and quantum, and to ensure the arbitrator or court has the advantage of obtaining full evidence and disclosure from the Parties and from the other parties, as applicable and as required to resolve the Dispute and to make findings of fact, liability and quantum of damages and awards or judgments binding on the Parties based on all available evidence.

11.4 Sections 11.1 and 11.2 of this Schedule 27 only apply:

(a) if the Dispute between the Parties includes a claim by one Party against the other for contribution or indemnity for that Party's liability or potential liability to the third party where such liability results or will result from an award in the Third Party Arbitration or a judgment in the Third Party Litigation; and

(b) to those specific issues that are common issues in the Project Agreement Arbitration, the Third Party Arbitration and the Third Party Litigation, such that all other issues in the Dispute shall continue to be resolved by Project Agreement Arbitration and shall not be consolidated with the Third Party Arbitration or Third Party Litigation.

12. INTENTIONALLY DELETED

13. MISCELLANEOUS

13.1 Project Co and the City shall diligently carry out their respective obligations under this Project Agreement during the pendency of any Disputes, including, without limitation, adjudication proceedings, arbitration proceedings or litigation proceedings. If during the pendency of any Dispute it is considered necessary by either Party to proceed in respect of the matter that is in Dispute, then without prejudice to Project Co's rights in respect of the Dispute (including in respect of Delay Events, Compensation Events and Variations), Project Co shall proceed in accordance with the direction of the City, and in the event the matter in dispute is determined in favour of Project Co, then, to the extent that such Dispute affects the System, proceeding in accordance with the City's position (i) prior to Revenue Service Availability shall, subject to and in accordance with Section 40 of this Project Agreement, be treated as a Delay Event and, subject to and in accordance with Section 41 of this Project Agreement, be treated as a Compensation Event, and (ii) following Revenue Service Availability shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation. For greater certainty, in respect of any Dispute relating to the Works referred to in Section 4.2 of this Schedule 27, the Independent Certifier shall be the decision maker of first instance and the Parties shall comply with the initial decision of the Independent Certifier unless and until it is overturned in a subsequent arbitration or litigation proceeding. This Section 13.1 shall not apply to Disputes in respect of the interpretation, application or administration of

Schedule 40 – Highway Work and the performance of the Highway Work and to any Dispute to which Section 14 of this Schedule 27 applies.

13.2 Nothing contained in this Schedule 27 will prevent the Parties from seeking interim protection from the courts of the Province of Ontario, including seeking an interlocutory injunction where available pursuant to Applicable Law, if necessary to prevent irreparable harm to a Party.

13.3 The Parties shall indemnify each other in respect of any damages suffered or incurred on amounts agreed to be paid pursuant to resolution of a Dispute by the Party Representatives or by the executives of the Parties pursuant to Sections 2 and 3 of this Schedule 27 and on the amount of any award or judgment as follows:

(a) for amounts payable by Project Co to the City, Project Co shall indemnify the City as provided for at Section 56.1(e) of this Project Agreement from and against any damages suffered or incurred resulting from any overpayment to Project Co or, as applicable, any underpayment or non-payment by Project Co from the date of any overpayment to Project Co or, as applicable, from the date on which payment was due under this Project Agreement to the City until the date of payment; or

(b) for amounts payable by the City to Project Co, the City shall indemnify Project Co as provided for at Section 56.2(c) of this Project Agreement from and against any damages suffered or incurred resulting from any overpayment to the City or, as applicable, any underpayment or non-payment by the City from the date of any overpayment to the City or, as applicable, from the date on which payment was due under this Project Agreement to Project Co until the date of payment.

13.4 Project Co shall ensure that any and all documents and other information in the possession or control of any Project Co Party that are available to Project Co and that may be necessary for the resolution of a Dispute on an informed basis by the Party Representatives or by the executives of the Parties pursuant to Sections 2 and 3 of this Schedule 27, or by an expert, an adjudicator, an arbitrator or court of competent jurisdiction, are made available in a timely manner to the City and the City Representative.

13.5 The City shall ensure that any and all documents and other information in the possession or control of any the City Party that are available to the City and that may be necessary for the resolution of a Dispute on an informed basis by the Party Representatives or by the executives of the Parties pursuant to Sections 2 and 3 of this Schedule 27, or by an adjudicator, an arbitrator or court of competent jurisdiction, are made available in a timely manner to Project Co and the Project Co Representative.

13.6 This Schedule 27 shall survive the expiration or termination of the Project Agreement for any reason.

13.7 The Parties agree that the *Municipal Arbitration Act* R.S.O. 1990, cM.48 shall have no application to the Project Agreement or this Schedule.

13.8 The Parties can, by written agreement, on a Dispute by Dispute basis:

(a) extend any or all timelines set out in this Schedule 27;

(b) agree to waive or by-pass any one or more of the Dispute resolution processes in Sections 2, 3, 4, 5 and 6 of this Schedule 27 and, instead, proceed directly to resolution of the Dispute by arbitration or litigation pursuant to Sections 7, 8 and 9 of this Schedule 27;

(c) agree to (i) resolve a Dispute by litigation rather than adjudication or arbitration notwithstanding the requirements of Section 6 and Section 8 of this Schedule 27, or (ii) agree to resolve a Dispute by arbitration rather than adjudication or litigation notwithstanding the requirements of Section 6 and Section 9 of this Schedule 27, or (iii) agree to resolve a Dispute by adjudication rather than arbitration or litigation notwithstanding the requirements of Section 8 and Section 9 of this Schedule 27; and

(d) agree to resolve a Dispute relating to the decision of an Expert by adjudication, arbitration or litigation, notwithstanding the provisions of Section 5 of this Schedule 27.

13.9 The Parties agree to copy the Consultant on all notices given hereunder that relate at least in part to the Highway Work or the interpretation, application or administration of Schedule 40 – Highway Work.

14. CANADIAN CONTENT

14.1 If, following the process referred to in Section 2 and 3 of this Schedule 27 (or as otherwise agreed to in writing by the Parties pursuant to Section 13.8 of this Schedule 27), any Dispute as to the interpretation, application or administration the Canadian Content Policy in respect of the Project Agreement has not been resolved, such Dispute shall be subject to this Section 14.

14.2 All Disputes to which this Section 14 applies shall be submitted:

(a) to an executive of the City who is in a position of authority above that of the Person selected in Section 3.1 of this Schedule 27 and, subject only to approval of City Council, if applicable, has full authority to resolve the Dispute; or

(b) if there is no such Person as is identified in Section 14.2(a) of this Schedule 27 either, to the Mayor of the City,

for determination within 30 Business Days after submission to the Person identified in Section 14.2 of this Schedule 27.

14.3 Project Co shall cooperate with the Person identified in Section 14.2 of this Schedule 27 and provide such information, records and documents as may be required by it to make the determination within the period referred to in Section 14.2 of this Schedule 27.

14.4 A determination made by the Person identified in Section 14.2 of this Schedule 27 shall be final and binding and not subject to appeal, adjudication, arbitration, litigation or any other dispute resolution process, and both Parties expressly waive all rights of appeal in connection with the Person's determination.

14.5 Notwithstanding the foregoing, where the Person identified in Section 14.2 of this Schedule 27 determines in its Discretion that it has received clear and unambiguous direction from the MTO in respect of the interpretation, application or administration of the Canadian Content Policy for this Project Agreement on a Dispute under this Section 14, and such direction is received prior to it having made a determination pursuant to this Section 14, then the City shall forthwith implement such direction under this Project Agreement.

SCHEDULE 28

REFINANCING

1. DEFINITIONS

1.1 The following terms shall have the following meanings:

(a) "**Distribution**" means, whether in cash or in kind, any:

(i) dividend or other distribution in respect of the Equity Capital;

(ii) reduction of capital, redemption or purchase of shares or any other reorganization or variation to the Equity Capital;

(iii) payment, loan, contractual arrangement or transfer of assets or rights to the extent (in each case) it was put in place after Financial Close and was neither in the ordinary course of business nor on reasonable commercial terms; or

(iv) the receipt of any other benefit which is not received in the ordinary course of business nor on reasonable commercial terms,

and where any such Distribution is not in cash, the equivalent cash value of such Distribution shall be calculated.

(b) "**Equity IRR**" means the projected internal rate of return to the Equity Provider over the full term of this Project Agreement, taking into account the aggregate of all its investments and of all Distributions made and projected to be made.

(c) "**Exempt Refinancing**" means:

(i) any Refinancing that has the effect of replacing or extending any Mini-Perm Financing, provided that:

(A) Project Co shall assume any and all risks and benefits associated with such Refinancing without adjustment to the Monthly Service Payments or any other form of compensation to Project Co under the Project Agreement, including any risk that such Refinancing results in higher financing costs than the financing costs assumed by Project Co in its Financial Model as of the date of this Project Agreement for the Refinancing of any Mini-Perm Financing; and

(B) such Refinancing occurs on or before the Planned Mini-Perm Refinancing Date;

(ii) a change in taxation or change in accounting treatment pursuant to a Change in Law or change in Canadian GAAP;

(iii) the exercise of any right, the grant of any amendment, waiver or consent or any similar action under the Lending Agreements that does not provide for a financial benefit to Project Co under those agreements;

(iv) any sale of Equity Capital or securitization of the existing rights or interests attaching to such Equity Capital, unless such sale or securitization involves increasing the Senior Debt Amount or the Junior Debt Amount, as applicable, or amending the Senior Debt Makewhole or the Junior Debt Makewhole, as applicable, on terms more favourable to Project Co than contained in the Lending Agreements;

(v) any Qualifying Bank Transaction;

(vi) any Rescue Refinancing;

(vii) any Refinancing that was approved by the City prior to the execution of this Project Agreement and occurs during the first six months following the date of this Project Agreement;

(viii) any amendment, variation or supplement of any agreement approved by the City as part of any Variation under this Project Agreement; or

(ix) any Permitted Borrowing.

(d) "**Mandatory Refinancing**" means an Exempt Refinancing described in Section 1.1(c)(i) of this Schedule 28.

(e) "**Mini-Perm Financing**" means a financing facility under any Lending Agreement that, pursuant to the applicable Lending Agreement, is scheduled to be repaid in whole or in part from the proceeds of a new financing on or before the Planned Mini-Perm Refinancing Date.

(f) "**Planned Mini-Perm Refinancing Date**" means the date(s) in which a Refinancing, in whole or in part, of the Mini-Perm Financing takes place, and with respect to the first Planned Mini-Perm Refinancing Date after Financial Close is **[NOT APPLICABLE]**, and in respect of other such dates, if any, shall be as scheduled pursuant to the applicable Lending Agreements and as consented to by the City.

(g) "**Qualifying Bank**" means a lending institution that is:

(i) a bank listed in Schedule I, II or III of the *Bank Act* (Canada); or

(ii) a bank, life insurance company, pension fund or fund managed by a professional fund manager that controls funds in excess of $500,000,000,

provided such institution is not a Restricted Person or a person whose standing or activities (1) are inconsistent with the City's role (in the City's reasonable opinion) in the Province of Ontario, or (2) may compromise the reputation or integrity of the City and/or any City Party, or (3) may compromise the nature of the City of Ottawa's transit system, so as to affect public perception of that system.

(h) "**Qualifying Bank Transaction**" means:

(i) the disposition by a Lender of any of its rights or interests in the Lending Agreements to a Qualifying Bank;

(ii) the grant by a Lender to a Qualifying Bank of any rights of participation in respect of the Lending Agreements; or

(iii) the disposition or grant by a Lender to a Qualifying Bank of any other form of benefit or interest in either the Lending Agreements or the revenues or assets of Project Co, whether by way of security or otherwise.

(i) "**Qualifying Refinancing**" means any Refinancing that will give rise to a Refinancing Gain that is not an Exempt Refinancing.

(j) "**Refinancing**" means:

(i) any amendment, variation, novation, supplement or replacement of any Lending Agreement;

(ii) the exercise of any right, or the grant of any waiver or consent, under any Lending Agreement;

(iii) the disposition of any rights or interests in, or the creation of any rights of participation in respect of, the Lending Agreements or the creation or granting of any other form of benefit or interest in either the Lending Agreements or the contracts, revenues or assets of Project Co whether by way of security or otherwise; or

(iv) any other arrangement put in place by Project Co or another person which has an effect which is similar to any of the foregoing provisions of this definition above or which has the effect of limiting Project Co's ability to carry out any of the foregoing provisions of this definition.

(k) "**Refinancing Financial Model**" means a comprehensive and detailed financial model satisfactory to the City, acting reasonably, prepared for the purpose of Section 2 of this Schedule 28, which financial model shall be similar in form and content to the Financial Model, suitable for the purposes for which it will be used in this Schedule 28, and shall take into account:

(i) cash flows for the entire remaining Project Term;

(ii) any changes in structure and funding since the date of this Project Agreement;

(iii) the performance of the activities within the Project Scope to the date of the Refinancing;

(iv) macroeconomic assumptions; and

(v) all other relevant factors.

(l) "**Refinancing Gain**" means an amount equal to the greater of zero and (A - B), where:

A = the net present value, discounted at a discount rate equal to the Base Case Equity IRR, of all Distributions as projected immediately prior to the Refinancing (using the Refinancing Financial Model and taking into account the effect of the Refinancing) to be made over the remaining term of this Project Agreement following the Refinancing.

B = the net present value, discounted at a discount rate equal to the Base Case Equity IRR, of all Distributions as projected immediately prior to the Refinancing (using the Refinancing Financial Model but without taking into account the effect of the Refinancing) to be made over the remaining term of this Project Agreement following the Refinancing.

(m) "**Refinancing Information**" has the meaning given in Section 2.8 of this Schedule 28.

(n) "**Refinancing Notice**" has the meaning given in Section 2.9 of this Schedule 28.

(o) "**Rescue Refinancing**" means any Refinancing which takes place due to the failure or prospective failure of Project Co to comply with any material financial obligation under the Lending Agreements, or any of them, which does not increase any liability of the City, whether actual or potential.

2. REFINANCING

2.1 Project Co shall not carry out any Qualifying Refinancing unless Project Co has obtained the prior written consent of the City, which consent, subject to Section 2.2 of this Schedule 28, shall not be unreasonably withheld or delayed.

2.2 The City may withhold its consent to any Qualifying Refinancing, in its Discretion:

(a) where any person with whom Project Co proposes to carry out a Qualifying Refinancing is a Restricted Person;

(b) if, at the time the Qualifying Refinancing is contemplated and effected, the Qualifying Refinancing will materially adversely affect the ability of Project Co to perform its obligations under the Project Documents or this Project Agreement; or

(c) if, at the time the Qualifying Refinancing is contemplated and effected, the Qualifying Refinancing will have the effect of increasing any liability of the City, whether actual or contingent, present or future, known or unknown.

2.3 The City shall be entitled to receive:

(a) a 50% share of any Refinancing Gain arising from a Qualifying Refinancing, in respect of any Refinancing Gain up to (when considered in aggregate with all previous Qualifying Refinancings) a Refinancing Gain of $2,000,000;

(b) a 60% share of any further Refinancing Gain arising from a Qualifying Refinancing, in respect of any Refinancing Gain in excess of $2,000,000 and up to (when considered in aggregate with all previous Qualifying Refinancings) a Refinancing Gain of $5,000,000; and

(c) a 70% share of any further Refinancing Gain arising from a Qualifying Refinancing.

2.4 Project Co shall promptly provide the City with full details of any proposed Qualifying Refinancing, including a copy of the proposed Refinancing Financial Model and the basis for the assumptions used in the proposed Refinancing Financial Model. The City shall (before, during and at any time after any Refinancing) have unrestricted rights of audit over the Refinancing Financial Model and any documentation (including any aspect of the calculation of the Refinancing Gain) used in connection with such Refinancing (whether or not such Refinancing is determined to be a Qualifying Refinancing). Project Co shall promptly, and, in any event, within 5 Business Days of receiving a written request from the City, provide any information in relation to a proposed Refinancing as the City may reasonably require. Project Co shall keep the City informed as to any changes to the material terms of the Refinancing.

2.5 Subject to Section 2.6 of this Schedule 28, the City shall have the right to elect to receive its share of any Refinancing Gain as:

(a) a single payment in an amount less than or equal to any Distribution made on or about the date of the Refinancing; and/or

(b) a reduction in the Monthly Service Payments over the remaining Project Term,

such that the total net present value, discounted at the Discount Rate, of the foregoing, calculated at the time immediately prior to the Refinancing, shall equal the City's share of the Refinancing Gain.

2.6 The City and Project Co will negotiate in good faith to agree upon the basis and method of calculation of the Refinancing Gain and payment of the City's share of the Refinancing Gain (taking into account how the City has elected to receive its share of the Refinancing Gain under Section 2.5 of this Schedule 28 and the profile of the Refinancing Gain). If the parties fail to agree upon the basis and method of calculation of the Refinancing Gain or the payment of the City's share, the Dispute shall be determined in accordance with Schedule 27 – Dispute Resolution Procedure.

2.7 The Refinancing Gain shall be calculated after taking into account the reasonable out-of-pocket costs that each Party directly incurs in relation to the Qualifying Refinancing and on the basis that, within 15 Business Days of any Qualifying Refinancing, Project Co will reimburse the City for all such reasonable out-of-pocket costs incurred by the City.

2.8 If Project Co must, at a future date, undertake a Mandatory Refinancing, then the City may at any time request that Project Co provide to the City full and complete details and information with respect to the Mandatory Refinancing and its plan for the Mandatory Refinancing, including in respect to all relevant assumptions regarding the Mandatory Refinancing set out in the Financial Model (the "**Refinancing Information**"). For clarity, if Project Co must, at a future date, undertake a Mandatory Refinancing, the City must request Project Co to provide the Refinancing Information before it can issue a Refinancing Notice pursuant to Section 2.9 of this Schedule 28. If the City and Project Co mutually agree, acting reasonably, that based on the Refinancing Information, a Refinancing prior to the Mandatory Refinancing would not have a negative material financial impact on the Mandatory Refinancing, then the City may provide Project Co with a Refinancing Notice pursuant to Section 2.9 of this Schedule 28.

2.9 If the City considers the funding terms generally available in the market to be more favourable than those reflected in the Lending Agreements, the City may, by notice in writing to Project Co (a "**Refinancing Notice**"), require Project Co to request potential funders to provide terms for a potential Refinancing.

2.10 The Refinancing Notice shall set out in reasonable detail the grounds upon which the City believes such funding terms to be available. Project Co and the City shall meet to discuss the Refinancing Notice within 20 Business Days. Such a meeting will consider the evidence available to both parties about the availability of funding terms for a potential Refinancing. The City shall be entitled to withdraw the Refinancing Notice at or before such a meeting, or within 7 Business Days following the meeting.

2.11 If the City serves a Refinancing Notice which is not withdrawn pursuant to Section 2.10 of this Schedule 28, then Project Co shall:

(a) act promptly, diligently and in good faith with respect to the potential Refinancing;

(b) use all reasonable endeavours to obtain the most favourable available terms from existing and/or new lenders for any potential Refinancing (provided that Project Co shall not be required to propose refinancing in a manner which a prudent board of directors of a company operating the same business in Canada to that operated by Project Co, in similar circumstances, would not approve), for the avoidance of doubt also being terms which are likely to generate a positive Refinancing Gain after the deduction of costs in accordance with the provisions of Section 2.7 of this Schedule 28; and

(c) either:

(i) as soon as reasonably practicable after receipt of the Refinancing Notice, provide to the City (I) full details of the proposed Refinancing, including a financial model and the basis for the assumptions used in the financial model and evidence to the reasonable satisfaction of the City that these assumptions represent the most favourable available terms for the potential Refinancing on the basis set out in Section 2.11(b) of this Schedule 28 and (II) initial drafts of any changes to the Project Agreement including in relation to potential compensation on termination which might be required to give effect to the proposed Refinancing; or

(ii) if Project Co (acting reasonably) believes that it is not possible to obtain funding terms which are more favourable than those reflected in the Lending Agreements in accordance with the requirements of Section 2.11(b) of this Schedule 28, provide evidence to the reasonable satisfaction of the City for such belief and evidence to the reasonable satisfaction of the City that Project Co has complied with its obligations in Sections 2.11(a) and (b) above of this Schedule 28.

2.12 Following receipt of the information referred to in Section 2.11(c)(i) of this Schedule 28, the City shall acting reasonably, either:

(a) instruct Project Co to implement the proposed Refinancing; or

(b) instruct Project Co to discontinue the proposed Refinancing,

provided that if the City reasonably considers that the requirements of Sections 2.11(c)(i) of this Schedule 28 or (ii) have not been satisfied, the City may require Project Co to satisfy its obligations under Sections 2.11(c)(i) or (ii) of this Schedule 28. If Project Co must, at a future date, undertake a Mandatory Refinancing, the City shall not instruct Project Co to implement the proposed Refinancing unless both the City and Project Co, acting reasonably, agree that such Refinancing will be likely to generate a positive Refinancing Gain after the deduction of costs in accordance with the provisions of Section 2.7 of this Schedule 28 and will not have a negative material financial impact on the Mandatory Refinancing.

2.13 If the City instructs Project Co to implement the proposed Refinancing:

(a) Project Co shall, as soon as reasonably practicable, use all reasonable endeavours to ensure that such proposed Refinancing is implemented;

(b) such proposed Refinancing shall be deemed to be a Qualifying Refinancing; and

(c) the provisions of Sections 2.1 to 2.7 of this Schedule 28 shall apply.

2.14 If:

(a) the City instructs Project Co to discontinue the potential Refinancing pursuant to Section 2.12(b) of this Schedule 28; or

(b) the requirements of Section 2.11(c)(ii) of this Schedule 28 are satisfied,

then, the City shall reimburse Project Co for the reasonable and proper professional costs incurred by Project Co in relation to the potential Refinancing, such costs to be paid to Project Co by the City within 20 Business Days after receipt of a valid invoice in respect of such amount. Such costs shall not include any internal management costs incurred by Project Co except insofar as (i) it can be demonstrated to the reasonable satisfaction of the City that such costs have been incurred in place of professional costs which would in the normal course of such business have been paid to third parties and (ii) the City has, by prior written agreement, approved the use of such internal management resource.

2.15 The City shall be entitled to issue a Refinancing Notice under Section 2.9 of this Schedule 28 at any time but not more than once in any two-year period. For the avoidance of doubt, a Refinancing Notice that has been withdrawn under Section 2.10 of this Schedule 28 has been issued for the purpose of this Section 2.15.

SCHEDULE 29

STANDBY LETTER OF CREDIT

[NTD: The Standby Letter of Credit must be issued by a bank acceptable to the City, acting reasonably, and must be callable at the bank's counters in either Toronto or Ottawa, Ontario.]

Letter of Credit: #**[•]**

Date: **[•]**

City of Ottawa
Finance Department, Supply Branch
100 Constellation Crescent
4th Floor, West Tower
Ottawa, ON K2G 6J8

Attn: City Treasurer

Dear Sir/Madam:

RE: Ottawa Light Rail Transit System

At the request of our client, Rideau Transit Group General Partnership ("**Project Co**"), we, **[**insert name and address of issuing bank**]**, hereby issue in your favour an irrevocable standby letter of credit (the "**Letter of Credit**") in the amount of twenty million dollars ($20,000,000).

The amount available under this Letter of Credit is payable to the City of Ottawa (the "**City**"), at any time and from time to time, upon (a) receipt by us of a written demand for payment, accompanied by a certificate signed by two officers of the City certifying that the City is entitled to draw on this Letter of Credit pursuant to Section 2.3(c) of a project agreement made on or about the 12th day of February, 2013 between the City and Project Co (as amended from time to time, the "**Project Agreement**"), and (b) presentation of the original of this Letter of Credit.

This Letter of Credit will expire at 5:00 p.m. on **[**insert the date that is 180 days after the Financial Close Target Date**]** (the "**Expiry Date**"), and the City may call for payment of any amount outstanding under this Letter of Credit at any time up to 5:00 p.m. on the Expiry Date should this Letter of Credit not be renewed.

It is a condition of this Letter of Credit that it shall be automatically extended, without amendment, for one year from the Expiry Date, or any future expiration date, unless, at least 30 days prior to any expiration date, we notify you, in writing, that we elect not to consider this Letter of Credit renewed for any such additional period. Upon receipt by you of such notice, you may draw the full amount hereunder by means of your demand.

Partial drawings are permitted.

We hereby agree that demands delivered under this Letter of Credit will be duly honoured upon presentation provided that all terms and conditions herein have been complied with.

Written demands drawn under this Letter of Credit shall state on their face that they are drawn under Letter of Credit #**[•]**.

It is understood that **[**insert name of issuing bank**]** is obligated under this Letter of Credit for payments of monies only.

The Project Agreement is referred to herein for reference purposes only and does not form part of the terms of this Letter of Credit.

This Letter of Credit is subject to the Uniform Customs and Practice for Documentary Credits (2007 Revision) of the International Chamber of Commerce (ICC Publication No. 600) (the "**UCP**") with the exception of Articles 18-30 inclusive (other than Article 29a, which shall apply) and Articles 31b, 31c and 32 except to the extent, if any, inconsistent with the express terms of this Letter of Credit. Notwithstanding Article 36 of the UCP, if this Letter of Credit expires during an interruption of business as contemplated in such Article 36, we shall honour any demand made under this Letter of Credit prior to the Expiry Date, within 30 days after the date on which such interruption of business ends (and we shall notify you promptly when it does so end). For matters not covered by such publication, this Letter of Credit shall be governed by and construed in accordance with the laws of the Province of Ontario.

Yours very truly,

[Name of Issuing Bank]

By: _____
Name:
Title:

By: _____
Name:
Title:

SCHEDULE 30

INSURANCE TRUST AGREEMENT

THIS AGREEMENT is made as of the 12th day of February, 2013

BETWEEN:

CITY OF OTTAWA

(the "**City**")

AND

BNY TRUST COMPANY OF CANADA, a trust company incorporated under the laws of Canada, acting as agent for and on behalf of the Lenders

(in such capacity, the "**Lenders' Agent**")

AND

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP

("**Project Co**")

AND

BNY TRUST COMPANY OF CANADA, a trust company incorporated under the laws of Canada, acting as account trustee for and on behalf of the City, Project Co and the Lenders' Agent

(in such capacity, the "**Account Trustee**")

WHEREAS:

A. The City and Project Co have entered into the Project Agreement.

B. The City, the Lenders' Agent and Project Co have entered into the Lenders' Direct Agreement.

C. The City, the Lenders' Agent and Project Co have agreed that all amounts from time to time contained in the Insurance Trust Account are to be held in trust by the Account Trustee in accordance with the terms of this Insurance Trust Agreement, and that no releases, distributions or transfers of any funds from the Insurance Trust Account shall be made other than in accordance with the terms of this Insurance Trust Agreement.

NOW THEREFORE in consideration of the mutual covenants and agreements of the Parties hereinafter contained and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties covenant and agree as follows:

1. DEFINITIONS

In this Insurance Trust Agreement, unless the context otherwise requires:

(a) "**Account Trustee**" means BNY Trust Company of Canada, acting as account trustee for and on behalf of the City, Project Co and the Lenders' Agent.

(b) "**Bank**" means National Bank of Canada.

(c) "**Business Day**" has the meaning given in the Project Agreement.

(d) "**Change of Authorization Event**" has the meaning given in Section 7(a) of this Insurance Trust Agreement.

(e) "**Change of Authorization Notice**" has the meaning given in Section 7(b)(i) of this Insurance Trust Agreement.

(f) "**Default Notice**" means a written notice given by the Lenders' Agent to the Account Trustee that an event of default under the Lending Agreements has occurred and is continuing.

(g) "**Default Period**" means the period commencing on the date upon which the Account Trustee receives a Default Notice and ending on the date upon which the Account Trustee receives written notice from the Lenders' Agent that the event of default which was the subject matter of the applicable Default Notice has been cured.

(h) "**Discretion**" has the meaning given in the Project Agreement.

(i) "**Governmental Authority**" has the meaning given in the Project Agreement.

(j) **"Highway"** has the meaning given in the Project Agreement.

(k) "**Insurance Policies**" has the meaning given in Section 4(a) of this Insurance Trust Agreement.

(l) "**Insurance Proceeds**" has the meaning given in Section 4(b) of this Insurance Trust Agreement.

(m) "**Insurance Trust Account**" means account 375-28337-19 at BMO Nesbitt Burns.

(n) "**Insurance Trust Agreement**" means this insurance trust agreement.

(o) "**Lenders**" has the meaning given in the Project Agreement.

(p) "**Lenders' Agent**" means BNY Trust Company of Canada, acting as agent for and on behalf of the Lenders.

(q) "**Lenders' Direct Agreement**" means the lenders' direct agreement made on or about the date hereof between the City, Project Co and the Lenders' Agent.

(r) "**Lending Agreements**" has the meaning given in the Project Agreement.

(s) "**Order**" has the meaning given in Section 6(k) of this Insurance Trust Agreement.

(t) "**Party**" means any of the City, Project Co, the Lenders' Agent or the Account Trustee, and "Parties" means all of the City, Project Co, the Lenders' Agent and the Account Trustee.

(u) "**Project**" has the meaning given in the Project Agreement.

(v) "**Project Agreement**" means the project agreement made on or about the 12th day of February, 2013 between the City and Project Co.

(w) "**Project Co**" means Rideau Transit Group General Partnership.

(x) "**Project Co Event of Default**" has the meaning given in the Project Agreement.

(y) "**Project Scope**" has the meaning given in the Project Agreement.

(z) "**System**" has the meaning given in the Project Agreement.

(aa) "**Trust Property**" means all of the property held in trust by the Account Trustee pursuant to this Insurance Trust Agreement, including, without limitation, the Insurance Trust Account, and all amounts from time to time contained therein, the Insurance Policies and the Insurance Proceeds.

2. INTERPRETATION

This Insurance Trust Agreement shall be interpreted according to the following provisions, unless the context requires a different meaning:

(a) The headings in this Insurance Trust Agreement are for convenience of reference only, shall not constitute a part of this Insurance Trust Agreement, and shall not be taken into consideration in the interpretation of, or affect the meaning of, this Insurance Trust Agreement.

(b) Unless the context otherwise requires, references to specific Sections, Clauses, Paragraphs, Subparagraphs, and other divisions are references to such Sections, Clauses, Paragraphs, Subparagraphs, or divisions of this Insurance Trust Agreement and the terms "Section" and "Clause" are used interchangeably and are synonymous.

(c) Words importing persons or parties are to be broadly interpreted and include an individual, corporation, firm, partnership, joint venture, trust, unincorporated organization, Governmental Authority, unincorporated body of persons or association and any other entity having legal capacity, and the heirs, beneficiaries, executors, administrators or other legal representatives of a person in such capacity.

(d) Unless the context otherwise requires, wherever used herein the plural includes the singular, the singular includes the plural, and each of the masculine, feminine and neuter genders include all other genders.

(e) References to any standard, principle, agreement or document include (subject to all relevant approvals and any other provisions of this Insurance Trust Agreement concerning amendments) a reference to that standard, principle, agreement or document as amended, supplemented, restated, substituted, replaced, novated or assigned.

(f) The words in this Insurance Trust Agreement shall bear their natural meaning.

(g) References containing terms such as:

(i) "hereof", "herein", "hereto", "hereinafter", and other terms of like import are not limited in applicability to the specific provision within which such references are set forth but instead refer to this Insurance Trust Agreement taken as a whole; and

(ii) "includes" and "including", whether or not used with the words "without limitation" or "but not limited to", shall not be deemed limited by the specific enumeration of items but shall, in all cases, be deemed to be without limitation and construed and interpreted to mean "includes without limitation" and "including without limitation".

(h) In construing this Insurance Trust Agreement, the rule known as the *ejusdem generis* rule shall not apply nor shall any similar rule or approach apply to the construction of this Insurance Trust Agreement and, accordingly, general words introduced or followed by the word "other" or "including" or "in particular" shall not be given a restrictive meaning because they are followed or preceded (as the case may be) by particular examples intended to fall within the meaning of the general words.

(i) Where this Insurance Trust Agreement states that an obligation shall be performed "no later than" or "within" or "by" a stipulated date or event which is a prescribed number of days after a stipulated date or event, the latest time for performance shall be 5:00 p.m. on the last day for performance of the obligation concerned, or, if that day is not a Business Day, 5:00 p.m. on the next Business Day.

(j) Where this Insurance Trust Agreement states that an obligation shall be performed "on" a stipulated date, the latest time for performance shall be 5:00 p.m. on that day, or, if that day is not a Business Day, 5:00 p.m. on the next Business Day.

(k) Any reference to time of day or date means the local time or date in Toronto, Ontario.

(l) Unless otherwise indicated, time periods will be strictly construed.

(m) Whenever the terms "will" or "shall" are used in this Insurance Trust Agreement they shall be construed and interpreted as synonymous and to read "shall".

3. INSURANCE TRUST ACCOUNT

(a) Prior to the commencement of a Default Period, the Insurance Trust Account, and all amounts from time to time contained therein, including interest thereon, shall be held in trust by the Account Trustee for the benefit of Project Co. During a Default Period, the Insurance Trust Account, and all amounts from time to time contained therein, shall be held in trust by the Account Trustee for the benefit of the Lenders' Agent and the Lenders, provided that, upon receipt by the Account Trustee of a Change of Authorization Notice, the Insurance Trust Account, and all amounts from time to time contained therein, shall be held in trust by the Account Trustee for the benefit of the City.

(b) The Account Trustee shall not release, distribute or transfer any funds from the Insurance Trust Account other than in accordance with the terms of this Insurance Trust Agreement.

(c) Notwithstanding any other provision of this Insurance Trust Agreement and subject to Section 3(d), the Lenders' Agent, the City, and Project Co agree that, if any of them either receives any Insurance Proceeds from the Insurance Trust Account or has the right to direct the Account Trustee to advance funds in respect of any Insurance Proceeds from the Insurance Trust Account, such funds shall be directed, used or advanced only for one of the following purposes:

(i) the repair, reinstatement, restoration, rehabilitation or replacement of the System or the Highway or any other assets, materials or goods necessary or desirable for the carrying out of the Project Scope in respect of which such Insurance Proceeds have been paid;

(ii) the completion of the Project; or

(iii) indemnification for any City loss for which the subject Insurance Proceeds were paid under the Insurance Policies (as defined below).

For greater certainty, use of any Insurance Proceeds received in respect of a claim by Project Co under delay in start-up, soft costs or business interruption insurance shall be applied in accordance with the terms of the Lending Agreements so as to enable Project Co to carry out the Project Scope.

(d) Notwithstanding anything in this Insurance Trust Agreement, if the City is entitled to indemnification under the Insurance Policies in respect of any loss incurred by the City, such related insurance proceeds are to be paid directly to the City by the insurer or the Account Trustee and shall not be Insurance Proceeds subject to Section 3(c)(i) or (ii) of this Insurance Trust Agreement. For greater certainty, it is understood and agreed that the City shall be required to use such proceeds for carrying out the purposes referred to in Sections 3(c)(i) and (ii) in respect of which such proceeds have been paid.

4. INSURANCE

(a) Project Co shall deliver, or cause to be delivered, to the Account Trustee originals of all property and asset related insurance policies that Project Co is required to maintain under

the Project Agreement (collectively, the "**Insurance Policies**"), and the Account Trustee shall hold the Insurance Policies in trust for the benefit of each of the beneficiaries and loss payees, as the case may be, thereunder.

(b) The Account Trustee shall distribute any proceeds of any Insurance Policy that are paid over to it by any insurer, Project Co, the Lenders' Agent or the City (the "**Insurance Proceeds**") as follows:

(i) subject to the last paragraph of Section 3(c), in the case of the all risks course of construction (builders' risk), boiler and machinery insurance or property insurance policies that Project Co is required to maintain under the Project Agreement:

(A) if the Account Trustee has not received a Default Notice and:

(1) if the amount of such Insurance Proceeds, together with the aggregate of all Insurance Proceeds paid in respect of the same loss or claim, is less than $2,000,000, to Project Co to repair, restore or replace the assets in respect of which such Insurance Proceeds have been paid; or

(2) if the amount of such Insurance Proceeds, together with the aggregate of all Insurance Proceeds paid in respect of the same loss or claim, is equal to or greater than $2,000,000, to the Lenders' Agent to reimburse Project Co for the costs of repairing, restoring or replacing the assets in respect of which such Insurance Proceeds have been paid; or

(B) if the Account Trustee has received a Default Notice, to the Insurance Trust Account to be distributed by the Account Trustee in such amounts and to such persons as the Lenders' Agent may at any time or from time to time direct in writing, provided that, if the Account Trustee has received a Change of Authorization Notice, the Account Trustee shall release such Insurance Proceeds from the Insurance Trust Account in such amounts and to such parties as the City may at any time or from time to time direct in writing, in each case, to repair, restore or replace the assets in respect of which such Insurance Proceeds have been paid; and

(ii) in the case of any other Insurance Policies, to the Lenders' Agent, or, following receipt by the Account Trustee of a Change of Authorization Notice, to the City, to be distributed to the parties entitled thereto.

(c) The Account Trustee shall distribute any excess Insurance Proceeds remaining after the distributions contemplated in Section 4(b)(ii) have been made, including, without limitation, any Insurance Proceeds held in the Insurance Trust Account:

(i) if the Account Trustee has not received a Default Notice, to Project Co; and

(ii) if the Account Trustee has received a Default Notice, to such persons as the Lenders' Agent, or, following receipt by the Account Trustee of a Change of Authorization Notice, the City, may at any time or from time to time direct in writing.

5. ACCOUNT AGREEMENT

(a) The Account Trustee hereby agrees to promptly provide to the Lenders' Agent all monthly statements and other information with respect to the Insurance Trust Account provided to the Account Trustee by the Bank pursuant to the relevant account agreement. The Account Trustee further agrees that it shall make such requests to the Bank for additional information with respect to the Insurance Trust Account as the Lenders' Agent may from time to time request in writing.

(b) The Account Trustee hereby agrees to promptly provide to the City all monthly statements and other information with respect to the Insurance Trust Account provided to the Account Trustee by the Bank pursuant to the relevant account agreement. The Account Trustee further agrees that it shall make such requests to the Bank for additional information with respect to the Insurance Trust Account as the City may from time to time request in writing.

6. THE ACCOUNT TRUSTEE

(a) The Account Trustee shall not have any duty or obligation to manage, control, use, make any payment in respect of, register, record, insure, inspect, sell, dispose of or otherwise deal with any part of the Trust Property except as expressly provided by the terms of this Insurance Trust Agreement. The Account Trustee shall carry out all written directions given by the Lenders' Agent, the City or Project Co, as applicable, in accordance with this Insurance Trust Agreement and shall not be required to exercise any discretion in exercising any of its duties under this Insurance Trust Agreement in pursuance of such written directions. The Account Trustee shall not be bound to do or take any act, action or proceeding by virtue of the powers conferred on it hereby unless and until it shall have been required to do so under the terms hereof and has received instruction, advice or direction from the Lenders' Agent, the City or Project Co, as applicable, as to the action to be taken (except with respect to actions specifically set out herein to be performed by the Account Trustee).

(b) The Account Trustee will exercise its powers and carry out its obligations hereunder as account trustee honestly, in good faith and in the best interests of the beneficiaries hereunder and in connection therewith will exercise that degree of care, diligence, and skill that a reasonably prudent professional trustee would exercise in comparable circumstances. Unless otherwise required by law, the Account Trustee will not be required to give bond surety or security in any jurisdiction for the performance of any duties or obligations hereunder. No provision of this Insurance Trust Agreement shall be construed to relieve the Account Trustee from liability for its own dishonesty, fraud, negligence (including, without limitation, negligence in the handling of funds), wilful misconduct, bad faith or reckless disregard of any duty hereunder.

(c) The Account Trustee will not be subject to any liability whatsoever, in tort, contract or otherwise in connection with the Trust Property or the carrying out of its duties under this Insurance Trust Agreement to the Lenders' Agent, the Lenders, Project Co or any other person for any action taken or permitted by it to be taken, or for its failure to take any action, or for not performing any act or fulfilling any duty, obligation or responsibility hereunder by reason of any occurrence beyond the control of the Account Trustee (including, but not limited to, any act or provision of any present or future law or of any Governmental Authority, any act of God or war, or the unavailability of any wire or communication facility), provided that the foregoing limitation will not apply in respect of any action or failure to act arising from or in connection with wilful misconduct, negligence or reckless disregard of duty by the Account Trustee. The Account Trustee in doing anything or permitting anything to be done in respect of the Trust Property or the carrying out of its duties under this Insurance Trust Agreement is, and will be conclusively deemed to be, acting as trustee for the beneficiaries hereunder and not in any other capacity. Except to the extent provided in this Section 6(c), the Account Trustee will not be subject to any liability for debts, liabilities, obligations, claims, demands, judgments, costs, charges or expenses against or with respect to the Trust Property, arising out of anything done or permitted by it to be done or its failure to take any action in respect of the execution of its duties hereunder and resort will be had solely to the Trust Property for the payment or performance thereof, and no other property or assets of the Account Trustee, whether owned in its personal capacity or otherwise, will be subject to levy, execution or other enforcement procedure with regard to any obligation under this Insurance Trust Agreement.

(d) The Account Trustee shall not be required to expend or risk its own funds or otherwise incur financial liability in the performance of any of its duties hereunder, or in the exercise of any of its rights or powers hereunder, or in acting at the request or direction of the Lenders' Agent on behalf of the Lenders, unless it shall have received adequate indemnity or security against such risk or liability satisfactory to it.

(e) Notwithstanding the foregoing, the Account Trustee shall be liable for any action or failure to act arising from or in connection with the dishonesty, fraud, negligence (including, without limitation, negligence in the handling of funds), wilful misconduct, bad faith or reckless disregard of any duty hereunder by the Account Trustee or any of its directors, officers or employees, or the failure to comply with the standard of care referred to in Section 6(b).

(f) Except as otherwise provided in Sections 6(c), 6(d) and 6(e):

(i) the Account Trustee may rely and shall be protected in acting or refraining from acting upon any signature, resolution, certificate, statement, instrument, opinion, report, notice, request, direction, consent, order or other paper or document reasonably believed by it in good faith to be genuine and to have been signed or presented by the proper party or parties; and

(ii) the Account Trustee may exercise its powers and perform its duties by or through such attorneys, representatives, agents and employees as it shall appoint; and may

consult with counsel, accountants and other skilled persons selected and employed or retained by it, and the Account Trustee shall not be liable for anything done, suffered or omitted in good faith by it in accordance with the written advice of such counsel, accountants or other skilled persons (provided that such advice pertains to such matters as the Account Trustee may reasonably presume to be within the scope of such person's area of competency) and not contrary to any express provision in this Insurance Trust Agreement.

(g) Project Co hereby agrees to pay, indemnify and hold harmless the Account Trustee from and against any and all loss, liability, cost, claim and expense incurred by the Account Trustee with respect to the performance of this Insurance Trust Agreement by the Account Trustee or any of the Account Trustee's directors, officers or employees, unless arising from its or their own dishonesty, fraud, negligence (including, without limitation, negligence in the handling of funds), wilful misconduct, bad faith or reckless disregard of any duty hereunder.

(h) Subject to the terms and conditions set forth in the Account Trustee fee letter, the Account Trustee shall receive from the Trust Property reasonable compensation for its services hereunder and shall be reimbursed by Project Co for its reasonable fees and expenses (including the disbursements and reasonable fees of counsel).

(i) The Account Trustee agrees to look solely to Project Co, and not, except as expressly set forth herein, to the Lenders' Agent, the Lenders or the City for any claim for indemnification which may arise under this Insurance Trust Agreement.

(j) The Account Trustee shall be responsible for keeping all appropriate books and records relating to the receipt and disbursement of all money which it receives hereunder.

(k) If at any time the Account Trustee is served with any judicial or administrative order, judgment, decree, writ or other form of judicial or administrative process which in any way affects the Trust Property held by it hereunder (including but not limited to orders of attachment or garnishment or other forms of levies or injunctions or stays relating to the transfer of Trust Property) (each, an "**Order**"), the Account Trustee is authorized to comply therewith in any manner as it or legal counsel of its own choosing deems appropriate. The Account Trustee shall in no way be bound to call for further evidence (whether as to due execution validity or effectiveness, or the jurisdiction of any court, or as to the truth of any fact), and shall not be responsible for any loss that may be occasioned by its failing to do so. If the Account Trustee complies with any Order, the Account Trustee shall not be liable to any of the Parties hereto or to any other person or entity even though such Order may be subsequently modified or vacated or otherwise determined to have been without legal force or effect. If the Account Trustee is served with any Order, it shall forthwith and, in any event, within three (3) Business Days, deliver a copy of such Order to each of the Lenders' Agent, the City and Project Co.

(l) Unless otherwise specifically set forth herein, the Account Trustee shall proceed as soon as practicable to collect any cheques or other collection items at any time deposited hereunder. All such collections shall be subject to the Account Trustee's usual collection

practices or terms regarding items received by the Account Trustee for deposit or collection. Except and to the extent provided herein, the Account Trustee shall not be required, or have any duty, to notify any person of any payment or maturity under the terms of any instrument deposited hereunder, nor to take any legal action to enforce payment of any cheque, note or security deposited hereunder, or to exercise any right or privilege which may be afforded to the holder of any such security.

(m) In the event that the Account Trustee determines that any direction, instruction, notice or other communication given under this Insurance Trust Agreement by the Lenders' Agent or, where the Account Trustee has received a Change of Authorization Notice, the City, is ambiguous or uncertain, the Account Trustee may, in its Discretion, refrain from taking any action other than retaining possession of the Trust Property, unless the Account Trustee has received written instructions, signed by the Lenders' Agent or, if the Account Trustee has received a Change of Authorization Notice, the City, which resolve such ambiguity or uncertainty, provided that the Account Trustee shall, forthwith upon determining that such direction, instruction, notice or other communication is ambiguous or uncertain, seek clarification from the Lenders' Agent, or where the Account Trustee has received a Change of Authorization Notice, the City, to resolve such ambiguity or uncertainty.

(n) Prior to receipt of a Change of Authorization Notice by the Account Trustee, any instruction, notice or other communication delivered to the Account Trustee by the Lenders' Agent shall be paramount to and supersede any direction, instruction, notice or other communication from any other Party to this Insurance Trust Agreement, and the Account Trustee shall comply with such direction, instruction, notice or other communication from the Lenders' Agent. After the Account Trustee has received a Change of Authorization Notice, any instruction, notice or other communication delivered to the Account Trustee by the City shall be paramount to and supersede any direction, instruction, notice or other communication from any other Party to this Insurance Trust Agreement, and the Account Trustee shall comply with such direction, instruction, notice or other communication from the City.

(o) Each of the Lenders' Agent and the City shall provide to the Account Trustee an incumbency certificate setting out the names and sample signatures of individuals authorized to give instructions to the Account Trustee hereunder. The Account Trustee shall be entitled to rely on each such incumbency certificate until a revised or replacement incumbency certificate is provided to the Account Trustee by the Lenders' Agent or the City, as applicable. The Account Trustee shall refuse to act upon any instruction given by the Lenders' Agent or the City which is signed by any person other than an individual named in the incumbency certificate provided to the Account Trustee by the Lenders' Agent or the City, as applicable, pursuant to this Section 6(o), as any such incumbency certificate may be amended, supplemented or replaced from time to time.

(p) The Account Trustee shall be entitled to rely on, and act upon, any direction, instruction, notice or other communication provided to it hereunder which is sent to it by facsimile transmission, provided that any such direction, instruction, notice or other

communication is signed by an individual named in the incumbency certificate delivered to the Account Trustee by the Lenders' Agent or the City, as applicable, pursuant to Section 6(o).

7. LENDERS' AGENT AND CITY RIGHTS TO DIRECT

(a) Until the termination of the Project Agreement in accordance with the Lenders' Direct Agreement and receipt by Project Co of any amounts to which it is entitled pursuant to Schedule 23 – Compensation on Termination to the Project Agreement and all Insurance Proceeds to the extent that the value of such Insurance Proceeds was deducted from the amounts payable to Project Co by the City (a "**Change of Authorization Event**"), the Lenders' Agent shall, subject to Sections 3 and 4 of this Insurance Trust Agreement, have the exclusive right to direct the Account Trustee with respect to the Insurance Trust Account, the Insurance Policies and the Insurance Proceeds.

(b) Upon the occurrence of a Change of Authorization Event:

(i) the Lenders' Agent shall cease to be entitled, and the City shall thenceforth be entitled, to direct the Account Trustee with respect to the Insurance Trust Account, the Insurance Policies and the Insurance Proceeds; and

(ii) the Lenders' Agent and the City shall jointly provide notice to the Account Trustee (a "**Change of Authorization Notice**") that the City shall, as of the date of such Change of Authorization Event, have the exclusive right to direct the Account Trustee with respect to the Insurance Trust Account, the Insurance Policies and the Insurance Proceeds.

(c) Notwithstanding the foregoing, no Change of Authorization Event shall occur and no Change of Authorization Notice shall be delivered to the Account Trustee where a City Event of Default has occurred. Where a City Event of Default has occurred, upon receipt by the Lenders' Agent and Lenders of all amounts owing by the City to the Lenders' Agent and Lenders under the Lenders' Direct Agreement, the Account Trustee shall release all amounts in the Insurance Trust Account, the Insurance Policies and the Insurance Proceeds to Project Co or as Project Co may otherwise direct from time to time.

8. TERMINATION

(a) Subject to the provisions of Section 8(b), this Insurance Trust Agreement shall remain in full force and effect and be binding in accordance with and to the extent of its terms until:

(i) the obligations of Project Co to the Lenders' Agent and the Lenders under the Lending Agreements have been paid and performed in full and the Lenders have no further obligation to make any further advances or other credit accommodations under the Lending Agreements; and

(ii) the obligations of Project Co to the City have been paid and performed in full.

(b) The Account Trustee may terminate this Insurance Trust Agreement at any time upon sixty (60) days prior written notice to the other Parties hereto, provided that no termination of this Insurance Trust Agreement by the Account Trustee shall be effective until such time as the Lenders' Agent, the City, and Project Co have entered into a replacement insurance trust agreement on the same terms and conditions as this Insurance Trust Agreement with a replacement account trustee satisfactory to the Lenders' Agent, the Lenders and the City.

9. ASSIGNMENT

(a) The Account Trustee shall not assign, transfer or otherwise dispose of any of its rights or obligations under this Insurance Trust Agreement without the prior written consent of the Lenders' Agent, the City and Project Co.

10. NOTICES

(a) All notices, requests, demands, instructions, certificates, consents and other communications required or permitted under this Project Agreement shall be in writing (whether or not "written notice" or "notice in writing" is specifically required by the applicable provision of this Insurance Trust Agreement) and served by sending the same by registered mail, facsimile or by hand, as follows:

If to the City:
City of Ottawa
Finance Department
Supply Branch
100 Constellation Crescent
4th Floor, West Tower
Ottawa, ON K2G 6J8

Fax: 613-580-9688
Attn.: Director, Rail Implementation

If to Project Co:
Rideau Transit Group General Partnership
c/o ACS Infrastructure Canada Inc.
155 University Avenue, Suite 1800
Toronto, ON M5H 3B7

Fax No.: (416) 365-7886
Attn: Eusebio Corregel

If to the Account Trustee:
BNY Trust Company of Canada
11th Floor, 320 Bay Street
Toronto, ON M5H 4A6

Fax No.: 416-360-1711
Attn.: Vice President, Transaction Management Group

If to the Lenders' Agent: BNY Trust Company of Canada
11th Floor, 320 Bay Street
Toronto, ON M5H 4A6

Fax No.: 416-360-1711
Attn.: Vice President, Transaction Management Group

(b) Where any notice is provided or submitted to a Party via facsimile, an original of the notice sent via facsimile shall promptly be sent by regular mail or registered mail. For greater certainty, a notice given via facsimile shall not be invalid by reason only of a Party's failure to comply with this Section 10(b).

(c) Any Party to this Insurance Trust Agreement may, from time to time, change any of its contact information set forth in Section 10(a) by prior notice to the other Parties, and such change shall be effective on the Business Day that next follows the recipient Party's receipt of such notice unless a later effective date is given in such notice.

(d) Subject to Sections 10(e), 10(f) and 10(g):

(i) a notice given by registered mail shall be deemed to have been received on the third Business Day after mailing;

(ii) a notice given by hand delivery shall be deemed to have been received on the day it is delivered; and

(iii) a notice given by facsimile shall be deemed to have been received on the day it is transmitted by facsimile.

(e) If the Party giving the notice knows or ought reasonably to know of difficulties with the postal system which might affect negatively the delivery of mail, any such notice shall not be mailed but shall be made or given by personal delivery or by facsimile transmission in accordance with this Section 10.

(f) If any Notice delivered by hand or transmitted by facsimile is so delivered or transmitted, as the case may be, either on a day that is not a Business Day or on a Business Day after 4:00 p.m. (recipient's local time), then such Notice shall be deemed to have been received by such recipient on the next Business Day.

(g) A notice given by facsimile shall be deemed to have been received by the recipient on the day it is transmitted only if a facsimile transmission report (maintained by the sender) indicates that the transmission of such notice was successful.

11. AMENDMENTS

This Insurance Trust Agreement may not be varied, amended or supplemented except by an agreement in writing signed by duly authorized representatives of the Parties and stating on its

face that it is intended to be an amendment, restatement or other modification, as the case may be, to this Insurance Trust Agreement.

12. WAIVER

(a) No waiver made or given by a Party under or in connection with this Insurance Trust Agreement shall be binding or effective unless the waiver is in writing, signed by an authorized representative of the Party giving such waiver, and delivered by such Party to the other Parties. No waiver made with respect to any right, power or remedy in one instance will be deemed to be a waiver with respect to any other instance involving the exercise of such right, power, or remedy or with respect to any other right, power, or remedy.

(b) Failure by any Party to exercise any of its rights, powers or remedies hereunder or its delay to do so shall not constitute a waiver of those rights, powers or remedies. The single or partial exercise of a right, power or remedy shall not prevent its subsequent exercise or the exercise of any other right, power or remedy.

13. RELATIONSHIP BETWEEN THE PARTIES

The Parties are independent contractors. This Insurance Trust Agreement is not intended to and does not create or establish between the Parties any relationship as partners, joint venturers, employer and employee, master and servant, or, except as provided in this Insurance Trust Agreement, of principal and agent.

14. ENTIRE AGREEMENT

Except where provided otherwise in this Insurance Trust Agreement, this Insurance Trust Agreement constitutes the entire agreement between the Parties in connection with its subject matter and supersedes all prior representations, communications, negotiations and understandings, whether oral, written, express or implied, concerning the subject matter of this Insurance Trust Agreement.

15. SEVERABILITY

Each provision of this Insurance Trust Agreement shall be valid and enforceable to the fullest extent permitted by law. If any provision of this Insurance Trust Agreement is declared invalid, unenforceable or illegal by the courts of a competent jurisdiction, such provision may be severed and such invalidity, unenforceability or illegality shall not prejudice or affect the validity, enforceability and legality of the remaining provisions of this Insurance Trust Agreement. If any such provision of this Insurance Trust Agreement is invalid, unenforceable or illegal, the Parties shall, acting in good faith, promptly negotiate new provisions to eliminate such invalidity, unenforceability or illegality and to restore this Insurance Trust Agreement as near as possible to its original intent and effect.

16. ENUREMENT

This Insurance Trust Agreement shall enure to the benefit of, and be binding on, each of the Parties and their respective successors and permitted transferees and assigns.

17. GOVERNING LAW AND JURISDICTION

(a) This Insurance Trust Agreement shall be governed by and construed in accordance with the laws of Ontario and the laws of Canada applicable therein and shall be treated in all respects as an Ontario contract, without regard to conflict of laws principles.

(b) The Parties agree that the courts of the Province of Ontario and all courts competent to hear appeals therefrom shall have exclusive jurisdiction to hear and settle any action, suit, proceeding or dispute in connection with this Insurance Trust Agreement and hereby irrevocably attorn to the exclusive jurisdiction of such courts.

18. FURTHER ASSURANCE

Each Party shall do all things, from time to time, and execute all further documents necessary to give full effect to this Insurance Trust Agreement.

19. LANGUAGE OF AGREEMENT

Each Party acknowledges having requested and being satisfied that this Insurance Trust Agreement and related documents be drawn in English. Chacune des parties reconnaît avoir demandé que ce document et ses annexes soient rédigés en anglais et s'en déclare satisfaite.

20. COUNTERPARTS

This Insurance Trust Agreement may be executed in one or more counterparts. Any single counterpart or a set of counterparts executed, in either case, by all the Parties shall constitute a full, original and binding agreement for all purposes. Counterparts may be executed either in original or faxed form provided that any Party providing its signature in faxed form shall promptly forward to such Party an original signed copy of this Insurance Trust Agreement which was so faxed.

[This section intentionally left blank]

IN WITNESS WHEREOF the Parties have executed this Insurance Trust Agreement as of the date first above written.

CITY OF OTTAWA

Per: _____
Name: Kent Kirkpatrick
Title: City Manager

I have authority to bind the corporation.

RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP, by its partners, ACS RTG PARTNER INC., SNC RTG PARTNER INC. and ELLISDON RTG PARTNER INC.

ACS RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

SNC RTG PARTNER INC.

Per: _____
Name:
Title:

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

ELLISDON RTG PARTNER INC.

Per: _____
Name:
Title:

I have authority to bind the corporation.

BNY TRUST COMPANY OF CANADA, in its capacity as agent for and on behalf of the Lenders

Per: _____
Name:
Title:

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

BNY TRUST COMPANY OF CANADA, in its capacity as account trustee for and on behalf of the City, Project Co and the Lenders' Agent

Per: _____
Name:
Title:

Per: _____
Name:
Title:

I/We have authority to bind the corporation.

SCHEDULE 31

PROJECT CO INFORMATION

Project Co represents and warrants that the following information is true and correct as of the date of this Project Agreement:

A. RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP

1.	Name:	Rideau Transit Group General Partnership
2.	Jurisdiction of Formation:	Ontario
3.	Date of Formation:	January 14, 2013
4.	Registration Number:	230047037
5.	Partner:	ACS RTG Partner Inc.
6.	Partner:	SNC RTG Partner Inc.
7.	Partner:	EllisDon RTG Partner Inc.

B. ACS RTG PARTNER INC.

8.	Name:	ACS RTG Partner Inc.
9.	Jurisdiction of Incorporation:	British Columbia
10.	Date of Incorporation:	January 4, 2013
11.	Corporation Number:	BC0959303
12.	Directors:	

Name	Address
Ramon Villaamil	155 University Avenue Suite 1800 Toronto, Ontario M5H 3B7
Juan Santamaria	155 University Avenue Suite 1800 Toronto, Ontario M5H 3B7

13. Officers:

Name	Address	Office
N/A	N/A	N/A

14. Subsidiaries: None.

C. SNC RTG PARTNER INC.

10. Name: SNC RTG Partner Inc.

11. Jurisdiction of Incorporation: Canada

12. Date of Incorporation: January 9, 2013

13. Corporation Number: 840122-5

14. Directors:

Name	Address
Michel Jodoin	
Gilles Laramée	

Gerry Grigoropoulos

15. Officers:

Name	Address	Office
Gilles Laramée		Chairman of the Board
Gerry Grigoropoulos		President
Michel Jodoin		Vice President and Corporate Secretary
Yvan Dery	455 René-Lévesque Blvd West, Montreal, Quebec H2Z 1Z3	Interim Vice-President and Treasurer
Franca Sucapane	455 René-Lévesque Blvd West, Montreal, Quebec H2Z 1Z3	Assistant Corporate Secretary
Hetal Patel	455 René-Lévesque Blvd West, Montreal, Quebec H2Z 1Z3	Vice-President

16. Subsidiaries: None.

C. ELLISDON RTG PARTNER INC.

1. Name: EllisDon RTG Partner Inc.
2. Jurisdiction of Incorporation: Ontario
3. Date of Incorporation: January 2, 2013
4. Corporation Number: 001879493

5. Directors:

Name	Address
Geoffrey M. Smith	
James M. King	
John Bernhardt	

6. Officers:

Name	Address	Office
Geoffrey M. Smith		President
James M. King		Secretary
Jody Becker	89 Queensway Ave West, Suite 800, Mississauga, Ontario L5B 2V2	Vice-President
Maryann Moons	2045 Oxford Street East London, Ontario N6A 4M6	Treasurer

7. Subsidiaries: None.

SCHEDULE 32

FINANCIAL MODEL EXTRACTS

SCHEDULE 33
WORKS REPORTS

PART 1
MONTHLY WORKS REPORT

1. MONTHLY WORKS REPORT

1.1 The provisions of Part 1 of this Schedule 33 shall apply to the monthly Works Report, which shall be submitted to the City in accordance with Schedule 10 – Review Procedure to this Project Agreement.

1.2 The monthly Works Report shall include, without limitation, the following:

(a) an executive summary describing the general status of the Works;

(b) status of the Works by high-level work breakdown segment and project phase, including:

(i) accomplishments in past month;

(ii) planned activities for next three months;

(iii) a narrative description of any Disputes related to the Works, including any action that has taken place over the past month to resolve such Disputes;

(iv) permits;

(v) details of staffing numbers for the Project and Key Individuals;

(vi) schedule of submissions with corresponding City response requirements;

(vii) progress against design and construction milestones; including person-hours against activities;

(viii) progress photos; and

(ix) details of any delays which shall be specifically highlighted together with details of the impacts and corrective actions and program recovery proposals;

(c) outstanding contractual decisions;

(d) status of all reports submitted pursuant to the requirements of the Project Agreement;

(e) an updated Works Schedule in printed (PDF) and native Oracle Primavera Project Management P6 format (XER), including person-hours resources to activities;

(f) environmental monitoring and compliance status;

(g) quality assurance and quality control, including:

(i) update of quality control and quality assurance activities and personnel responsible;

(ii) monthly Quality Management System reports, Quality Audit reports and summary information from the Non-Conformance Tracking System, as described in Schedule 11 – Quality Management;

(iii) internal and external audits; and

(iv) training metrics;

(h) organization/staffing changes and additions for Project Co and Construction Contractor;

(i) tangible capital asset controls;

(j) health and safety, including:

(i) lost time injuries; and

(ii) accidents with no lost time;

(k) subcontract status, including:

(i) consultants;

(ii) Subcontracts awarded;

(iii) tenders;

(iv) labour report (average workforce); and

(v) Subcontractor 3 month rolling program;

(l) financial cost control status, including:

(i) progress as measured by Earned Value Management key performance factors, including: Schedule Performance Index (SPI); Cost Performance Index (CPI); Schedule variance (SV); Cost Variance (CV); Planned Value (PV); Earned Value (EV); Actual Cost (AC); Estimate to Complete (ETC); and, Estimate at Completion (EAC);

(ii) Variations;

(iii) insurance summary;

(iv) Construction Contractor default status; and

(v) cash flow projection (capital cost components);

(m) Risk Management, including:

(i) updated Risk Register;

(ii) Risk response plans requiring action from the City;

(iii) claims;

(iv) liens;

(v) environmental issues;

(vi) labour;

(vii) market conditions;

(viii) outstanding disputes;

(ix) operational risks;

(x) Subcontractor risks; and

(xi) other risks;

(n) status of any integration, testing and commissioning activities.

1.3 Updated versions of each of the Project Management Plan and Risk Management Plan, which shall be submitted to the City in accordance with Schedule 10 – Review Procedure to this Project Agreement and shall be submitted with the first Works Report.

SCHEDULE 33
WORKS REPORTS

PART 2
TECHNICAL REPORTS

2. TECHNICAL WORKS REPORTS

2.1 The provisions of Part 2 of this Schedule 33 shall apply to the technical Works Reports, which shall be submitted to the City under separate cover from the monthly Works Report described in Part 1 of this Schedule 33 and in accordance with Schedule 10 – Review Procedure to this Project Agreement, and shall, without limitation, contain the following:

Table 2.1 – Technical Works Reports

Deliverable Name	Due Date	Deliverable Submission Period	Submitted under the Review Procedure	Reference Section
Tunnel Technical Works Report	Monthly, as noted in Section 2.2 of this Schedule	Design and Construction Period	Yes	2.2
Interim Tunnel Notifications	As noted in Section 2.3 of this Schedule	Design and Construction Period	Yes	2.3

2.2 The Tunnel Technical Works Report shall be submitted once per month commencing 30 working days prior to the start of construction, and without limitation, contain the following:

(a) Executive Summary

(i) Overall narrative and summation of the previous months work and plan and schedule for the next 3 months.

(b) Protection of Adjacent Structures

(i) Updated Schedule of Assets.

(ii) Summation of Geotechnical instrumentation monitoring including all events that resulted in either a Trigger Level, or an Action Level exceedance has occurred.

(c) General

(i) Geological mapping records and field logs.

(ii) Geological as-built longitudinal section of the Tunnel. The section is to be a developed longitudinal section, depicting the observed geology along the length of the Tunnel for the invert, sidewalls and crown.

(iii) Quality Control testing data and reports for materials used in Construction of the Tunnels.

(iv) Excavation support installation logs and placement records, and testing data for the main support measures.

(v) Summation of meeting agendas and minutes, action plans, reports and data.

(vi) Summation of results of data acquisition and monitoring for excavation performance and deformations within Tunnels.

(vii) Summation of electrical and other inspection reports, including ventilation, muck haulage, and water discharge.

(viii) Summation of inspection stops, equipment maintenance, lost ground, gassy conditions, or emergency conditions.

(ix) Summation of shift reports identifying labour, equipment and materials utilized for final lining activities.

(d) Mined Structures

(i) Production performance and proof testing data for key tunnel support elements including:

(A) Shotcrete;

(B) Rock dowels or bolts; and

(C) Fiberglass dowel or bolts.

(ii) The logs and survey notes that shall include the following information:

(A) Measurements of in-tunnel or other deformations;

(B) Construction loading or other activities in the vicinity of instrumentation; and

(C) Any cracks in or damage to any in-tunnel or surface Structures, or other events.

(e) Bored Tunnels

(i) Summation of TBM daily and weekly records identifying the following:

(A) Shift reports and grout sample testing;

(B) Notifications of low or high grout takes; and

(C) Test results.

(ii) Tail void grouting, summation of daily and weekly records identifying the following:

(A) Shift reports and grout sample testing;

(B) Notifications of low or high grout takes; and

(C) Test Results.

(iii) For segmental linings, summation of records for fabrication, transport to site, damage and repairs, dimension checks, mockup or fit ups, quality control records, and installation records.

(f) Cut and Cover Structures

(i) Summation of test reports for:

(A) Load testing of soil and rock anchors;

(B) Weld inspections;

(C) Waterproofing tests and inspections; and

(D) Concrete, reinforcement, and embedment tests.

(g) Blasting

(i) Blasting Records in accordance with the City Special Provision F-1201.

2.3 Interim Tunnel Notifications shall be articulated and submitted to the City for the following events, no later than the time frames as specified below:

(a) Protection of Adjacent Structures

(i) Geotechnical instrumentation monitoring data: 1 day of obtaining data;

(ii) Trigger Level exceedance: within four hours of determination and every four hours after until levels have stabilized;

(iii) Action Level exceedance: within one hour of determination and every one hour after until levels have stabilized.

SCHEDULE 34

VEHICLE AND FIXED EQUIPMENT WARRANTIES

1. WARRANTY ON VEHICLES FROM ALSTOM POWER & TRANSPORT CANADA INC.

1.1 Warranty on the Vehicles from Alstom Power and Transportation Canada Inc. ("**Alstom**"), subject to standard claims procedures and exclusions, as have been agreed between Alstom and the Construction Contractor:

(a) General defects warranty commencing on acceptance of each Vehicle and continuing until two years after Revenue Service Availability;

(b) Epidemic defects warranty commencing on Revenue Service Availability and continuing until four years after Revenue Service Availability;

(c) Latent defects warranty for defects in existence at acceptance of each Vehicle but not discoverable during the general defects warranty period until 15 years following Revenue Service Availability.

2. WARRANTY ON CBTC SYSTEM FROM THALES CANADA INC.

2.1 Warranty on the CBTC System from Thales Canada Inc. ("**Thales**"), subject to standard claims procedures and exclusions, as have been agreed between Thales and the Construction Contractor:

(a) General defects warranty on equipment, software and other defects commencing on acceptance of each Vehicle and continuing until two years after Revenue Service Availability;

(b) Latent defects warranty for defects in existence at acceptance of each Vehicle but not discoverable during the general defects warranty period until 15 years following Revenue Service Availability.

SCHEDULE 35

ADDITIONAL VEHICLES

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PART 1
DEFINITIONS

1.1 Definitions

The following definitions shall have the following meanings:

(a) **"Additional Maintenance Spare Vehicles"** has the same meaning given to it in Section 2.2(a).

(b) **"Additional Payments for Non-Project Co Additional Vehicles"** has the same meaning given to it in Section 5.3(a).

(c) "**Additional Vehicles**" means any additional light rail transit vehicles purchased by the City following Financial Close pursuant to this Schedule 35, including all electromechanical and other equipment therein. For clarity, this includes any additional light rail transit vehicles beyond the initial fleet of Vehicles to be provided by Project Co at the Revenue Service Availability Date, whether or not such additional light rail transit vehicles are purchased from the Project Co or any other third party.

(d) "**Additional Vehicles Agreement**" has the meaning given to it in Section 8.1(a).

(e) "**Additional Vehicles Termination Date**" has the meaning given to it in Section 8.1(b).

(f) "**Annual Service Payment**" has the meaning given to it in Schedule 20 - Payment Mechanism.

(g) **"Capacity Factor"** means 1.25.

(h) "**Closing Date**" means the date upon which resolution of all punch list items have been achieved, as certified by the Independent Certifier**;**

(i) "**Configuration Management**" means a process to establish and maintain the integrity of all identified project outputs and make them available to all concerned stakeholders.

(j) "**Cost of Work**" has the same meaning given to it in Schedule 3 of RFP, Part 2 - Financial Submission Requirements.

(k) "**Corrective Maintenance Plan**" has the meaning given to it in Schedule 15-1 – Output Specifications - Technical Definitions and Reference Documents.

(l) "**Custodial Maintenance Plan**" has the same meaning given to it in Appendix A of Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements.

(m) **"Daily Bus In Service Costs"** means $935, Adjusted for Inflation.

(n) "**Default Interest Rate**" means 5% over the Prime Rate.

(o) "**Designated Site**" means a site in the City of Ottawa as designated by the City to which Project Co is required to deliver the Additional Vehicles.

(p) "**Deliver**" or "**Delivery**" means that Project Co delivers the Additional Vehicles purchased by the City pursuant to and in accordance with this Schedule 35 to the Designated Site on the Delivery Date in a manner as requested by the City.

(q) "**Delivery Date**" means the later of:

(i) 30 months following the date when an Option Notice is given by the City to Project Co in accordance with Section 2.1(c), upon which date Project Co shall be required to deliver the Additional Vehicles to a Designated Site; and

(ii) the Required Revenue Service Availability Date.

(r) "**Escalation Factor**" has the meaning given to it in Schedule 20 - Payment Mechanism.

(s) "**Handover Maintenance Plan**" has the meaning given to it in Schedule 15-1 – Output Specifications - Technical Definitions and Reference Documents.

(t) "**Lifecycle Maintenance Plan**" means the plan as contemplated by Section 6.4(a).

(u) "**Liquidated Damages for Service Level Increase Additional Vehicle Delivery Delay**" means the liquated damages that are payable by Project Co to the City pursuant to and in accordance with Section 2.7(c) and Section 2.7(d).

(v) "**Maintenance Plan**" means collectively, the Custodial Maintenance Plan, the Corrective Maintenance Plan, and the Preventive Maintenance Plan.

(w) **"Major Service Change**" has the meaning given to it in Schedule 15-1 – Output Specifications - Technical Definitions and Reference Documents.

(x) "**Marginal PPHPD**" means, for any day, the difference in minimum service capacity (PPHPD) for the Morning Peak Period between:

(i) the Service Level requested by the City for that day via a Major Service Change request in accordance with Section 3.5 of Appendix 1 of Schedule 15-3 - Output Specifications – Maintenance and Rehabilitation Requirements, and

(ii) the Service Level being provided by Project Co on that day;

and by way of example only, Marginal PPHPD for a Service Level Increase from Service Level 1 to Service Level 2 is derived by reference to Schedule 10 of the RFP - Preliminary Service Plan, by taking the minimum service capacity (PPHPD) for the Morning Peak Period (Monday-Thursday) for Service Level 2 (Cell Reference H20, Sheet "Service Level 2 2020-2021"), and subtracting the minimum service capacity (PPHPD) for the Morning Peak Period (Monday-Thursday) for Service Level 1 (Cell

Reference H20, Sheet "Service Level 1 2018-2019"), which yields 11,360-10,700 = 660. For clarity, during the Maintenance Term, the relevant reference document will be the Operations Service Plan, as amended from time to time in accordance with the Project Agreement.

(y) "**Maximum Order**" means the maximum number of the Additional Vehicles that the City shall be entitled to by way of the Option to Purchase in each year during the Option Term pursuant to Section 2.2(c).

(z) "**Minimum Order**" means the minimum number of the Additional Vehicles that the City shall be entitled to by way of the Option to Purchase in each year during the Option Term pursuant to Section.2.2(b).

(aa) "**Non-Project Co Additional Vehicles**" means the Additional Vehicles which are purchased by the City from a third party other than Project Co pursuant to this Schedule 35.

(bb) "**Option Term**" means seven (7) years following Financial Close.

(cc) "**Option Notice**" has the meaning given to it in Section 2.1(c)(i).

(dd) "**Option to Purchase**" refers to the option described in Section 2.1(a).

(ee) "**Preventive Maintenance Plan**" has the meaning given to it in Schedule 15-1 – Output Specifications - Technical Definitions and Reference Documents.

(ff) "**Price Change Formula**" means the Escalation Factor set out in Section 4.1 of Part B of Schedule 20 – Payment Mechanism.

(gg) "**Prime Rate**" means on any day, the annual rate of interest announced by the Royal Bank of Canada (or its successor), or any Canadian chartered bank agreed by the City and Project Co, from time to time as its reference rate then in effect for determining interest rates on Canadian dollar commercial loans made by it in Canada.

(hh) "**Project Co Additional Vehicles**" means the Additional Vehicles which are purchased by the City from Project Co pursuant to this Schedule 35.

(ii) "**Service Level Increase"** has the meaning given to it in Schedule 15-1 – Output Specifications - Technical Definitions and Reference Documents.

(jj) "**Service Level Increase Date**" means the date upon which the Additional Vehicles are brought into revenue service. For greater certainty, for the purpose of this Schedule 35, the Service Level Increase Date shall not be earlier than the Delivery Date.

(kk) "**Service Level Increase Additional Vehicle Delivery Delay**" has the meaning given to it in Section 2.7(c).

(ll) "**System Extension**" has the meaning given to it in Schedule 38 – Extension and Additional Phases.

(mm) "**Traction Power**" has the meaning given to it in Schedule 15-1 – Output Specifications - Technical Definitions and Reference Documents.

(nn) "**Train Control System**" has the meaning given to it in Schedule 15-1 – Output Specifications - Technical Definitions and Reference Documents.

(oo) "**Vehicle Availability Standard**" has the same meaning given to it in Appendix A of Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements.

(pp) "**Vehicle Long Stop Date**" means 6 months following the Delivery Date.

(qq) "**Vehicle Supplier**" means Alstom Power and Transport Canada Inc.

(rr) [REDACTED]

(ss) "**Volume Payment**" has the meaning given to it in Schedule 20 - Payment Mechanism.

(tt) "**Weekday**" means Monday, Tuesday, Wednesday, Thursday, or Friday that is not a statuary holiday in the Province of Ontario.

PART 2
OPTION TO PURCHASE

2.1 City's Option to Purchase

(a) At its option, the City shall have the right within the Option Term to purchase from Project Co Additional Vehicles and require such Additional Vehicles be delivered by Project Co to the Designated Site on the Delivery Date.

(b) The Additional Vehicles that are purchased by the City pursuant to Section 2.1(a) may, at the City's option, be used for the System and any System Extension.

(c) Option to Purchase:

(i) The Option to Purchase shall be exercised by written notice (an "**Option Notice**") given by the City to Project Co at any time during the Option Term in accordance with Section 61 of the Project Agreement.

(ii) An Option Notice shall specify the number of the Additional Vehicles that the City wishes to purchase from Project Co, the Designated Site, additional storage area, maintenance requirements, upgrades to Train Control System (if any), Traction Power and other issues relating to integration of Additional Vehicles into the System.

(iii) Upon delivery of a relevant Option Notice in accordance with the foregoing provision there shall be deemed to be a binding agreement of purchase and sale between the City as purchaser and Project Co as vendor in respect of the Additional Vehicles. The terms and conditions of the agreement of purchase and sale of such Additional Vehicles shall be in accordance with this Schedule 35 or the terms otherwise provided in the Project Agreement not in conflict with this Schedule 35.

(iv) The purchase of the Additional Vehicles resulting from the exercise of the Option to Purchase shall be completed upon the Closing Date.

(v) On the Closing Date, Section 29.5 of the Project Agreement shall apply, *mutatis mutandis*, to Project Co and the Additional Vehicles.

(vi) If the Additional Vehicles are encumbered by any encumbrances contrary to Section 29.5 of the Project Agreement or Project Co fails to perform any covenant on its part herein contained, the City may in its Discretion, without derogation from its right respecting any Project Co Event of Default as provided for in the Project Agreement, on prior written notice to Project Co (the "**Default Notice**"), perform any such covenant capable of being performed by the City or arrange for the encumbrance to be discharged (any such event, a "**Default Event**") and if the Default Event requires the payment or expenditure of money, the City may make such payment or expenditure and all sums so expended shall be forthwith payable by Project Co to the City with the Default Interest Rate thereon until paid and the City may deduct and set-off any such amount against the purchase price payable on the Closing Date. The parties agree that the Closing Date shall be extended by such period of time as the City determines is necessary for the purposes of it curing such Default Event prior to the Closing Date.

(vii) Each of the parties shall execute and deliver all such other further documents and do such other things as the other party may reasonably request to give full effect to this Section 2.1.

(d) Project Co represents that it has agreed with its Vehicle Supplier on the terms that are sufficient to give effect to the Option to Purchase as provided for in this Schedule 35. Upon receipt of the Option Notice, Project Co shall exercise its rights and perform all necessary acts under its agreement with its Vehicle Supplier to give full effect to City's Option to Purchase under this Section 2.1

2.2 The Number of the Additional Vehicles

(a) The number of the Additional Vehicles with respect to which the Option to Purchase is exercised pursuant to Section 2.1 for each year of the Option Term shall take into account the spare vehicles required to provide the necessary spare vehicle capacity to allow Project Co to conduct Maintenance Services in accordance with Schedule 15-3 - Output Specifications – Maintenance and Rehabilitation Requirements (the "**Additional Maintenance Spare Vehicles**"). For the purpose of this Section 2.2, where the calculation for the required Additional Maintenance Spare Vehicles pursuant to Project Co's Response produces a fraction, such fraction shall not be taken into account in determining the number of required Additional Maintenance Spare Vehicles.

(b) The Minimum Order that the City shall have the right to place by way of the Option to Purchase from Project Co pursuant to Section 2.1 for each year of the Option Term shall be equal to one (1) train consist.

(c) The Maximum Order that the City shall have the right to place by way of the Option to Purchase from Project Co pursuant to Section 2.1 for each year of the Option Term shall be equal to three (3) train consists. Notwithstanding the Maximum Order permitted in an annual period, the City shall also be entitled to order Additional Maintenance Spare Vehicles required in accordance with Section 2.2(a) in such year.

2.3 Output Specifications of Additional Vehicles

(a) Subject to Section 2.3(b) and Section 2.3(c), the Additional Vehicles purchased by the City pursuant to Section 2.1(a) shall be manufactured in accordance with the Output Specifications provided for in Schedule 15-2 – Output Specifications - Design and Construction Specifications.

(b) In the event that there are any improvements or upgrades required for the System in accordance with Schedule 15 – Output Specifications which do not result in a Variation (a "**Required Upgrade**"), or there are any improvements or upgrades included in the basic model of the Vehicles (an "**Included Upgrade**"), the Project Co shall ensure that the Additional Vehicles are upgraded to conform to any Required Upgrade or Included Upgrade, and that all associated equipment and interfaces are tested to accommodate such upgrades, without further costs to the City**.**

(c) Notwithstanding Section 2.3(a), the City may amend the Output Specifications provided for in Schedule 15 – Output Specifications in respect of the Additional Vehicles including any improvements or upgrades thereof. Unless the amendments to the Output Specifications in respect of the Additional Vehicles result from required improvements or upgrades to the System as provided for in Section 2.3(b), such amendments shall result in a Variation in accordance with the Project Agreement and Schedule 22 - Variation Procedure. In the event that the Variation Procedure shall apply pursuant to this Section 2.3(c), Project Co shall, at the City's request, provide the City with necessary

information determining the Variation before the City shall decide whether any amendment is required.

2.4 Price of Additional Vehicles

(a) Subject to the provisions of this Section 2.4 and Section 2.3(c) providing otherwise, the price of each of the Additional Vehicles to be purchased by the City pursuant to Section 2.1(a) shall be the Vehicle Unit Price.

(b) The price of each of the Additional Vehicles as provided for in this Section 2.4(a) shall be subject to price escalation or reduction as follows:

(i) there shall be no price escalation or reduction for the initial three (3) years of the Option Term; and

(ii) for the remainder of the Option Term, the Vehicle Unit Price in respect of the Additional Vehicles may increase or decrease in accordance with the Price Change Formula. The Vehicle Unit Price for each of the Additional Vehicles shall be increased or decreased by applying the Price Change Formula to 100% of the Vehicle Unit Price.

2.5 [REDACTED]

2.6 Commissioning of Additional Vehicles

(a) The Additional Vehicles purchased pursuant to Part 2 of this Schedule 35 shall be tested and commissioned by Project Co in accordance with Schedule 14 - Commissioning.

2.7 Project Co's Failure to Deliver

(a) Subject to Section 2.7(c), if Project Co shall fail to Deliver the Additional Vehicles on the Delivery Date, the City shall be entitled to an amount equal to $1,500 per Additional Vehicle each day, subject to the Escalation Factor, on account of liquidated damages. Such amount of liquidated damages shall constitute the City's sole entitlement to damages in respect of a failure of Project Co to deliver the Additional Vehicles on the Delivery Date.

(b) If Project Co shall fail to Deliver the Additional Vehicles by the Vehicle Long Stop Date, the City shall have the right to:

(i) cancel the exercised Option to Purchase the undelivered Additional Vehicles by written notice to Project Co (the "**Cancelled Vehicles**"), in which event, without derogation from the City's right under Section 2.7(a) or Section 2.7(c), as the case may be, the City shall be entitled to a refund of the payments that the City has made up until the Vehicle Long Stop Date in respect of such Cancelled Vehicles, together with the Default Interest Rate thereon.

or,

(ii) without derogation from the City's right under Section 2.7(a) or Section 2.7(c), as the case may be, proceed with the exercised Option to Purchase by written notice to Project Co in accordance with the terms and conditions set out herein.

(c) Notwithstanding Section 2.7(a), where the City has caused Project Co to acquire Additional Vehicles under the provisions of this Schedule 35 in order to implement a Service Level Increase, and Project Co has failed or has determined that it will fail to achieve the delivery, commissioning, and assimilation into the vehicle fleet of the Additional Vehicles by the Service Level Increase Date so as to effect the required Service Level Increase ("**Service Level Increase Additional Vehicle Delivery Delay**"), then Project Co shall:

(i) pay to the City the Liquidated Damages for Service Level Increase Additional Vehicle Delivery Delay in accordance with Section 2.7(d), below, for each Weekday of Service Level Increase Additional Vehicle Delivery Delay; or

(ii) with the City's consent, not to be unreasonably withheld, confirm that it will provide the required Service Level Increase using Project Co's existing vehicle fleet, on a temporary basis, during the period of Service Level Increase Additional Vehicle Delivery Delay, in which case Project Co shall be responsible to provide the relevant Service Level and shall be subject to all applicable penalties under the Project Agreement for failure to do so, including Schedule 20- the Payment Mechanism;

or

(iii) where Project Co can partially provide the required Service Level Increase using Project Co's existing vehicle fleet on a temporary basis during the period of Service Level Increase Additional Vehicle Delivery Delay, a combination of the foregoing subparagraphs (i) and (ii).

For greater certainty, the amount of the Liquated Damages for Service Level Increase Additional Vehicle Delivery Delay as provided for in this Section 2.7(c) and 2.7(d) shall constitute the City's sole entitlement to damages in respect of a failure of Project Co to deliver the Additional Vehicles on the Service Level Increase Date as required in this Section 2.7(c)

(d) For the purpose of this Section 2.7(c):

(i) The Liquated Damages for Service Level Increase Additional Vehicle Delivery Delay shall be calculated for each Weekday of Service Level Increase Additional Vehicle Delivery Delay, based on the formula below:

$$PWAVDLD_{Wk} = \left(\frac{Marginal\ PPHPD}{70}\right) * Capacity\ Factor * Daily\ Bus\ In\ Service\ Cost$$

Where:

"PWAVDLDWk" means the amount, in dollars, of Liquidated Damages for Service Level Increase Additional Vehicle Delivery Delay calculated for any given Weekday during a period of Service Level Increase Additional Vehicle Delivery Delay.

(ii) The Liquidated Damages for Service Level Increase Additional Vehicle Delivery Delay shall be applicable to each Weekday during a period of Service Level Increase Additional Vehicle Delivery Delay, up to a maximum period of six (6) months following the Delivery Date.

(e) In the event that the City shall cancel the exercised Option to Purchase with respect to the undelivered Additional Vehicles pursuant to Section 2.7(b)(i), the City shall have the right to exercise an Option to Purchase in respect of such Cancelled Vehicles in the next option period.

(f) Section 2.7 does not derogate from any of Project Co's obligations as set out in Part 5 of this Schedule 35.

2.8 Canadian Content

(a) For clarification, except as provided in Section 2.8(b), there shall be no obligation on Project Co to comply with the Canadian Content Requirements with respect to Additional Vehicles delivered to the City pursuant to the exercise of the Option to Purchase.

(b) Notwithstanding Section 2.8(a), the City may, in its Discretion, require compliance with the Canadian Content Requirements (a "CC Request"), with respect to any Additional Vehicles purchased pursuant to the Option to Purchase by including the CC Request with the Option Notice. In such event the Canadian Content Requirements shall be deemed to be a Variation and the provisions respecting Variations in the Project Agreement and Schedule 22 – Variation Procedure shall be applicable to the Additional Vehicles that are the subject matter of the CC Request.

PART 3
NEGOTIATED PURCHASE OF ADDITIONAL VEHICLES

3.1 Negotiated Purchase

(a) During and after the Option Term, the City shall have the right to negotiate with Project Co to purchase Additional Vehicles in accordance with Part 3 of this Schedule 35.

(b) The Additional Vehicles that are purchased by the City pursuant to Section 3.1(a) may, at the City's option, be used for the System and any System Extension.

3.2 Output Specifications of Additional Vehicles

(a) Subject to Section 3.2(c), the Additional Vehicles purchased pursuant to Section 3.1(a) shall be manufactured in accordance with the Output Specifications provided for in Schedule 15-2 – Output Specifications - Design and Construction Specifications, or as otherwise agreed upon by the City and Project Co during the negotiation.

(b) In the event that there are any Required Upgrades or Included Upgrades, Project Co shall ensure that the Additional Vehicles are upgraded to conform to such Required Upgrades or Included Upgrades, and that all associated equipment and interfaces are tested to accommodate such upgrades, without further costs to the City**.**

(c) Notwithstanding Section 3.2(a), the City may amend the Output Specifications provided for in Schedule 15-2 – Output Specifications - Design and Construction Specifications in respect of the Additional Vehicles including any improvements or upgrades thereof. Unless the amendments to the Output Specifications in respect of the Additional Vehicles result from required improvements or upgrades to the System as provided for in Section 3.2(b), such amendments shall result in a Variation in accordance with the Project Agreement and Schedule 22 - Variation Procedure. In the event that the Variation Procedure shall apply pursuant to this Section 3.2(c), Project Co shall, at the City's request, provide the City with necessary information determining the Variation before the City shall decide whether any amendment is required.

3.3 Price of Additional Vehicles

(a) The price of each of the Additional Vehicles purchased by the City pursuant to Section 3.1(a) shall be negotiated by Project Co and the City.

3.4 Commissioning of Additional Vehicles

(a) The Additional Vehicles as purchased by the City pursuant to Part 3 of this Schedule 35 shall be tested and commissioned by Project Co in accordance with Schedule 14 - Commissioning.

PART 4
VEHICLE PROCUREMENT

4.1 City's Right to Procure

(a) During and after the Option Term, the City shall have the right to procure any Additional Vehicles from a provider other than Project Co. The City may use any form of competitive procurement, sole-source contract, or other procurement methodology or transaction structure. At its option, the City may bundle the Option to Purchase in respect of the Additional Vehicles with other procurement processes.

4.2 Consulting Service

(a) The City shall have the right to retain either a third party or Project Co as consultant in procuring the Additional Vehicles procured pursuant to Section 4.1(a).

(b) In the event that the City shall desire to consider retaining Project Co as consultant in procuring the Additional Vehicles pursuant to Section 4.1(a), the City shall provide Project Co with a written notice which shall include the following information:

(i) a description of the Additional Vehicles the City wishes to procure including the number, model, preliminary output specifications and other significant features of the Additional Vehicles; and

(ii) a preliminary plan and anticipated timelines for procurement of the Additional Vehicles.

(c) Within a period of 15 days after the date of receipt of the notice provided for in Section 4.2(b), Project Co shall deliver to the City its written response advising the City of an estimate of the consulting fee it will charge for the consulting services to be provided in respect of such Additional Vehicles, with reasonable details to support such estimate.

(d) the City shall within a period of 15 days after the date of receipt of Project Co's response as provided for in Section 4.2(c), deliver a written notice notifying Project Co whether or not the City shall wish to retain Project Co for providing the consulting service respecting such Additional Vehicles.

(e) In the event that the City shall wish to retain Project Co for providing the consulting service respecting such Additional Vehicles by giving the notice as provided for in

Section 4.2(d), then upon delivery and receipt of such notice, the City and Project Co shall, in good faith and acting reasonably, negotiate the terms of a binding agreement for the performance of the consulting services in respect of procuring the Additional Vehicles pursuant to and in accordance with Section 4.2.

4.3 Project Co's Obligation to Assist

(a) In the event that the City shall retain a third-party consultant in procuring the Additional Vehicles pursuant to Section 4.2(a), subject to the provisions in Schedule 41 – Intellectual Property, Project Co shall provide assistance to the City as reasonably required by the City and at the City's cost, which assistance shall include without limitation:

(i) providing all necessary information and access to Fixed Facilities, E&M, MSF, and Vehicles supplied by Project Co in order to allow the City to develop appropriate technical specifications for the Additional Vehicles; and

(ii) other assistance reasonably requested by the City.

(b) In the event that the City shall retain Project Co as consultant in procuring the Additional Vehicles pursuant to Section 4.2(a), subject to payment by the City of the consulting fees as agreed upon by the City and Project Co pursuant to Section 4.2(d), and the provisions in Schedule 41 – Intellectual Property, Project Co shall provide assistance to the City as reasonably required by the City, which assistance shall include without limitation:

(i) assistance in development of vehicle specifications and evaluation of vehicle designs to ensure compatibility with existing Fixed Facilities, E&M, MSF supplied by Project Co and maintenance practices of Project Co;

(ii) providing all necessary information and access to Fixed Facilities, E&M, MSF, and Vehicles supplied by Project Co in order to allow the City to develop appropriate technical specifications for the Additional Vehicles;

(iii) advising the City on development of a Lifecycle Maintenance Plan, to be developed in conjunction with other supplier(s) that will include a schedule of lifecycle maintenance and major component replacement and a budget for carrying out such work;

(iv) advising the City on potential modifications that will result in maintenance cost savings guaranteed by Project Co, which savings shall be shared by the City and Project Co equally;

(v) participation in testing, commissioning, acceptance process and Configuration Management; and

(vi) other assistance reasonably requested by the City.

4.4 Commissioning of Non-Project Co Additional Vehicles

(a) In the event that the City shall retain Project Co as consultant in procuring the Additional Vehicles pursuant to Section 4.2(a), at the City's option, the Non-Project Co Additional Vehicles as procured by the City pursuant to Part 4 of this Schedule 35 shall be tested and commissioned by Project Co in accordance with Schedule 14 – Commissioning.

4.5 Liquidated Damages

(a) The provisions respecting liquidated damages in Section 2.7 shall apply to Non-Project Co Additional Vehicles if, and only if, the delivery delay as provided for Section 2.7 results from Project Co's failure to carry out commissioning activities in accordance with Schedule 14 – Commissioning.

PART 5
MAINTENANCE SERVICES OF ADDITIONAL VEHICLES

5.1 Obligation of Project Co to Maintain

(a) The City may at its option require Project Co to be fully responsible for providing Maintenance Services for the Additional Vehicles purchased during the Maintenance Term pursuant to this Schedule 35, including without limitation, the Non-Project Co Additional Vehicles.

(b) In the event that the City shall require Project Co to provide Maintenance Services for the Additional Vehicles pursuant to Section 5.1(a), provisions in Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements shall apply in respect of the Additional Vehicles, including without limitation, the provisions relating to maintenance reporting on the status and details of completion of various maintenance activities in respect of the Additional Vehicles.

5.2 Service Level Increase

(a) Where Project Co is required to provide Maintenance Services for any Additional Vehicles pursuant to Section 5.1, due to a Major Service Change in accordance with Article 3 of Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements, Project Co's Annual Service Payment and Volume Payment shall be adjusted in accordance with Article 3 of Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements.

(b) Subject to Section 5.3(a), Project Co shall have no other entitlement for any additional payment in respect of Maintenance Services provided to the Additional Vehicles pursuant to Section 5.1 due to a Major Service Change, save and except for that provided for in Section 5.2(a).

5.3 Additional Payments to Project Co

(a) In addition to the payments as provided for in Section 5.2(a) but without duplication thereof, Project Co shall be entitled to additional payments in respect of providing Maintenance Services for the Non-Project Co Additional Vehicles pursuant to and in accordance with the provisions respecting Variations in the Project Agreement and Schedule 22 – Variation Procedure with respect to any addition or changes to the System required by the inclusion of the Non-Project Co Additional Vehicles as Approved by the City ("**Additional Payments for Non-Project Co Additional Vehicles**"), in which event, Project Co shall, at the City's request, provide the City with necessary information determining the Variation before the City shall decide whether such addition or changes are required.

PART 6
ADJUSTMENTOF LIFECYCLE PAYMENTS

6.1 Lifecycle Maintenance Services

(a) In the event that the City shall require Project Co to be fully responsible for providing Maintenance Services for any Additional Vehicles pursuant to Section 5.1, the provisions in respect of lifecycle maintenance services in Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements shall apply to such Additional Vehicles.

6.2 Option to Purchase

(a) Where the City shall purchase any Additional Vehicles by way of exercising the Option to Purchase pursuant to Section 2.1(a), subject to Section 6.2(b), Project Co shall be entitled to amend its schedule of Lifecycle Payments set out in Schedule 20 - Payment Mechanism, taking into account lifecycle costs for the Additional Vehicles that occur within the Maintenance Term.

(b) Project Co's amendment of the Lifecycle Payments schedule as provided for in Section 6.2(a) shall be based on a lifecycle cost curve identical in real dollar terms to the lifecycle cost curve for Vehicles contained in Project Co's financial model (PA Schedule 35 Lifecycle Info, columns D and E) at Financial Close, as amended from time to time.

(c) For greater certainty, the amendment of the Lifecycle Payments as provided for hereunder shall take into account that:

(i) any amendment in the Output Specifications requested by the City pursuant to Section 2.3(c) or Section 3.2(c) shall result in an adjustment in the Lifecycle Payments; and

(ii) the City shall be responsible for lifecycle costs for the Additional Vehicles that occur beyond the Maintenance Term.

6.3 Negotiated Purchase of Additional Vehicles

(a) Where the City shall purchase any Additional Vehicles by way of negotiating a purchase pursuant to Section 3.1(a), subject to Section 6.3(b), the City and Project Co shall agree on appropriate amendments to the schedule of Lifecycle Payments set out in Schedule 20 - Payment Mechanism, taking into account lifecycle costs for the Additional Vehicles that occur within the Maintenance Term.

(b) The amendments of the Lifecycle Payments schedule as provided for in Section 6.3(a) shall be presumptively based on a lifecycle cost curve identical in real dollar terms to the lifecycle cost curve for the Vehicles contained in Project Co's financial model at Financial Close, as amended from time to time. Any variations must be demonstrated by Project Co with specific references to unique features of the Additional Vehicles which require a different lifecycle maintenance approach.

(c) For greater certainty, the amendment of the Lifecycle Payments as provided for hereunder shall take into account that:

(i) any amendment in the Output Specifications requested by the City pursuant to Section 2.3(c) or Section 3.2(c) shall result in an adjustment in the Lifecycle Payments; and

(ii) the City shall be responsible for lifecycle costs for the Additional Vehicles that occur beyond the Maintenance Term.

6.4 Procurement of Non-Project Co Additional Vehicles

(a) Where the City shall procure any Non-Project Co Additional Vehicles pursuant to Section 4.1(a), Project Co and the City shall agree on a Lifecycle Maintenance Plan in respect of such Non-Project Co Additional Vehicles, which Lifecycle Maintenance Plan shall result in a Variation in accordance with Project Agreement and Schedule 22 - Variation Procedure.

(b) The City and Project Co shall agree on appropriate amendments to the schedule of Lifecycle Payments set out in Schedule 20 - Payment Mechanism, taking into account:

(i) the lifecycle costs for the Non-Project Co Additional Vehicles that occur within the Maintenance Term, as budgeted for in the Lifecycle Maintenance Plan; and

(ii) the City shall be responsible for lifecycle costs for the Additional Vehicles that occur beyond the Maintenance Term.

PART 7 HANDOVER MAINTENANCE OF ADDITIONAL VEHICLES

7.1 Handover Maintenance Services

(a) In the event that the City shall require Project Co to be fully responsible for providing Maintenance Services for any Additional Vehicles pursuant to Section 5.1, the provisions in respect of Handover Maintenance services in Schedule 15-3 – Output Specifications – Maintenance and Rehabilitation Requirements shall apply to such Additional Vehicles, including without limitation, the provisions relating to the Handover Maintenance Period, subject to reasonable adjustment based upon the proportionate age and usage of the Additional Vehicles in relation to the Vehicles, as determined by the City, acting reasonably.

PART 8 TERMINATION OF PROJECT AGREEMENT

8.1 Termination of Project Agreement

(a) In the event that the Project Agreement shall be terminated pursuant to and in accordance with the provisions thereof and at that time the City shall have exercised the Option to Purchase pursuant to Section 2.1 hereof or otherwise there shall have been a binding agreement between the City and Project Co for the City to purchase Additional Vehicles from Project Co in accordance with this Schedule 35 (collectively, the "**Additional Vehicles Agreement**"), the provisions of this Section 8.1 shall apply.

(b) If the Project Agreement shall be terminated as a result of a City Event of Default or the exercise of the City's right to terminate for convenience pursuant to Section 47.3 of the Project Agreement:

(i) Project Co shall have the right either to continue to carry out the Additional Vehicles Agreement or terminate the Additional Vehicles Agreement by giving the City a written notice within thirty (30) days following the termination of the Project Agreement effective immediately (the "**Additional Vehicles Termination Date**");

(ii) in the event that Project Co shall elect to carry out the Additional Vehicles Agreement in accordance with subparagraph (i) above, the provisions of this Schedule 35 and the Additional Vehicles Agreement shall apply; and

(iii) in the event that Project Co shall elect to terminate the Additional Vehicles Agreement in accordance with subparagraph (i) above, the City shall be entitled to a refund of the payments that the City shall have made in respect of the Additional Vehicles on the Additional Vehicles Termination Date.

(c) If the Project Agreement shall be terminated as a result of neither a City Event of Default nor the exercise of the City's right to terminate for convenience pursuant to Section 47.3 of the Project Agreement:

(i) the City shall have the right either to continue to carry out the Additional Vehicles Agreement or terminate the Additional Vehicles Agreement by giving Project Co a written notice within thirty (30) days following the termination of the Project Agreement effective immediately;

(ii) in the event that the City shall elect to carry out the Additional Vehicles Agreement in accordance with subparagraph (i) above, the provisions of this Schedule 35 and the Additional Vehicles Agreement shall apply; and

(iii) in the event that the City shall elect to terminate the Additional Vehicles Agreement in accordance with subparagraph (i) above, the City shall be entitled to a refund of the payments that the City shall have made in respect of the Additional Vehicles, together with the Default Interest Rate thereon up until the date of repayment by Project Co.

(d) In the event that Project Co or the City, as the case may be, fails to deliver a written notice within thirty (30) days following the termination of the Project Agreement as provided for in Section 8.1(b) or Section 8.1(c), it shall be deemed that Project Co or the City, as the case may be, elects to terminate the Additional Vehicles Agreement.

SCHEDULE 36

MILESTONES

Please see Schedule 19 – Milestone Payments.

SCHEDULE 37
MOBILITY MATTERS

PART A
MOBILITY MATTERS – BUS RAPID TRANSIT

1. PART A DEFINITIONS

In this Part A of Schedule 37, the following definitions shall have the following meanings:

1.1 "**Aggregate Actual Bus Rapid Transit Lane Closure**" or "**AABRTLC**" means the actual number of BRT Lanes, or portions thereof that are closed during each Milestone period.

1.2 "**Aggregate BRT Lane Target Closure**" or "**ABRTLTC**" means the total BRT Lane Closures, set forth in the BRT Lane Closure Target Letter submitted by Project Co at Commercial Close and which has been accepted by the City. The ABRTLTC shall include and account for all requirements of Schedule 15 – Output Specifications of the Project Agreement.

1.3 "**BRT Lane Closure**" means any restriction or closure of a BRT lane to bus traffic along any segment, as a result of OLRT related construction activities, as described below, of the BRT. All partial restrictions or partial closures along a segment will be considered a full Lane Closure. Lane closures will be measured on a per segment, per hour basis. A maximum of one (1) BRT Lane Closure in each direction will be assessed at any given location. "**Peak**" means Monday through Friday between the hours of 0600h – 0930h, or 1500h – 1830h. "**Night**" means the hours between 2200h – 0500h. "**Off Peak**" means all other hours not defined as "Peak" or "Night". Lane Closures will no longer be in effect once Revenue Service Availability has been achieved.

(a) Segments

(i) Tunney's Pasture, Station 98+000 to Bayview, Station 99+700 old station

(ii) Transit Priority Reserved Lanes, including all BRT Lanes that are not in a segregated right-of-way but not limited to Albert, Slater, Wellington, Rideau, and any BRT detour lanes

(iii) Campus, Station 103+400 to Lees, Station 104+200

(iv) Lees, Station 104+200 to Hurdman, Station 105+620

(v) Hurdman, Station 105+620 to Train, Station 106+780

(vi) Train, Station 106+780 to St Laurent, Station 107+980

(vii) St Laurent, Station 107+980 to Blair, Station 110+680

1.4 "**BRT Gainshare Allowance**" means the amount calculated pursuant to Part A Section 5 of this Schedule 37, which may be used to offset BRTLCA.

1.5 "**BRT Lane Closure Adjustment**" or "**BRTLCA**" means the deduction which may be claimed by the City from Project Co (which amount will be deducted from the Revenue Service Availability Payment) as calculated pursuant to Part A, Section 5 of this Schedule 37.

1.6 "**BRT Lane Closure Analysis Report**" has the meaning given to it in Part A, Section 3 of this Schedule 37.

1.7 "**BRT Lane Closure Target Letter**" means the letter submitted by Project Co at Commercial Close setting forth the ABRTLTC.

1.8 "**High Cost Measures**" means, in respect of a Milestone period, discrete BRT Lane Closure saving measures that incur capital expenditure greater than 33% of the discrete BRT Lane Closure savings cost.

1.9 "**Low Cost Measures**" means, in respect of a Milestone period, discrete BRT Lane Closure saving measures that incur capital expenditure less than 33% of the discrete BRT Lane Closure savings cost.

1.10 "**No Cost Measures**" means, in respect of a Milestone period, discrete BRT Lane Closure saving measures, including those related to good house-keeping, involving no material additional expenditure and/or no capital expenditure to carry out.

1.11 "**Peak Hour BRT Interruptions**" means unplanned interruptions to the operation of the BRT during Peak periods by either an unplanned event or a planned event exceeding the time restrictions granted. For further clarity Peak Hour BRT Interruptions would only be for events within Project Co's control. Peak Hour BRT Interruptions as defined above are not included in AABRTLC.

1.12 "**Review Meeting**" means meetings between City Representatives and Project Co Representatives to occur within 5 days of completion of each construction Milestone (or other date as may be agreed between the City and Project Co) to discuss BRT Lane Closures.

1.13 "**Traffic and Transit Management Plan**" or "**TTMP**" means the plan for the manner in which traffic and transit will be managed during construction activities and the method used to determine the magnitude of the impacts.

1.14 "**Unit Rate Price BRT Lane Closures**" means the price for each standard unit of BRT Lane Closure as set in RFP Schedule 3, Part 1 – Technical Submission Requirements.

2. PROCEDURES FOR DETERMINING BRT LANE CLOSURE ADJUSTMENT

2.1 The City will assess Project Co for the cost of BRT Lane Closures based on the total BRT Lane Closures that occur during Peak, Off Peak and Night time. All BRT Lane

Closures shall be included in the calculation of the BRT Lane Closure Adjustment as provided in Part A, Section 5 of this Schedule 37.

2.2 The BRT Lane Closure Target shall form the benchmark for calculating the BRT Lane Closure cost in respect to the AABRTLC. The AABRTLC shall be used to calculate the BRT Lane Closure Adjustments. The BRT Lane Closure Target shall not be altered or adjusted except by the process described in Part A, Section 4 of this Schedule 37.

2.3 The measurement and verification of BRT Lane Closure shall be performed by the Independent Certifier. No less than 30 days prior to any BRT Lane Closures, Project Co shall provide the City with a BRT Lane Closure Measurement and Verification Plan, as part of the overall TTMP. All subsequent BRT Lane Closure Reports are to be based on this plan.

2.4 Project Co shall provide the City with a draft BRT Lane Closure Analysis Report, with the completion of each Milestone, which report shall include copies of all documents to fully support the draft BRT Lane Closure Analysis Report. The draft BRT Lane Closure Analysis Report shall be consistent with the format and content requirements set out in Part A, Section 3 of this Schedule 37.

2.5 As soon as practicable and in any event within 5 Business Days following the completion of each Milestone, Project Co and the City shall convene a Review Meeting to be attended by the Project Co Representative and the City Representative. At the Review Meeting Project Co shall present the draft BRT Lane Closure Analysis Report to the City, and the City and Project Co shall discuss the Aggregate Actual BRT Lane Closure for the preceding period.

2.6 Project Co shall assist the City Representative and afford the City Representative such information and access to the BRT Lane Closure records, and by other means as may reasonably be required for the City Representative to confirm the draft BRT Lane Closure Analysis Report provided by Project Co to determine the Aggregate Actual BRT Lane Closures for the proceeding period. The City shall promptly notify Project Co of the details of any disagreement of all or any aspect of the BRT Lane Closure Analysis Report, and the Parties shall then seek to agree to any matters in dispute, but where matters cannot be resolved within such 20 Business Day period (or such other period as may be otherwise agreed by the City Representative, acting reasonably) it shall be dealt with in accordance with Schedule 27 – Dispute Resolution Procedure to this Project Agreement.

(a) Within 20 Business Days following each Review Meeting, or within such period as may be otherwise agreed between the City Representative and the Project Co Representative, acting reasonably:

(i) The City shall confirm its acceptance of all or any aspect of the BRT Lane Closure Analysis Report; and

(ii) Subject to Part A, Section 4 of this Schedule 37, Project Co and the City shall agree to any adjustments to the Aggregate BRT Lane Target Closure.

(b) Subject to Part A, Section 2.6(c), Project Co shall be subject to a BRT Lane Closure Adjustment calculated in accordance with this Schedule 37.

(c) The BRT Lane Closure Adjustments shall be determined at the Review Meeting. If the City makes a claim for a BRT Lane Closure Adjustment, the City shall within 10 Business Days after acceptance of the BRT Lane Closure Analysis Report by the City Representative or within such other period as may be agreed by the City Representative and Project Co, acting reasonably, submit an account to Project Co setting out its calculations and justifying the quantification of the BRT Lane Closure Adjustment.

2.7 If either Project Co or the City wishes to dispute any account presented pursuant to Part A, Section 2.6(c) of this Schedule 37, it must do so by written notice to the other Party within 10 Business Days of receipt of such account. The City Representative and the Project Co Representative shall use reasonable efforts to resolve the dispute for an additional 10 Business Days. If there is no agreement within a further 10 Business Days then either Party may refer the matter to the Dispute Resolution Procedure. If neither Party objects in accordance with this Section 2.7 or, following final determination of the disputed account in accordance with this Section 2.7, Project Co shall include the relevant BRT Lane Closure Adjustment as a separate item within the invoice prepared by Project Co for the Revenue Service Availability Payment.

2.8 At Commercial Close, Project Co shall deliver to the City the BRT Lane Closure Target Letter in form and substance satisfactory to the City, which such BRT Lane Closure Target Letter shall reflect the development of the design of the TTMP. In addition, Project Co shall deliver to the City for review in accordance with Schedule 10 – Review Procedure, an updated final BRT Lane Closure Target Letter together with a supporting TTMP 6 months prior to the first BRT Lane Closure. Any changes to the BRT Lane Closure Target Letter after Commercial Close shall require the approval of the City and shall constitute a Variation.

3. CONTENT AND FORMAT OF THE BRT LANE CLOSURE ANALYSIS REPORT

3.1 The BRT Lane Closure Analysis Report shall present findings of Aggregate Actual BRT Lane Closures during the relevant Milestone period and shall include the following:

(a) a summary of actual closures and breakdown by locations, times, dates and duration, indicating Peak, Off Peak or Night. The summary should also highlight any exceptional changes (being changes of plus or minus 10% in consumption or pattern of use) in use since any previous reports;

(b) identification of potential savings in respect to BRT Lane Closures and provide an estimate of implementation costs, along with identifying potential risks associated with each proposed measure. Project Co shall categorize these measures in the following categories: No Cost Measures, Low Cost Measures and High Cost Measures. Project Co shall also advise the City of projected BRT Lane Closures

for the remaining duration of construction and along with trends and potential risks associated with these closures; and

(c) accurate and precise data in support of the above noted items.

3.2 The objectives of the BRT Lane Closure Analysis Report are to confirm Aggregate Actual BRT Lane Closures in the relevant Milestone period and to provide data to calculate any BRT Lane Closures Adjustments.

3.3 Consistent with the objectives set out in Part A, Section 3.2 of this Schedule 37, Project Co shall ensure that the BRT Lane Closure Analysis Report has the following components:

(a) presentation of Aggregate Actual BRT Lane Closures;

(b) establishment of a basis for continued monitoring of BRT Lane Closure and adjustments to the Aggregate BRT Lane Closures;

(c) outline any outstanding issues from any previous BRT Lane Closure Analysis Reports and mitigating strategies to address those issues;

(d) adjustments to the Aggregate BRT Lane Target Closure;

(e) summary tables from all previous BRT Lane Closure Analysis Report delivered by Project Co to the City.

4. PROCESS FOR AMENDING THE AGGREGATE BRT LANE TARGET CLOSURE

4.1 In all cases, corrections to Aggregate BRT Lane Target Closure must be consistent with the principles outlined in the TTMP.

4.2 Following the acceptance of the BRT Lane Closure Analysis Report by the City Representative in accordance with Part A, Section 2.6 of this Schedule 37, the data set out in the BRT Lane Closure Analysis Report will be used to determine the BRT Lane Closure Adjustments.

4.3 For each Milestone period the BRT Lane Closure Adjustment shall be made in accordance with Part A Section 5 of this Schedule.

4.4 At any time commencing after the beginning of construction, Project Co and the City shall, acting reasonably, agree to make any adjustments to the ABRTLTC, AABRTLC and the BRT Gainshare Allowance only in the event of:

(a) changes implemented in accordance with the Project Agreement that would cause BRT Lane Closure changes.

4.5 The Party requesting an amendment to the ABRTLTC, subject to the other Party's approval (acting reasonably), shall pay for an amended TTMP. The amended TTMP shall include a detailed analysis of the impacts to traffic and Transit service, including an analysis of BRT Lane Closure requirements. The amended TTMP shall include a recommendation regarding amendments to the ABRTLTC. Both the City and Project Co must agree to the amended ABRTLTC within 20 Business Days following receipt of such report. If there is no agreement within a further 10 Business Day period, then either Party may refer the matter to Dispute Resolution Procedure.

4.6 Any amendment to the ABRTLTC shall only affect the BRT Lane Closure Adjustment calculations from the date on which the amendment is effective and shall not, for greater certainty, have a retrospective effect on any other previous BRT Lane Closure Adjustment calculations except where the Dispute Resolution procedure adjudicates in favour of Project Co whereby such calculations shall be prorated to 30 days after the TTMP and third party report.

5. CALCULATION OF BRT LANE CLOSURE ADJUSTMENT

5.1 A BRT Gainshare Allowance is available to proponents who have demonstrated the total Aggregate BRT Lane Target Closure and associated costs (excluding BRT Cash Allowance hours associate with Schedule 15-2 Part 1 Articles 30 and 31) are below the reference threshold value of $65,000,000 dollars. The BRT Gainshare Allowance will be equal to half of the reference threshold value minus the total ABRTLTC cost (excluding BRT Cash Allowance hours associated with Schedule 15-2 Part 1 Articles 30 and 31). For clarity BRT Gainshare Allowance = 0.5*($65,000,000 – $ABRTLTC).

5.2 Comparing BRT Lane Closure Target

(a) After the acceptance of the BRT Lane Closure Analysis Report described in Part A, Section 3 for each Milestone period, the AABRTLC shall be compared to the ABRTLTC and:

(i) if the AABRTLC in respect to ABRTLTC is greater than 110% of the ABRTLTC in respect of such closures then Project Co shall calculate the BRT Lane Closure Adjustment set out in Part A, Section 5.3, apply any available BRT Gainshare Allowance against this amount and deduct any remaining amount of the BRT Lane Closure Adjustment from the Revenue Service Availability Payment to be made in accordance with Project Agreement Section 34 – Payment.

The table below shows the banding mechanism used for calculating the BRT Lane Closure Adjustment.

Table 5.1

BRT Lane Closures	period "X"	BRT Lane Closure Adjustment then equals:
If the Variance from ABRTLTC for the purposes of calculating BRT Lane Closure Adjustment in the previous period was:	0 to 10%	0
If the Variance from ABRTLTC for the purposes of calculating BRT Lane Closure Adjustment in the previous period was:	> 10%	100%

(b) If Project Co is subject to a BRT Lane Closure Adjustment with respect to a Milestone period, then Project Co shall submit a detailed remediation plan within fourteen (14) days of the calculation of the BRT Lane Closure Adjustment to explain how it will reduce the AABRTLC such that it will not exceed the 110% threshold established in Section 5.2(a)(i), above, for the subsequent Milestone period.

5.3 The formulae to calculate the BRT Lane Closure Adjustment set out in this Section 5.3 is based on Table 5.1 of Part A of this Schedule 37. For the avoidance of doubt, if AABRTLC falls within a set band the relevant ABRTLTC (i.e.: no more than 10% above the benchmark) no BRT Lane Closure Adjustment will be made for that Milestone period. No increases in the BRT Gainshare Allowance will be made based on actual performance.

(a) For the purposes of this Section 5.3(b):

A = the AABRTLC during the relevant Milestone period.

B = the ABRTLTC for the relevant Milestone period.

(b) In respect to Milestone periods leading up to Revenue Service Availability:

IF: A> 1.10B then the City shall be entitled to deduct a BRT Lane Closure Adjustment where,

IF: A> 1.10B then BRTLCA = (A – 1.10B) * Unit Rate Price BRT Lane Closures – BRT Gainshare Allowance

For clarity, BRTLCA shall not be less than zero.

6. PEAK HOUR BRT INTERRUPTIONS

6.1 The City will assess Project Co for Peak Hour BRT Interruptions at a cost of $400 per minute.

6.2 Any time assessed in the cost associated with Peak Hour BRT Interruptions will not be included in calculations of BRT Lane Closure Adjustments.

6.3 Project Co shall calculate the cost of Peak Hour BRT Interruptions and deduct this amount from the Revenue Service Availability Payment in accordance with Project Agreement Section 34 – Payment.

7. BRT CLOSURES FOR CONVERSION TO LRT

7.1 When the full BRT Lane Closures occurs for conversion to LRT, only two (2) BRT Lane Closures (one in each direction) will be applied for each segment that is closed.

8. LANE CLOSURES FOR CASH ALLOWANCE CIVIC WORKS

8.1 Lane Closures resulting from Cash Allowance Civic Works are to be included in BRT Lane Closures. Schedule 15-2 Part 1 Article 31 (Rock Stabilization Work) and Article 30 (Combined Sewage Storage Tunnel Work) provide BRT Lane Closures values based on the total Lane Closures that occur for; Peak, Off Peak, and Night Time BRT Lane Closures. All Cash Allowance BRT Lane Closures shall be included in the ABRTLTC in Part A, Section 5 of this Schedule 37.

SCHEDULE 37
MOBILITY MATTERS

PART B
MOBILITY MATTERS – LANE CLOSURES

1. PART B DEFINITIONS

In this Part B of Schedule 37, the following definitions shall have the following meanings:

1.1 "**Aggregate Actual Lane Closures**" or "**AALC**" means the actual number of lanes, or portions thereof that are closed for each Milestone period. "**Aggregate Lanes Target Closure**" or "**ALTC**" means the total LANE closure, set forth in the Lane Closure Target Letter submitted by Project Co at Commercial Close and which has been accepted by the City. The ALTC shall include and account for all requirements of Schedule 15 – Output Specifications of the Project Agreement.

1.2 "**High Cost Measures**" means, in respect of a Milestone period, discrete Lane Closure saving measures that incur capital expenditure greater than 33% of the discrete Lane Closure savings cost.

1.3 "**Lane Closure**" or "**Lane Closures**" means any restriction or closure of any lane, as a result of OLRT related construction activities, as further described below, to bus or vehicular traffic or parking and loading between two intersecting streets including tapers. All partial restrictions or partial closures between intersecting streets will be considered as a full Lane Closure. Lane Closures will be measured on a per Block, per hour basis. "**Peak**" means Monday through Friday between the hours of 0700h – 0900h, or 1530h – 1800h. "**Night**" means the hours between 2200h – 0500h. "**Off Peak**" means all other hours not defined as "Peak" or "Night". Travel lanes shall be identified as one of two classifications, Rideau Street Lanes, and Other Lanes. Lane Closures will no longer be in effect once Revenue Service Availability has been achieved:

(a) Lanes

(i) Rideau Street Lanes: Any lanes along Rideau Street or Wellington Street from Kent Street to Nelson Street, excluding transit priority lanes.

(ii) Other Lanes: All lanes other than Rideau Street Lanes, excluding transit priority lanes.

1.4 "**Lane Closure Adjustment**" or LCA means the deduction which may be claimed by the City from Project Co (which amount will be deducted from the Revenue Service Availability Payment) as calculated pursuant to Part B Section 5 of this Schedule 37.

1.5 "**Lane Closure Analysis Report**" has the meaning given to it in Part B, Section 3 of this Schedule 37.

1.6 "**Lane Closure Target Letter**" means the letter submitted by Project Co at Commercial Close setting forth the ALTC.

1.7 "**Low Cost Measures**" means, in respect of a Milestone period, discrete Lane Closure saving measures that incur capital expenditure less than 33% of the discrete Lane Closure savings cost.

1.8 "**No Cost Measures**" means, in respect of a Milestone period, discrete Lane Closure saving measures, including those related to good house-keeping, involving no material additional expenditure and/or no capital expenditure to carry out.

1.9 "**Peak Hour Lane Interruptions**" means unplanned interruptions to the operation of roadway lanes, excluding BRT lanes, during Peak periods by either an unplanned event or a planned event exceeding the time restrictions granted. For further clarity Peak Hour Lane Interruptions would only be for events within Project Co's control. Peak Hour Lane Interruptions as defined above are not included in AALC.

1.10 "**Review Meeting**" means meetings between City Representatives and Project Co Representatives to occur within 5 days of completion of each construction Milestone (or such other date as may be agreed between the City and Project Co) to discuss Lane Closures.

1.11 "**Traffic and Transit Management Plan**" or "**TTMP**" means the plan for the manner in which traffic and transit will be managed during construction activities and method used to determine the projected impacts.

1.12 "**Unit Rate Price Lane Closures**" means the price for each standard unit of each Lanes Closure as set in RFP Schedule 3, Part 1 – Technical Submission Requirements.

2. PROCEDURES FOR DETERMINING LANE CLOSURE ADJUSTMENTS

2.1 The City will assess Project Co for the cost of Lane Closures based on the total Lane Closures that occur for; Peak, Off Peak, and Night Time lane closures. All Lane Closures shall be included in the calculation of the Lane Closure Adjustment as provided in Part B, Section 5 of this Schedule 37.

2.2 The Lane Closure Target shall form the benchmark for calculating the Lane Closure cost in respect to the AALC. The AALC shall be used to calculate the Lane Closure Adjustments. The Lane Closure Target shall not be altered or adjusted except by the process described in Part B, Section 4 of this Schedule 37.

2.3 The measurement and verification of Lane Closure shall be performed by the Independent Certifier. No less than 30 days prior to any Lane Closures, Project Co shall provide the City with a Lane Closure Measurement and Verification Plan, as part of the overall TTMP. All subsequent Lane Closure Reports are to be based on this plan.

2.4 Project Co shall provide the City with a draft Lane Closure Analysis Report, with the completion of each Milestone, which report shall include copies of all documents to fully

support the draft Lane Closure Analysis Report. The draft Lane Closure Analysis Report shall be consistent with the format and content requirements set out in Part B, Section 3 of this Schedule 37.

2.5 As soon as practicable and in any event within 5 Business Days following the completion of each Milestone, Project Co and the City shall convene a Review Meeting to be attended by the Project Co Representative and the City Representative. At the Review Meeting Project Co shall present the draft Lane Closure Analysis Report to the City, and the City and Project Co shall discuss the Aggregate Actual Lane Closure for the preceding period.

2.6 Project Co shall assist the City Representative and afford the City Representative such information and access to the Lane Closure records, and by other means as may reasonably be required for the City Representative to confirm the draft Lane Closure Analysis Report provided by Project Co to determine the Aggregate Actual Lane Closure for the proceeding period. The City shall promptly notify Project Co of the details of any disagreement of all or any aspect of the Lane Closure Analysis Report, and the Parties shall then seek to agree to any matters in dispute, but where matters cannot be resolved within such 20 Business Day period (or such other period as may be otherwise agreed by the City Representative, acting reasonably) it shall be dealt with in accordance with Schedule 27 – Dispute Resolution Procedure to this Project Agreement.

(a) Within 20 Business Days following each Review Meeting, or within such period as may be otherwise agreed between the City Representative and the Project Co Representative, acting reasonably:

(i) The City shall confirm its acceptance of all or any aspect of the Lane Closure Analysis Report; and

(ii) Subject to Part B, Section 4 of this Schedule 37, Project Co and the City shall agree to any adjustments to the Aggregate Lane Target Closure.

(b) Subject to Part B, Section 2.6(c), Project Co shall be subject to a Lane Closure Adjustment calculated in accordance with this Schedule 37.

(c) Lane Closure Adjustments shall be determined at the Review Meeting. If the City makes a claim for a Lane Closure Adjustment, the City shall within 10 Business Days after acceptance of the Lane Closure Analysis Report by the City Representative or within such other period as may be agreed by the City Representative and Project Co, acting reasonably, submit an account to Project Co setting out its calculations and justifying the quantification of the Lane Closure Adjustment.

2.7 If either Project Co or the City wishes to dispute any account presented pursuant to Part B, Section 2.6(c) of this Schedule 37, it must do so by written notice to the other Party within 10 Business Days of receipt of such account. The City Representative and the Project Co Representative shall use reasonable efforts to resolve the dispute for an additional 10 Business Days. If there is no agreement within a further 10 Business Days

then either Party may refer the matter to the Dispute Resolution Procedure. If neither Party objects in accordance with this Section 2.7 or, following final determination of the disputed account in accordance with this Section 2.7, Project Co shall include the relevant Lane Closure Adjustment as a separate item within the invoice prepared by Project Co for the Revenue Service Availability Payment.

2.8 At Commercial Close, Project Co shall deliver to the City the Lane Closure Target Letter in form and substance satisfactory to the City, which such Lane Closure Target Letter shall reflect the development of the design of the TTMP. In addition, Project Co shall deliver to the City for review in accordance with Schedule 10 – Review Procedure, an updated final Lane Closure Target Letter together with a supporting TTMP 3 months prior to the first lane Closure. Any changes to the Lane Closure Target Letter after Commercial Close shall require the approval of the City and shall constitute a Variation.

2.9 For the purpose of calculating the Lane Closure Adjustment the evaluation will be done following the Revenue Service Availability Milestone, comparing the total AALC of each construction period to the total ALTC for the entire construction period. For clarity over-performance from one Construction Milestone can be added to underperformance during a separate Construction Milestone.

3. CONTENT AND FORMAT OF THE LANE CLOSURE REPORT

3.1 The Lane Closure Analysis Report shall present findings of Aggregate Actual Lane Closures during the relevant Milestone period and shall include the following:

(a) a summary of actual closures and breakdown by locations, times, dates and duration indicating Peak, Off Peak or Night. The summary should also highlight any exceptional changes (being changes of plus or minus 10% in consumption or pattern of use) in use since any previous reports;

(b) identification of potential savings in respect to Lane Closures and provide an estimate of implementation costs, along with identifying potential risks associated with each proposed measure. Project Co shall categorize these measures in the following categories: No Cost Measures, Low Cost Measures and High Cost Measures. Project Co shall also advise the City of projected Lane Closures for the remaining duration of construction and along with trends and potential risks associated with these closures; and

(c) accurate and precise data in support of the above items.

3.2 The objectives of the Lane Closure Analysis Report are to confirm Aggregate Actual Lane Closures in the relevant Milestone period and to provide data to calculate any Lane Closures Adjustments.

3.3 Consistent with the objectives set out in Part B, Section 3.2 of this Schedule 37, Project Co shall ensure that the Lane Closure Analysis Report has the following components:

(a) presentation of Aggregate Actual Lane Closures;

(b) establishment of a basis for continued monitoring of Lane Closure and adjustments to the Aggregate Lane Closures;

(c) outline any outstanding issues from any previous Lane Closure Analysis Reports and mitigating strategies to address those issues;

(d) adjustments to the Aggregate Lane Target Closure;

(e) summary tables from all previous Lane Closure Analysis Report delivered by Project Co to the City.

4. PROCESS FOR AMENDING THE AGGREGATE LANE TARGET CLOSURE

4.1 In all cases, corrections to Aggregate Lanes Target Closure must be consistent with the principles outlined in the TTMP.

4.2 Following the acceptance of the Lane Closure Analysis Report by the City Representative in accordance with Part B, Section 2.8 of this Schedule 37, the data set out in the Lane Closure Analysis Report will be used to determine the Lane Closure Adjustments.

4.3 For the summation of the Milestone periods, the Lane Closure Adjustment will be calculated in accordance with Part B Section 5 of this Schedule 37.

4.4 At any time commencing after the beginning of construction, Project Co and the City shall, acting reasonably, agree to make any adjustments to the ALTC and the AALC only in the event of:

(a) changes implemented in accordance with the Project Agreement that would cause Lane Closure changes.

4.5 The Party requesting an amendment to the ALTC, subject to the other Party's approval (acting reasonably), shall pay for an amended TTMP. The amended TTMP shall include a detailed analysis of the impacts to traffic and Transit service, including an analysis of Lane Closure requirements. The amended TTMP shall include a recommendation regarding amendments to the ALTC. Both the City and Project Co must agree to the amended ALTC within 20 Business Days following receipt of such report. If there is no agreement within a further 10 Business Day period, then either Party may refer the matter to Dispute Resolution Procedure.

4.6 Any amendment to the ALTC shall only affect the Lane Closure Adjustments calculations from the date on which the amendment is effective and shall not, for greater certainty, have a retrospective effect on any other previous Lane Closure Adjustment calculations except where the Dispute Resolution procedure adjudicates in favour of Project Co whereby such calculations shall be prorated to 30 days after the TTMP and third party report.

5. CALCULATION OF LANE CLOSURE ADJUSTMENT

5.1 Comparing Lane Closure Target

(a) After the acceptance of the Lane Closure Analysis Report described in Part B, Section 3 and following the completion of the Revenue Service Availability Milestone, the total AALC shall be compared to the total ALTC and:

(i) if the AALC in respect to ALTC is greater than 110% of the ALTC in respect of such closures then Project Co shall calculate the Lane Closure Adjustment set out in Part B, Section 5.2and deduct the amount of the Lane Closure Adjustment from the Revenue Service Availability Payment to be made in accordance with Project Agreement Section 34 – Payment.

The table below shows the banding mechanism used for calculating the Lane Closure Adjustment.

Table 5.1

Lane Closure	period "X"	Lane Closure Adjustment then equals:
If the Variance from ALTC for the purposes of calculating Lane Closure Adjustment was:	0 to 10%	0
If the Variance from ALTC for the purposes of calculating Lane Closure Adjustment was:	> 10%	100%

(b) If Project Co is subject to a potential Lane Closure Adjustment with respect to a Milestone period, then Project Co shall submit a detailed remediation plan within fourteen (14) days of the calculation of the Lane Closure Adjustment to explain how it will reduce the AALC such that it will not exceed the 110% threshold established in Part B, Section 5.1(a)(i), above, for the subsequent Milestone period.

5.2 The formulae to calculate the Lane Closure Adjustment set out in this Section 5.2 is based on Table 5.1 of Part B of this Schedule 37. For the avoidance of doubt, if AALC falls within a set band the relevant ALTC (i.e.: no more than 10% above the benchmark) no Lane Closure Adjustment will be made for that Milestone periods.

(a) For the purposes of this Section 5.2(b):

A = the AALC during the total Milestone periods.

B = the ALTC for the total Milestone periods.

(b) In respect to the total Milestone periods leading up to Revenue Service Availability:

IF: A> 1.10B then the City shall be entitled to deduct a Lane Closure Adjustment where,

IF: A> 1.10B then LCA = (A – 1.10B) * Unit Rate Price Lane Closures.

6. PEAK HOUR LANE INTERRUPTIONS

6.1 The City will assess Project Co for Peak Hour Lane Interruptions at a cost of $100 per minute.

6.2 Any time assessed in the cost associated with Peak Hour Lane Interruptions will not be included in calculations of Lane Closure Adjustments.

6.3 Project Co shall calculate the cost of Peak Hour Lane Interruptions and deduct this amount from the Revenue Service Availability Payment accordingly in accordance with Project Agreement Section 34 – Payment.

7. LANE CLOSURES FOR CASH ALLOWANCE CIVIC WORKS

7.1 Lane Closures resulting from Cash Allowance Civic Works are to be included in Lane Closures. Schedule 15-2 Part 1, Articles 27 (Albert Street Works), 28 (Queen Street Works), 30 (Combined Sewage Storage Tunnel (CSST) Work) and 32 Coventry Road Bridge provide Lane Closures values based on the total Lane Closures that occur for; Peak, Off Peak, and Night Time lane closures. All Cash Allowance Lane Closures shall be included in the calculation of the Lane Closure in Part B, Section 5 of this Schedule 37.

APPENDIX A

BRT LANE CLOSURE REPORT SUBMITTAL REQUIREMENTS

Total BRT Lane Closure Summary	**BRT Lane Target Closure**		**Actual BRT Lane Closures**		**Percent Variance between iv and ii**	**BRT Lane Closure Adjustment**
	Number of Target Closures	**Cost of BRT Lane Closure for Milestone period** (calculated based on number of closures multiplied by lane closure rate)	**Usage**	**Cost of BRT Lane Closures for Milestone period** (calculated based on number of closures multiplied by cost of closures)		
	i	ii	iii	iv	v	vi
Milestone 1 Peak						
Milestone 1 Off Peak						
Milestone 1 Night						
AABRTLC Milestone 1						
Milestone 2 Peak						
Milestone 2 Off Peak						
Milestone 2 Night						
AABRTLC Milestone 2						
Milestone 3 Peak						
Milestone 3 Off Peak						
Milestone 3 Night						

AABRTLC Milestone 3						
Milestone 4 Peak						
Milestone 4 Off Peak						
Milestone 4 Night						
AABRTLC Milestone 4						
Milestone * Peak						
Milestone * Off Peak						
Milestone * Night						
AABRTLC Milestone *						
Revenue Service Availability Peak						
Revenue Service Availability Off Peak						
Revenue Service Availability Night						
AABRTLC Revenue Service Availability						

* Milestones used shall reflect Proponents selections for Milestone Payments.

APPENDIX B

LANE CLOSURE REPORT SUBMITTAL REQUIREMENTS

Total Lane Closure Summary	**Lane Target Closure**		**Actual Lane Closures**		**Percent Variance between iv and ii**	**Lane Closure Adjustment**
	Number of Target Closures	**Cost of Lane Closure for Milestone period** (calculated based on number of closures multiplied by lane closure rate))	**Usage**	**Cost of Lane Closures for Milestone period** (calculated based on number of closures multiplied by cost of closures)		
	i	ii	iii	iv	v	vi
Milestone 1 Peak						
Milestone 1 Off Peak						
Milestone 1 Night						
AALC Milestone 1						
Milestone 2 Peak						
Milestone 2 Off Peak						
Milestone 2 Night						
AALC Milestone 2						
Milestone 3 Peak						
Milestone 3 Off Peak						
Milestone 3 Night						
AALC Milestone 3						

Milestone 4 Peak						
Milestone 4 Off Peak						
Milestone 4 Night						
AALC Milestone 4						
Milestone * Peak						
Milestone * Off Peak						
Milestone * Night						
AALC Milestone *						
Revenue Service Availability Peak						
Revenue Service Availability Off Peak						
Revenue Service Availability Night						
AALC Revenue Service Availability						

* Milestones used shall reflect Proponents selections for Milestone Payments.

SCHEDULE 38
EXTENSION AND ADDITIONAL PHASES

ARTICLE I
DEFINITIONS

1.1 Definitions

In this Schedule 38, unless the context otherwise requires:

(a) "**Additional Vehicles**" has the meaning given in Schedule 35 – Additional Vehicles.

(b) "**City Extension Requirements**" means the proposal delivered by the City pursuant to Section 2.2(c).

(c) "**Extension Contractor**" means a Person engaged by the City to perform any part of a System Extension, which Person may or may not be Project Co.

(d) "**Extension Lenders**" means any Person or Persons who provide financing to an Extension Contractor or to Project Co in respect of a System Extension, and, where the context so permits, prospective financiers or lenders.

(e) "**Extension Maintenance Services**" means the maintenance and other work to be performed and services to be provided in respect of a System Extension as set out in the City Extension Requirements.

(f) "**Extension Notice Response**" means the response delivered by the Project Co pursuant to Section 2.2(b).

(g) "**Extension Permits, Licences and Approvals**" means all permissions, consents, approvals, certificates, permits, licences, statutory agreements and authorizations needed to complete a System Extension described in the City Extension Requirements in accordance with Applicable Law.

(h) "**Extension Work**" means the design, construction, installation, testing, commissioning and completion of a System Extension, including rectification of any Extension Work Minor Deficiencies, and any other activities required to enable or facilitate the commencement of the Extension Maintenance Services.

(i) "**Extension Work Minor Deficiencies**" means any defects, deficiencies and items of outstanding work which would not materially impair the City's use and enjoyment of the System Extension.

(j) "**Integrated System Extension**" means the development, testing, commissioning and certification (including safety recertification in order to satisfy the Safety Management Plan) of additional facilities, Infrastructure, electrical and mechanical equipment, computer hardware and systems, including communication and control systems, in order to connect with the System such that the Vehicles and all other components of the

System, as extended by the Integrated System Extension, function together as one coherent fully integrated system.

(k) "**Notice of Extension**" means the notice delivered by the City pursuant to Section 2.2(a).

(l) "**Non-Integrated System Extension**" means the development, testing, commissioning and certification (including safety recertification in order to satisfy the Safety Management Plan) of additional facilities, Infrastructure, electrical and mechanical equipment, computer hardware and systems, including communication and control systems, in order to form a transit system that connects with the System at a single interchange point such that the Vehicles and other components of the System do not form part of a coherent integrated system with the extended transit system.

(m) "**Option Term**" has the meaning given in Schedule 35 – Additional Vehicles.

(n) "**Project Co Extension Proposal**" means the proposal delivered by Project Co pursuant to Section 2.2(d).

(o) "**Reciprocal Agreement**" means the agreement to be executed in the event of a Non-Integrated System Extension as described in further detail in Section 3.1(e).

(p) "**System Extension**" means either an Integrated System Extension or a Non-Integrated System Extension.

ARTICLE II
SYSTEM EXTENSION

2.1 System Extension

(a) The City and Project Co acknowledge that the City may, in its Discretion, elect to pursue one or more System Extensions during the Project Term. The City may pursue any System Extension through an Extension Contractor or through a negotiated agreement with Project Co in accordance with this Schedule 38. In the event the City elects to engage an Extension Contractor, the City may decide which Persons are eligible for consideration, and such Persons may or may not include Project Co or any of the Contractors, in the City's Discretion, and the City may use any form of competitive procurement, sole-source contract, lease or transaction structure that the City in its Discretion decides. If the City elects to negotiate an agreement with Project Co, the Parties shall follow the process set out in Section 2.2.

(b) The City may in its Discretion elect to implement a System Extension by way of a Variation in which case Section 39.1 of the Project Agreement and the provisions of Schedule 22 – Variation Procedure shall apply in respect of such System Extension.

(c) The City may in its Discretion elect to procure or negotiate, as the case may be, the performance of Extension Work and Extension Maintenance Services in

respect of a System Extension through consolidated or separate procurements or negotiations.

(d) For clarity, the City may pursue a System Extension at any time or times pursuant to any of the alternatives set out in this Section 2.1 in its Discretion. In the event the City has elected to pursue a System Extension in accordance with this Section 2.1, the City may, at any time prior to entering into a binding agreement in respect of the System Extension, in its Discretion, elect to cease pursuing the System Extension under the chosen alternative and pursue the same System Extension under a different alternative process.

2.2 Negotiation between the City and Project Co of Extension Work and/or Extension Maintenance Services

(a) If the City notifies Project Co that it wishes to negotiate with Project Co to perform Extension Work and/or Extension Maintenance Services, the City shall provide Project Co with a Notice of Extension which will include information respecting the project, including:

(i) a description of the scope of the Extension Work and/or the Extension Maintenance Services, as applicable;

(ii) preliminary "term sheet level" output specifications for the Extension Work and/or the Extension Maintenance Services, as applicable, including: details with respect to alignment, number of stations, length of track (in kilometres), modelling results and performance expectations with respect to the System Extension, as-builts for Existing Infrastructure and utilities, condition reports, results of environmental assessments, development plans, stakeholder engagement information, E&M requirements specific to the System Extension, location and capacity requirements of any maintenance and storage facilities, and

(iii) a preliminary schedule and required timelines for completion of the Extension Work and/or the Extension Maintenance Services, as applicable.

(b) Within a period of 30 days after the date of receipt of the Notice of Extension, Project Co shall deliver to the City its Extension Notice Response advising the City whether or not Project Co desires to proceed to the next stage of negotiation with the City in respect of the System Extension. In the event Project Co desires to proceed, Project Co shall, within a period of 60 days after the delivery of its Extension Notice Response, deliver to the City a preliminary cost estimate and schedule for the Extension Work and/or the Extension Maintenance Services, as applicable.

(c) If the City elects, in its Discretion, to continue to consider Project Co for the Extension Work and/or the Extension Maintenance Services, as applicable, the City shall within a period of 120 days after the date of receipt of Project Co's

Extension Notice Response, deliver its City Extension Requirements. The City Extension Requirements (which shall be non-binding on the City) shall include:

(i) a draft heads of terms agreement for the Extension Work and/or the Extension Maintenance Services, as applicable;

(ii) draft output specifications and commissioning processes for the System Extension;

(iii) draft "term sheet level" parameters of the payment mechanism to be used in respect of the Extension Work and/or the Extension Maintenance Services; and

(iv) guidelines with respect to the structure of construction or permanent financing to be secured by Project Co;

(d) Within a period of 150 days after the date of receipt of the City Extension Requirements, Project Co shall deliver to the City the Project Co Extension Proposal which shall be non-binding on Project Co. The Project Co Extension Proposal shall include:

(i) a detailed cost estimate and construction schedule in respect of the Extension Work and/or the Extension Maintenance Services, as applicable;

(ii) any impact the Extension Work and/or the Extension Maintenance Services, as applicable, would have on Project Co's activities under the Project Agreement, including, if applicable, any schedule impact on the provision of the System or the Highway, and completion of the Design and Construction Works or the Highway Work;

(iii) any impact on expected usage of utilities, including those identified in Schedule 20 – Payment Mechanism, for the current Contract Year and subsequent Contract Years;

(iv) any contemplated amendments to the Project Agreement to coordinate the Extension Work and/or the Extension Maintenance Services, as applicable, with Project Co's obligations in respect of the Project Scope;

(v) the expected Direct Costs of Project Co and each Subcontractor that will be incurred in respect of the Extension Work and/or the Extension Maintenance Services, as applicable, including:

(A) any Capital Expenditure that will be incurred; and

(B) any other costs that will be incurred, reduced or avoided and the impact on Project Co's cash flows from incurring, reducing or avoiding such costs;

(vi) preliminary terms of the financing structure specified in the City Extension Requirements;

(vii) Project Co's confirmation that the projected internal rate of return on any equity capital required in respect of the Extension Work and/or the Extension Maintenance Services, as applicable, will be the Base Case Equity IRR;

(viii) Project Co's preliminary indication of the potential increase or decrease, if any, of the Monthly Service Payments, with such amount calculated by reference to the relevant parts of the Financial Model to demonstrate the impact of the Extension Work and/or the Extension Maintenance Services, as applicable; and

(ix) any Extension Permits, Licences and Approvals that must be obtained or any Permits, Licences and Approvals amended for the Extension Work and/or the Extension Maintenance Services, as applicable, to be implemented;

in each case, together with such supporting information and justification as is reasonably required.

(e) In preparing the Project Co Extension Proposal, Project Co shall include sufficient information to demonstrate to the City's satisfaction, acting reasonably, that:

(i) Project Co has used or has obliged each Subcontractor (or will oblige any Subcontractor not yet selected) to use commercially reasonable efforts, including the use of competitive quotes or tenders to minimize costs in respect of the System Extension;

(ii) except as otherwise set out herein, all costs of Project Co and each Subcontractor are limited to Direct Costs;

(iii) Project Co and any Subcontractor shall charge only the margins for overhead and profit as set out in Appendix B to Schedule 22 – Variation Procedure (such margins each calculated on the basis of the applicable Direct Costs so that no margin of Project Co or any Subcontractor is calculated on any other margin under the Project Agreement of Project Co or any Subcontractor), and no other margins or mark ups;

(iv) the margins for overheads and profit as set out in Appendix B to Schedule 22 – Variation Procedure as applicable to Project Co's Direct Costs shall only be chargeable on Direct Costs of Project Co, such that Project Co shall not charge any margins on any amounts charged by any Subcontractors;

(v) all costs of completing the Extension Work and/or the Extension Maintenance Services, as applicable, including Capital Expenditures,

reflect labour rates applying in the open market to providers of services similar to those required for the Extension Work and/or the Extension Maintenance Services, as applicable;

(vi) Project Co has mitigated or will mitigate the impact of the Extension Work and/or the Extension Maintenance Services, as applicable, including on the Works Schedule, the Highway Construction Schedule, the performance of the activities within the Project Scope, the expected usage of utilities, and the Direct Costs to be incurred; and

(vii) Project Co will use commercially reasonable efforts to obtain the best value for money when procuring any work, services, supplies, materials or equipment required in respect of the Extension Work and/or the Extension Maintenance Services, as applicable, and will comply with all Good Industry Practice (Works) in relation to any such procurement, to a standard no less than Project Co would apply if all costs incurred were to its own account without recourse to the City, including using commercially reasonable efforts to mitigate such costs.

(f) Subject to Section 2.2(g), as soon as practicable after the receipt of the Project Co Extension Proposal, the City and Project Co shall, in good faith and acting reasonably, negotiate the terms of the binding agreement for the performance of the Extension Work and/or Extension Maintenance Services as applicable, as well as any necessary amendments to the Project Agreement, based on the contents of the City Extension Requirements and the Project Co Extension Proposal.

(g) Notwithstanding anything contained in this Schedule 38, except as may be the subject matter of a competitive procurement process, no agreement relating to the subject matter of this Schedule 38 shall be effective unless entered into in writing by each of the Parties and the entering into of same shall be subject to each Party's Discretion. Either Party may in its Discretion elect to cease negotiations at any time in the process set out in this Section 2.2 prior to the signing of such written agreement.

2.3 System Extension during Option Term

(a) If the City elects to proceed with a System Extension during the Option Term, the provisions of Schedule 35 – Additional Vehicles shall apply with respect to any Additional Vehicles that are required as a result of the System Extension.

ARTICLE III
PROJECT CO COOPERATION

3.1 Project Co Cooperation with the City and Interface with an Extension Contractor

(a) In the event the City pursues a System Extension with an Extension Contractor, Project Co shall use commercially reasonable best efforts to provide such

assistance to the City as the City may request, acting reasonably. Such assistance shall include but is not limited to:

(i) the development of technical specifications in respect to the Extension Work or the Extension Maintenance Services, as applicable, and the evaluation of designs proposed by prospective Extension Contractors to ensure compatibility with the Fixed Facilities, E&M, MSF, Vehicles and any Additional Vehicles already supplied, and other items as specified by the City;

(ii) permitting the City access to relevant information respecting Fixed Facilities, E&M, MSF, Vehicles and any Additional Vehicles already supplied, and other items as specified by the City;

(iii) advising the City on potential modifications to the Extension Work or the Extension Maintenance Services, as applicable, that could result in cost savings or other benefits to the City (If Project Co identifies any cost savings to the Maintenance Services or the Extension Maintenance Services, such savings shall be shared equally by the City and Project Co by way of an adjustment to the Monthly Service Payments); and

(iv) the development of an interface protocol between the City, Project Co and the Extension Contractor.

The City and Project Co's obligations under this Section 3.1(a) shall be subject to and in accordance with the provisions of Schedule 41 – Intellectual Property.

(b) The City shall pay Project Co reasonable consulting fees in respect of the assistance Project Co provides pursuant to this Section 3.1. Such consulting fees shall be paid within 30 days of receipt of an invoice from Project Co. Each Project Co invoice shall set out in reasonable detail, the nature of assistance provided in the invoice period, the personnel involved and the time committed by Project Co personnel in respect of such assistance.

(c) As soon as practicable after the City provides notice to Project Co that the City has reached a binding agreement with an Extension Contractor, the City and Project Co shall meet with the Extension Contractor and, in good faith and acting reasonably, negotiate and execute an interface agreement and/or construction procedures agreement to govern matters relating to the coordination of Project Co's activities in respect of the Project Scope and the Extension Contractor's activities relating to the Extension Work and/or the Extension Maintenance Services as applicable. The City shall also include, in its agreement with any Extension Contractor, an obligation on the Extension Contractor to negotiate with the City and Project Co in the terms of the interface agreement and/or construction procedures agreement in good faith and acting reasonably.

(d) In the event of an Integrated System Extension, the agreement to be negotiated between the City, Project Co and the Extension Contractor pursuant to Section 3.1(c) shall include provisions related to:

(i) the rights and obligations of the City, Project Co and the Extension Contractor in respect of the physical linking, testing and commissioning, safety and system certification of the System and the Integrated System Extension;

(ii) commissioning requirements with respect to Additional Vehicles and the extended lines;

(iii) a protocol with respect to the testing of the entire System and Integrated System Extension to ensure integration and ability for the operation of the entire line as contemplated in the Output Specifications and the final output specifications developed in respect of the Integrated System Extension; and

(iv) provision for the sharing of the MSF if the City so requires in which case Project Co shall be entitled to a reasonable fee as negotiated between the parties in good faith and acting reasonably.

(e) In the event of a Non-Integrated System Extension, the City, Project Co, the Lenders, the Extension Contractor, and the Extension Lenders shall execute a reciprocal agreement in a form to be agreed to between the parties acting reasonably and negotiating in good faith (the "**Reciprocal Agreement**"). The Reciprocal Agreement shall govern the rights of the parties in respect of the station, Infrastructure or other location on the System which has an interchange point with the Non-Integrated System Extension and shall govern matters such as:

(i) reciprocal easements or other rights-of-access;

(ii) appropriate cost sharing arrangements;

(iii) sharing of information;

(iv) decision making process regarding matters affecting the interchange between the System and the Non-Integrated System Extension; and

(v) mutual repair obligations of structural or other elements in common between the System and the Non-Integrated System Extension.

SCHEDULE 39

OPERATIONS MATTERS

1. DEFINITIONS

The following definitions shall have the following meanings:

1.1 "**Aggregate Actual Annual Driver Hours**" or "**AAADH**" means, in a given Contract Year, the actual number of Driver Hours required in that Contract Year for operation of the Vehicles in accordance with the then-current Operations Service Plan, as adjusted in accordance with Section 6 of this Schedule 39.

1.2 "**Aggregate Annual Driver Hours Target**" or "**AADHT**" means the total forecasted annual amounts of Driver Hours, set forth in the Annual Driver Hours Target Letter submitted by Project Co at Commercial Close and which has been accepted by the City, and as amended over the term of the contract, as may be required, in accordance with the terms of the Project Agreement and Section 6 of this Schedule. The AADHT shall include and account for all requirements of the Operations Service Plan, and Schedule 15 – Output Specifications of the Project Agreement.

1.3 "**Annual Driver Hours**" means in respect of a Contract Year, the amount of Driver Hours in that Contract Year.

1.4 "**Annual Driver Hours Adjustment**" or "**ADHA**" means the amount determined in accordance with Section 7 of this Schedule 39.

1.5 "**Annual Driver Hours Analysis Report**" has the meaning given to it in Section 4 of this Schedule 39.

1.6 "**Annual Driver Hours Target Letter**" means the letter submitted by Project Co at Commercial Close setting forth the AADHT for each Contract Year, as amended in accordance with the terms of this Schedule 39.

1.7 "**Annual Review Meeting**" means meetings between the City Representative and the Project Co Representative to be held within 90 days of completion of each anniversary of the Revenue Service Availability Date (or other date as may be agreed between the City and Project Co) to discuss Annual Driver Hours.

1.8 "**Driver Hours**" means the number of person-hours logged by Drivers of the Vehicles, while the Vehicles are in Revenue Service.

1.9 "**High Cost Measures**" means, in respect of a Contract Year, Annual Driver Hours saving measures that incur capital expenditure greater than 33% of the Annual Driver Hours savings cost.

1.10 "**Interactive Spreadsheet**" means the Excel spreadsheet attached as Appendix B to this Schedule 39, as amended in accordance with Section 6.

1.11 "**Low Cost Measures**" means, in respect of a Contract Year, Annual Driver Hours saving measures that incur capital expenditure less than 33% of the Annual Driver Hours savings cost.

1.12 "**No Cost Measures**" means, in respect of a Contract Year, Annual Driver Hours saving measures, involving no material additional expenditure and/or no capital expenditure to carry out.

1.13 "**Operational Performance Simulation**" or "**OPS**" means the simulation model developed by Project Co in accordance with the requirements of Part E to Schedule 3(1) to the RFP, and attached hereto as Appendix B.

1.14 "**Unit Rate Price Driver Hour**" means fifty dollars ($50), indexed to the Inflation Index in accordance with the escalation methodology set out in Schedule 20 (Payment Mechanism).

1.15 "**Operating Performance Parameters**" means the inputs provided by Project Co to the Interactive Spreadsheet at the RFP Submission Date, being drivers per train, vehicle capacity (seats per car and standing room per car), cars per train at peak and off-peak periods, and terminal to terminal run time.

2. INTENT AND PURPOSE

2.1 The intent of this Schedule 39 (Operations Matters) is to provide a mechanism for holding Project Co accountable throughout the Maintenance Term for the design solution and the associated Operating Performance Parameters it has represented in its Response, through the annual benchmarking of the AAADH against the AADHT.

2.2 The Parties intend to adjust the AADHT and/or AAADH as required during the Maintenance Term, in order to account for changes in the Operations Service Plan, and other changes in operational practices or policies. The Parties shall make adjustments to the AADHT in accordance with Section 6.

2.3 During any adjustments to the AADHT, the Operating Performance Parameters shall at all times be held constant, unless the Parties mutually agree to change the Operations Performance Parameters.

3. ANNUAL DRIVER HOURS TARGET LETTER

3.1 At Commercial Close, Project Co shall deliver to the City the Annual Driver Hours Target Letter in form and substance satisfactory to the City. The Annual Driver Hours Target Letter shall reflect the development of the design, the OPS, and ridership and capacity targets over the Maintenance Term. The Annual Driver Hours Target Letter shall not differ in any material respect from the draft Annual Driver Hours Target Letter provided in Project Co's Response, unless such variation is approved by the City.

3.2 Project Co shall deliver to the City for review in accordance with Schedule 10 – Review Procedure, an updated final Annual Driver Hours Target Letter together with a

supporting OPS six (6) months prior to the Revenue Service Availability Date. Any changes to the Annual Driver Hours Target Letter after Commercial Close and prior to the Revenue Service Availability Date are subject to the approval of the City and must be arising from either:

(a) Project Co changes to the Operating Performance Parameters which have been approved by the City; or

(b) Changes to the Operations Service Plan, and for clarity, the Operating Performance Parameters may not be changed in this circumstance unless approved by the City.

3.3 Following submission of the updated final Annual Driver Hours Target Letter, the Annual Driver Hours Target Letter may only be amended in accordance with the process set out in Section 6 of this Schedule 39.

4. PROCEDURES FOR DETERMINING ANNUAL DRIVER HOURS ADJUSTMENT

4.1 The measurement and verification of Annual Driver Hours shall be performed by Project Co and verified by the City.

4.2 No less than 30 days prior to the Revenue Service Availability Date, Project Co shall provide the City with an Annual Driver Hours Measurement and Verification Plan. All subsequent Annual Driver Hours Analysis Reports are to be based on this plan.

4.3 Project Co shall provide the City with a draft Annual Driver Hours Analysis Report within 60 days following the end of each Contract Year, which report shall include copies of all documents to fully support the draft Annual Driver Hours Analysis Report. The draft Annual Driver Hours Analysis Report shall be consistent with the format and content requirements set out in Section 5 of this Schedule 39.

4.4 As soon as practicable and in any event no later than 80 days following the end of each Contract Year, Project Co and the City shall convene an Annual Review Meeting to be attended by the Project Co Representative and the City Representative. At the Annual Review Meeting Project Co shall present the draft Annual Driver Hours Analysis Report to the City, and the City and Project Co shall discuss the AAADH and associated adjustments (in accordance with Section 6.2) for the preceding Contract Year.

4.5 Within 20 Business Days following each Annual Review Meeting, or within such period as may be otherwise agreed between the City Representative and the Project Co Representative, acting reasonably:

(a) the City shall confirm its acceptance of all or any aspect of the Annual Driver Hours Analysis Report; and

(b) subject to Section 6.6 of this Schedule 39, Project Co and the City shall agree to any adjustments to the AAADH; and

(c) Project Co and the City shall agree on the quantum of any Annual Driver Hours Adjustments resulting from the agreed-upon AAADH, which shall be supported by an account prepared by the City setting out the calculations of any such Annual Driver Hours Adjustments.

4.6 Project Co shall assist the City Representative and afford the City Representative such information and access to the Annual Driver Hours records, and by other means as may reasonably be required for the City Representative to confirm the draft Annual Driver Hours Analysis Report provided by Project Co to determine the Aggregate Actual Annual Driver Hours for the preceding Contract Year. The City shall promptly notify Project Co of the details of any disagreement of all or any aspect of the Annual Driver Hours Analysis Report, and the Parties shall then seek to agree to any matters in dispute, but where matters cannot be resolved within the 20 Business Day review period identified in Section 4.5 (or such other period as may be otherwise agreed by the City Representative, acting reasonably) it shall be resolved in accordance with Schedule 27 – Dispute Resolution Procedure to this Project Agreement.

4.7 If either Project Co or the City wishes to dispute any account presented pursuant to Section 4.5(c) of this Schedule 39, it must do so by written notice to the other Party within 10 Business Days of receipt of such account. The City Representative and the Project Co Representative shall use reasonable efforts to resolve the dispute for an additional 10 Business Days. If there is no agreement within a further 10 Business Days then either Party may refer the matter to the Schedule 27 - Dispute Resolution Procedure.

5. CONTENT AND FORMAT OF THE ANNUAL DRIVER HOURS ANALYSIS REPORT

5.1 The Annual Driver Hours Analysis Report shall present findings of Aggregate Actual Annual Driver Hours relevant to the Contract Year and shall include the following:

(a) A summary of actual Annual Driver Hours and breakdown by dates. The summary should also highlight any exceptional changes (being changes of plus or minus 10% in Annual Driver Hours since any previous reports);

(b) Identification of potential savings in respect to Annual Driver Hours and provide an estimate of implementation costs, along with identifying potential risks associated with each proposed measure. Project Co shall categorize these measures in the following categories: No Cost Measures, Low Cost Measures and High Cost Measures. Project Co shall also advise the City of projected Annual Driver Hours for the remaining duration of the Maintenance Term and along with trends and potential risks associated with each; and

(c) Accurate and precise data in support of the above noted items.

5.2 The objectives of the Annual Driver Hours Analysis Report are to confirm the AAADH in the relevant Contract Year and to provide data to calculate any Annual Driver Hours Adjustments.

5.3 Consistent with the objectives set out in Section 5.2 of this Schedule 39, Project Co shall ensure that the Annual Driver Hours Analysis Report has the following components:

(a) presentation of the AAADH;

(b) presentation of proposed adjustments to the AAADH used for calculating ADHA, in accordance with Section 6.6;

(c) outline any outstanding issues from any previous Annual Driver Hours Analysis Reports;

(d) any adjustments to the Aggregate Annual Driver Hours Target calculated in accordance with Section 6.2; and

(e) summary tables from all previous Annual Driver Hours Analysis Reports delivered by Project Co to the City.

6. PROCESS FOR AMENDING THE AADHT AND AAADH

6.1 In all cases, amendments to the AADHT must be consistent with the principles outlined in the OPS, and must be consistent with the Operations Performance Parameters.

6.2 At any time commencing after the first anniversary of the Revenue Service Availability Date, Project Co and the City shall adjust the AADHT when triggered by one of the following events:

(a) A change in Service Level;

(b) Any other change in the Operations Service Plan initiated by the City that impacts Driver Hours; or

(c) Any other City-initiated change in operations policies or procedures which is demonstrated by Project Co to have an impact on Driver Hours.

6.3 The Parties shall re-run the Interactive Spreadsheet, with appropriate amendments to the operational elements which have changed, in order to determine the appropriate amendments to the AADHT. The Parties may use the OPS to assist in this process, or may use the OPS as the main point of reference in order to determine the amendments to the AADHT, if agreed by both Parties.

6.4 The Parties shall agree upon the appropriate amendments to the AADHT within thirty (30) days of the relevant triggering event, and shall effect the agreed-upon amendments through a revised Annual Driver Hours Target Letter. If the Parties cannot agree within the thirty (30) day period, then the Parties shall jointly retain and pay for a third party to carry out an independent OPS. The new OPS shall include a detailed analysis of the impacts to operational performance, including an analysis of Annual Driver Hours requirements. The third party shall prepare a report making a recommendation regarding amendments to the AADHT. Both the City and Project Co must agree to the amended

AADHT within 20 Business Days following receipt of such report. If there is no agreement within a further 10 Business Day period, then either Party may refer the matter to Schedule 27 - Dispute Resolution Procedure.

6.5 Any amendment to the AADHT shall only affect the Monthly Service Payment (as a result of any Annual Driver Hours Adjustments) from the date on which the amendment is effective and shall not, for greater certainty, have a retrospective effect on any other previous Annual Driver Hours Adjustment calculations or Monthly Service Payments, except where the Dispute Resolution procedure adjudicates in favour of Project Co whereby the payments shall be prorated to 30 days after the TTMP and third party report.

6.6 Project Co shall be entitled to adjust its AAADH downward in the following circumstances:

(a) Changes in the Operations Service Plan (which have not already been reflected by amendments to the AADHT);

(b) Service provided in excess of the Operations Service Plan, such as additional service provided during special events or emergency situations that are not due to Project Co acts or omissions;

(c) The occurrence of a Non-Project Co Cause, as defined in Schedule 20 of the Project Agreement, which increases Driver Hours;

(d) Temporary measures imposed by the City that impact Driver Hours, which measures are not due to Project Co acts or omissions.

6.7 Project Co shall notify the City of any proposed adjustment to AAADH within 30 days of the event triggering the proposed adjustment.

7. CALCULATION OF ANNUAL DRIVER HOURS ADJUSTMENT

7.1 Comparing Annual Driver Hours Target

(a) After the acceptance of the Annual Driver Hours Analysis Report described in Section 4 for each Contract Year, the AAADH, including agreed-to adjustments per Section 6.6 of this Schedule 39, shall be compared to the AADHT and:

(i) if the AAADH in respect to AADHT is greater than 105% of the AADHT in respect of such Annual Driver Hours then Project Co shall calculate the Annual Driver Hours Adjustment as per Section 7.2.

The table below shows the banding mechanism used for calculating the Annual Driver Hours Adjustment.

Table 7.1		
Annual Driver Hours	**Period "X"**	**Annual Driver Hours Adjustment then equals:**
If the Variance from AADHT for the purposes of calculating Annual Driver Hours Adjustment in the previous period was:	0 to 5%	0
If the Variance from AADHT for the purposes of calculating Annual Driver Hours Adjustment in the previous period was:	> 5%	100%

(b) If Project Co is subject to an Annual Driver Hours Adjustment with respect to a Contract Year, then Project Co shall submit a detailed remediation plan within fourteen (14) days of the calculation of the Annual Driver Hours Adjustment to explain how it will reduce the AAADH such that it will not exceed the 105% threshold established in Section 7.1(a), above, for the subsequent Contract Year. If Project Co is not successful in its remediation plan such that the Annual Driver Hours Adjustment in Section 7.1(a) is applied with respect to such AAADH for the subsequent Contract Year, then the Annual Driver Hours Adjustment set out in Section 7.2 will again apply.

7.2 The formulae to calculate the Annual Driver Hours Adjustment set out in this Section 7.2 is based on Table 7.1 of this Schedule 39. For the avoidance of doubt, if the AAADH falls within a set band the relevant AADHT (i.e.: no more than 5% above the benchmark) no Annual Driver Hours Adjustment will be made for that Contract Year.

(a) For the purposes of Section 7.2(b):

A = the AAADH during the relevant Contract Year.

B = the AADHT for the relevant Contract Year.

(b) In respect of each Contract Year following the Revenue Service Availability Date:

IF: A> 1.05B then the City shall be entitled to deduct an Annual Driver Hours Adjustment where

If A> 1.05B then ADHA = (A – 1.05B) * Unit Rate Price Annual Driver Hours

7.3 The Annual Driver Hours Adjustment, if applicable, shall be applied as a deduction to the Monthly Service Payment in accordance with the provisions of Part B, Section 1.1 of Schedule 20 (Payment Mechanism).

APPENDIX A

ANNUAL DRIVER HOURS REPORT SUBMITTAL REQUIREMENTS

Total Annual Driver Hours Summary	**Annual Driver Hours Target**		**Actual Annual Driver Hours**		**Percent Variance between iv and ii**	**Annual Driver Hours Adjustment**
	Aggregate Annual Driver Hours Target (AADHT)	**Cost of Annual Driver Hours for Contract Year** (calculated based on AADHT multiplied by Unit Rate Price Annual Driver Hours)	**Aggregate Actual Annual Driver Hours (AAADH)**	**Cost of Annual Driver Hours for Contract Year** (calculated based AAADH multiplied by Unit Rate Price Annual Driver Hours)		
	i	ii	iii	iv	v	vi
Contract Year 1						
Contract Year 2						
Contract Year 3						
Contract Year 4						
Contract Year 5						
Contract Year 6						
Contract Year 7						
Contract Year 8						
Contract Year 9						

Total Annual Driver Hours Summary	Annual Driver Hours Target		Actual Annual Driver Hours		Percent Variance between iv and ii	Annual Driver Hours Adjustment
	Aggregate Annual Driver Hours Target (AADHT)	**Cost of Annual Driver Hours for Contract Year** (calculated based on AADHT multiplied by Unit Rate Price Annual Driver Hours)	**Aggregate Actual Annual Driver Hours (AAADH)**	**Cost of Annual Driver Hours for Contract Year** (calculated based AAADH multiplied by Unit Rate Price Annual Driver Hours)		
	i	ii	iii	iv	v	vi
Contract Year 10						
Contract Year 11						
Contract Year 12						
Contract Year 13						
Contract Year 14						
Contract Year 15						
Contract Year 16						
Contract Year 17						
Contract Year 18						
Contract Year 19						
Contract Year 20						
Contract Year 21						

Total Annual Driver Hours Summary	Annual Driver Hours Target		Actual Annual Driver Hours		Percent Variance between iv and ii	Annual Driver Hours Adjustment
	Aggregate Annual Driver Hours Target (AADHT)	**Cost of Annual Driver Hours for Contract Year** (calculated based on AADHT multiplied by Unit Rate Price Annual Driver Hours)	**Aggregate Actual Annual Driver Hours (AAADH)**	**Cost of Annual Driver Hours for Contract Year** (calculated based AAADH multiplied by Unit Rate Price Annual Driver Hours)		
	i	ii	iii	iv	v	vi
Contract Year 22						
Contract Year 23						
Contract Year 24						
Contract Year 25						
Contract Year 26						
Contract Year 27						
Contract Year 28						
Contract Year 29						
Contract Year 30						

ANNEX G
HIGHWAY SUPPLEMENTARY CONDITIONS

This Annex G consists of Part A – MTO General Conditions, Part B – Addenda and Part C – Special Conditions.

The Part A – MTO General Conditions, Part B – Addenda and Part C – Special Conditions shall be read in conjunction with the Project Agreement (including Schedule 40 – Highway Work).

Any capitalized terms used in this Annex G but not defined herein shall have the meanings ascribed to them in the Project Agreement. In addition, any reference to the following terms in this Annex G shall be deemed a reference to the corresponding term in the Project Agreement set out below:

Term in Annex G	Term in Project Agreement
"Change Order"	"Variation Confirmation"
"construction schedule"	"Highway Construction Schedule"
"Contract"	"Schedule 40 – Highway Work" or "Project Agreement" as the context requires
"Contract Administrator"	"Consultant"
"Contract Bid Price"; "Contract price"	"Highway Milestone Payment"
"Contract Completion"	"Highway Final Completion"
"Contract Completion Certificate"	"Highway Final Completion Certificate"
"Contract Drawings"; "Contract Plans"	"Highway Drawings"
"Contract Time"	"Highway Contract Time"
"Contractor"; "General Contractor"	"Project Co"
"Ministry" or "Owner"	the "City" or, if the context requires, the "City as authorized by MTO"
"Substantial Performance"	"Substantial Completion of the Highway Work"
"Work"	"Highway Work"

For greater certainty, the Part B – Addenda and Part C – Special Conditions shall apply, and are hereby incorporated, into Annex G to Schedule 40 to the Project Agreement with the following amendments and modifications:

1. All references to Part C – Special Conditions shall be interpreted as "Part C – Special Conditions as amended by Part B – Addenda" and as further amended by the following amendments and modifications.

2. Any pages prior to the table of contents referring to tender are deleted.

3. If a Special Condition in Part C – Special Conditions specifically refers to amending a General Condition in Part A – MTO General Conditions that has been deleted or marked "Reserved", then such Special Condition shall be deemed to be deleted from Part C– Special Conditions.

4. With respect to any sections titled "Measurement for Payment":

a. Any references to “Measurement for payment…”, or wording of similar intent is replaced with “Measurement for quantity reporting…”; and

b. the title of the section is renamed “Measurement for Quantity Reporting and Quality Control”.

5. With respect to any sections titled “Basis of Payment” or “Bases for Payment”, any references to:

“Payment at the Contract Price or bid price for the above tender item shall be full compensation for ....” or wording of similar intent,

are deleted and substituted with:

“The Highway Milestone Payment shall be full compensation for ...”.

6. Any references to “payment being made based on unit price”, “tender price”, “lump sum tender”, “bid price”, “interim payments” or “in a progress payment basis” are not applicable.

7. All quantity values appearing in the Quantity Sheet Book are for information purposes only and the City assumes no risk for such quantity values. For clarity, the quantity values referred above are those numbers appearing to the right of the double vertical line appearing in sheets numbered 1 to 570 contained in the Quantity Sheet Book 1 of 1, GWP 4320-06-00, Eastern Region, May 17, 2012, listed in Annex A to Schedule 40 – Highway Work.

8. Any references to “referee testing” are not applicable.

9. The special provision entitled “Section C – Special Provisions – Liquidated Damages” is deleted in it’s entirety. Any references to “liquidated damages” are not applicable.

10. In respect of the Tender Item List, the columns titled “Quantity”, “Unit” and “Total” are deleted. The requirement for the Contractor to submit the “Tender Item List” with its bid is deleted.

11. The Sections starting with “Instructions to Bidders” on or about Page 23 up to and including “Part 2 – Disclosure – Conflict of Interest” on or about Page 31 are deleted.

12. The full page that begins with the heading “SIGNED STATEMENT BY BIDDER THAT THE BID IS PREPARED AND SUBMITTED WITHOUT COLLUSION OR DECEIT” is deleted.

13. The Special Provision under the heading “OPERATIONAL CONSTRAINT – Large Diameter watermains over 300mm” that begins with the words “e) Obtain additional insurance coverage” is deleted and substituted with “e) Intentionally Deleted”.

14. The Special Provision under the heading “NOTICE TO CONTRACTOR - Additional Indemnification and Insurance Requirements” is deleted.

15. Under the heading “OPERATIONAL CONSTRAINT (STRUCTURAL) - Standby Equipment”, the following two sentences are deleted:

“Payment for standby equipment shall be deemed included with the Contract unit price for the items requiring use of this equipment.”, and

"Payment for standby equipment shall be deemed included with the Contract unit price for the items requiring use of this equipment."

16. Under the heading "Lane and Ramp Closures – General", the words "(paid duty)" are added immediately following the words "Ontario Provincial Police".

17. In section "**313.07.06.03 Placing Hot Mix Asphalt Before Winter Shutdown**", item b) which begins with "Payment", the words "at the contract prices for the work" are deleted.

18. Under the heading "OTHER CONTRACTORS WITHIN OR ADJACENT TO THE LIMITS OF THE CONTRACT", the following paragraphs are deleted:

"Ottawa Light Rail Transit Project

a. Location of Work

Crossing under Highway 417 from north to south approximately 150m east of Nicholas Street Bridge; adjacent to and to the south of Highway 417 from Vanier Parkway/ Riverside Drive to approximately 400 m west of St. Laurent Boulevard; crossing under Highway 417 from south to north approximately 400m west of St. Laurent Boulevard and then adjacent to and to the north of Highway 417 and OR 174 to the east limits of the contract.

b. Contact Person

Infrastructure Ontario
Physical Resources Service
Telephone: (613) 562-5800 ext. xxxx

c. Schedule

Anticipated start January 1, 2013 with anticipated completion September 2018."

19. Under the heading "TRAFFIC CONTROL SIGNING – Item No. 86", in the paragraph that begins with the words "The Contractor shall be responsible for contacting…", the word "Ministry" is deleted and substituted with "Contractor".

20. Under the heading "CONCRETE IN DECK - Item No. 308, 340, 378, 412, 427, 522", in Section 904.07 - CONSTRUCTION, the last sentence in both paragraphs that begin with the words "The Contractor shall ensure that the temporary structures and facilities…" is deleted.

21. Under the heading "MAINTENANCE AND WARRANTY FOR LANDSCAPE PLANTING - Item No. 154":

a. Section 7 is revised by deleting the reference to the "contract price for this item being 20% of the total Tender Price". The paragraph that follows the reference is also deleted. The "Highway Post Substantial Completion Maintenance Payment" is the amount referred to under Section 34.1(f) of the Project Agreement and the full and final compensation to Project Co in respect of this provision is included in the payment as calculated and adjusted under Section 34.1(f) of the Project Agreement.

b. Section 8 is revised by deleting all references to “Default” and the GC. Any payment in respect of this Section may be adjusted by the Consultant as part of the calculation of the Net Highway Maintenance Adjustment. Further, the words “or fails to perform the warranty and maintenance work in accordance with the Contract” are hereby added to the paragraph. For greater certainty, the added phrase constitutes a basis on which the Consultant may adjust the payment under Section 34.1(f) of the Project Agreement as part of the calculation of the Net Highway Maintenance Adjustment.

22. Under the heading “MAINTENANCE AND WARRANTY FOR ADVANCED TRAFFIC MANAGEMENT SYSTEM WORK - Item no. 277”:

a. In Section 4.1.3, the reference to an “invoice period” is deleted. The provision shall be read to include the requirement for Project Co to submit logs every three months during the maintenance and warranty period.

b. In Section 7.3 - Repairs and Spare Parts, the last paragraph of the provision is deleted.

c. In Section 10 – Basis of Payment; delete the following paragraphs: paragraph 2 and paragraphs thereafter up to and including the paragraph immediately preceding the section entitled “**10.1 Non-**Performance”, and replace with the following:

> “The Highway Post Substantial Completion Maintenance Payment shall include full compensation for all labour, Equipment, Materials and services required to provide Maintenance and Warranty during Phase II.
>
> As a condition to making the Highway Post Substantial Completion Maintenance Payment, the subsystem shall be fully operational and performing in accordance with Contract Specifications and all spare system components taken from the Owner’s inventory by the Contractor to carry out Routine Maintenance and Emergency Repairs have been replaced in good working condition.”

d. In Section 10.1 – Non-Performance, the sentence immediately following the table is deleted and replaced with the following paragraphs:

> “The above penalties, when confirmed justified by the Contract Administrator, shall be deducted from the Highway Post Substantial Completion Maintenance Payment.
>
> In the event the Contractor does not remedy the non-performance within 5 days of notification of non-performance, the Owner will deduct from the Highway Post Substantial Completion Maintenance Payment any additional costs the Owner incurs as a result of the Contractor’s non-performance.
>
> The Owner reserves the right to cancel the Maintenance and Warranty agreement with the Contractor at anytime during the Contract without monetary compensation or notice.”

e. Section 10.2 – Default is deleted in its entirety.

23. Under the heading "SYSTEM INTEGRATION TESTING FOR ADVANCED TRAFFIC MANAGEMENT SYSTEM WORK - Item No. 280" (Special Provision No. 681F19M): In section "10 BASIS OF PAYMENT", all paragraphs and tables after the second paragraph are deleted.

24. The entire paragraph, including heading, under the heading "H. General Condition" on or about Page 46 which begins with "OPSS.Prov 100, MTO General Conditions of Contract, April 2010" is deleted.

25. Under the heading "PROTECTION OF PUBLIC TRAFFIC" (Special Provision No. 100F08M), the following paragraphs are deleted:

" **Penalty for Early Closing**

On each occasion when the Contractor closes lanes to traffic earlier than the specified times, the Contract Administrator will assess the Contractor an initial penalty of $ 1,000.00.

Thereafter, a further penalty of $ 100.00 per minute will be assessed against the Contractor for every minute outside the permitted closure window that the traffic lanes are not open to traffic. The Contract Administrator will be the sole judge of the length of time of the delay.

Penalty for Late Opening

On each occasion when the Contractor fails to reopen the traffic lanes by the specified time, the Contract Administrator will assess the Contractor an initial penalty of $ 10,000.00.

If traffic lanes are not open within 15 minutes of the specified time, a further penalty of $ 1,000.00 will be assessed against the Contractor.

Thereafter, a further penalty of $ 100.00 per minute will be assessed against the Contractor for every minute that the traffic lanes are not open to traffic. The Contract Administrator will be the sole judge of the length of time of the delay. "

" Basis of Payment

Section 706.10 of OPSS 706 is amended in that payment for all costs associated with the number of lane closures and the number of days of speed control activities stipulated above is deemed to be included in the Traffic Control Signing item and no additional payment will be made.

Any additional OPP-assisted lane closures and speed control activities that result from the Contractor's chosen sequence and/or method of operation are deemed to be included in the Traffic Control Signing item and no additional payment will be made.

If a third party stipulates that additional OPP-assisted lane closures or speed control activities are required, the Owner will compensate the Contractor for the cost of the OPP services as extra work. "

26. Under the heading “706.10.04 Temporary Advance Information Signs (TC-64’s) – Item”, the following paragraph is deleted:

> “ On each occasion when the Contractor fails to install the Temporary Advance Information Signs (TC-64's) in accordance with the above requirements, or fails to remove the TC-64 signs within two hours of re-opening of the affected roadway, the Ministry will assess a penalty of $2,000.00. A further penalty of $2,000.00 per calendar day, or part thereof, with no maximum penalty, shall be assessed until such time as the Temporary Advance Information Sign (TC-64) is removed. “

27. Under the heading “CONTAMINATED EARTH EXCAVATION - Item No. 5”:

- The word “Contingency” is deleted from the heading “Contingency - Groundwater and Other Free Liquids”; and

- The following sentence under the subheading “Basis of Payment” on or about page 171 is deleted: “ Work required as a result of any "contingencies" as specified shall be paid as Extra Work in accordance with Section GC3.11 of the General Conditions of Contract. “

28. In Part C of this Annex G to Schedule 40, where payment “incentives”, “disincentives” and “penalties” or quality assurance “payment adjustments” are specified, the corresponding payments or payment deductions shall be made by way of an increase or decrease, as the case may be, on a one time basis, on or before the Highway Milestone Payment Date, to the Highway Milestone Payment (the “Net Highway Payment Adjustment”). Project Co and the City acknowledge that the Net Highway Payment Adjustment shall not constitute a Variation in the Scope of the Highway Work. The Net Highway Payment Adjustment shall, as determined by the Consultant, be equal to the net amount of all incentives, disincentives, quality assurance material payment adjustments and penalties determined in accordance with Part C of this Annex G to Schedule 40 of the Project Agreement including but not limited to the following provisions:

A. Ontario Provincial Standard Specifications, including the associated referenced General Special Provisions and Item Specific Special Provisions: 308,313,314,904,930,1010; and

B. Special Provision:

- Notice to Contractor – Incentive / Disincentive for Opening Highway 417

- Operational Constraint – Large Diameter Watermains over 300mm

- Incentive for Supply of Canadian Steel

- Protection of Existing System – Special Provision No. 168S20 – Accidental Damage to Existing ATMS Plant – Contractor Payments to Owner for Damages

For greater certainty, the Net Highway Payment Adjustment shall not include the Net Highway Maintenance Adjustment. The Net Highway Maintenance Adjustment shall, as determined by the Consultant, be equal to the net amount of any deductions and penalties set out in Part C of this Annex G to Schedule 40 as described in Item No. 277 – Maintenance and Warranty for Advanced Traffic Management System Work and in Item No. 154 –

Maintenance and Warranty for Landscape Planting in Part C of this Annex G - Highway Supplementary Conditions and as otherwise related to the maintenance and warranty of the ATMS and landscaping, without duplication to the items otherwise included in the Net Highway Payment Adjustment. In the event that the Consultant determines that Project Co's obligations in respect of Item No. 154 – Maintenance and Warranty for Landscape Planting have not been fully performed in accordance with the terms of the Project Agreement, including this Annex G to Schedule 40 – Highway Work, the Net Highway Maintenance Adjustment shall also include the amount of $50,000 as a deduction against the payment under Section 34.1(f) of the Project Agreement.

Where applicable, the Net Highway Payment Adjustment shall also be determined in accordance with the following "NOTICE TO CONTRACTOR – Material Payment Adjustments based on Quality Assurance Testing" Special Provision:

NOTICE TO CONTRACTOR – Material Payment Adjustments based on Quality Assurance Testing

Special Provision

Notwithstanding Paragraph 5 above, for the sole purpose of calculating Concrete, Granular, Asphalt, PGAC, and Pipe Sewer payment adjustments based on Owner Quality Assurance Testing specified in the Contract, the terms "Price", "Item Price", "Tender Price", "Tender Lump Sum Price", "Contract Price" or wording of similar intent within the applicable calculations shall be deemed to mean the following for each specific material payment adjustment:

Material		Price
Concrete materials	-	$1000.00 per cubic meter *
Granular materials	-	$21.00 per Tonne
HMA materials	-	$12.00 per Square Meter
Pipe Sewer	-	$700.00 per meter

* Tender Lump Sum Price and Tender Quantity are required in the calculation of concrete Air Void System payment reduction. The Contract Administrator shall calculate the Tender Quantity in cubic meters for each applicable tender item and multiply that by $1000.00 to determine the Tender Lump Sum Price.

29. The following maintenance requirements entitled "NOTICE TO CONTRACTOR – Queensway Maintenance Requirements" are deemed to be included in Part C– Special Conditions:

NOTICE TO CONTRACTOR – Queensway Maintenance Requirements

Special Provision

1) SCOPE

The contractor shall ensure that Maintenance is carried out within the limit of the contract as identified elsewhere, in accordance with the requirements of this special provision until the Highway Warranty period begins.

In addition to the requirements of GC 7.08 Maintaining Roadways and Detours, responsibility for maintenance in the area affected by the ATMS Requirements – interim completion date shall be transferred between the contractor and the City when the ATMS Requirements – interim completion date is achieved.

MTO shall only be responsible for snow, ice and frost control on the travelled lanes. The contractor shall be responsible for any snow removal in the construction work zone, behind temporary barriers or other devices that has been placed by the snow, ice and frost control measures.

All work to meet the requirements of this special provision shall be part of the lump sum bid price.

2) DEFENITIONS

For the purposes of this special provision the following terms shall have the following meanings:

Activity: means a single maintenance operation intended to address a deficiency in the highway system.

Central Dispatch: means the MTO radio room or Ottawa Compass Traffic Operation Centre used to receive and provide information over a two-way radio system.

Defect(s): means any deficient condition on the Highway identified in the maintenance requirements.

Detect, Detected or Detection: means observed, should have been observed or has been informed.

Hazard (s) or Hazardous: means a condition or Defect within the Highway causing an unsafe condition to the public or workers.

Hazardous Substance: means, but is not limited to, any solid, liquid, gas or other substance or emission which is a contaminant, pollutant, dangerous substance, liquid waste, industrial waste, hazardous material or hazardous substance which is or becomes regulated by Environmental Laws or occupational health and safety law or which is classified as hazardous or toxic under Environmental Laws.

Highway: means a common and public highway any part of which is intended for or used by the general public for the passage of vehicles and includes the area between the lateral property lines thereof.

Immediate or Immediately: means the initiation of an Activity as soon as possible after Detection or being Made Aware and no later than 1 hours from the time of Detection or being Made Aware. If more than one Activity requires Immediate action at the same time, the Contractor shall complete the Work giving priority to the highest degree of Hazard.

Made Aware: means when the Contractor has been advised by any party or upon Detection.

Maintenance: means the activities performed to maintain the Highway in a safe and passable condition, to prolong the life of the asset, and other activities prescribed in the maintenance requirements.

Outcome Target: means a performance requirement with a measurable goal that is to be met within a specified time.

3) MAINTENANCE REQUIREMENTS

All conditions that are considered, or causing, a Hazard shall be addressed Immediately by the Contractor upon Detection or being Made Aware.

All of the Maintenance Requirements set out a minimum standard and the Contractor shall, at all times, demonstrate the standard of care of a reasonable Contractor in like circumstances and exercising good business practices.

All work required within this special provision shall be completed in accordance with all Laws and Regulations and any documents listed in the Reference section of each Maintenance Requirement.

When the Maintenance Requirement identifies a time limit to complete an Activity, the time begins when the Contractor Detects, or should have Detected, or was Made Aware of the situation. These are maximum permissible time allotments. However if the Defect is or may be causing or could cause safety or health Hazards, the work shall be completed Immediately or as soon as possible to maximize the safety of the public.

The Outcome Targets specified apply to all Highway and City of Ottawa roads within the limits of the limits of the Contract.

Maintenance standards may change over time due to reasons which may include changes in; technology, industry standards, standards of the Ministry and other highway authorities, generally accepted methods of highway maintenance, and legislation.

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MAINTENANCE REQUIREMENT 1006 – INCIDENT RESPONSE

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1006.02 DEFINITIONS

1006.03 CONTRACTOR RESPONSIBILITY AND OBLIGATIONS

1006.04 OUTCOME TARGETS

1006.01 SCOPE

This Maintenance Requirement identifies the responsibilities and the obligations for Incident Response within the contract area.

1006.02 DEFINITIONS

The following definitions are specific to this Performance Requirement.

Debris Control means the physical removal from the travelled lanes and shoulders and the subsequent disposal of objectionable items such as damaged ministry inventory, roadside garbage (e.g. batteries, tires, containers, etc.), dead animals, unlawful signs, fallen trees, loose brush and rocks on the driving surface and shoulders.

Incident or Incidents means, but is not limited to events such as traffic accidents, emergency situations, spills (Hazardous and non-Hazardous), flooding, water ponding, highway deficiencies, Debris Control, tree removal, etc

Incident Site means the location within the contract area where an Incident has occurred and response is required.

Priority Basis means completing the work in order of importance with respect to the public's safety.

Safe Passage of Vehicle Traffic means that the road structure is free of Hazards.

1006.03 CONTRACTOR RESPONSIBILITY AND OBLIGATIONS

1006.03.01 General

The Contractor is to respond to Incidents and provide assistance to the police and other regulatory agencies in protecting the safety of motorists and highway users. This includes response on short notice for Incidents.

When the contactor is Made Aware of an Incident on a Highway, the Contractor shall be responsible for proceeding to the Incident Site to secure the site and/or provide assistance as required. The Contractor shall take all action required to keep the travelling public, adjacent landowner and staff safe. This could include, but is not limited to, providing any or all of the following:

The main objectives at the site of the Incident are:

1. To provide traffic control in accordance with the OTM Book 7 and Ministry of Labour orders and assist in restoring traffic movement as quickly as possible.

2. To protect the safety of motorists, highway users, adjacent landowners and staff at Incident scenes.

3. To provide for the containment of any spillage on the highway in conjunction and co-operation with regulatory agencies, the police and appropriate municipal and provincial authorities. The Contractor shall Notify the Ministry of Environment (MOE) and the affected Municipality in case of a spill.

4. To provide measures to secure, protect, or isolate damaged Ministry infrastructure as requested or required and to restore the roadway to a safe condition.

   Temporary repairs to highway infrastructure from accidents, natural disasters and acts of vandalism including but not restricted to the following:

   - guiderail protection
   - drainage protection
   - protection of damaged electrical facilities
   - damaged signs that require repair to facilitate the safe movement of traffic

5. Provide Debris Control from the highway driving lanes and shoulders. The Contractor is responsible for managing and disposing of the removed debris in accordance with all statutes and regulations governing such activities.

1006.03.02 Restoring the Site for Safe Passage of the Public

The Contractor shall be responsible for making permanent or temporary repairs as required to restore traffic to all lanes ensuring that all components within the Highway will accommodate the Safe Passage of Vehicle Traffic.

1006.03.03 Response Time

Response time to all Incidents shall be (1) one hour or less. This means a maximum of (1) one hours from the time the Contractor is Made Aware of the Incident until an appropriate complement of human resources, material, and equipment are on site. .

The Contractor shall be available twenty-four (24) hours a day, seven (7) days a week and shall respond with sufficient equipment to provide lane closures and services as required.

1006.03.04 Communications

The Contractor shall notify MTO Central Dispatch when they arrive at each Incident site.

1006.04 OUTCOME TARGETS

The Contractor shall ensure that the work performed under this Performance Requirement, meets or exceeds the Outcome Targets specified in this Performance Requirement.

Feature	Outcome Target
Incident Response	
Response Time	• Response to all Incidents in one hours or less
Communications	
Notice to MTO Central Dispatch upon arrival at all Incidents	• Notification of MTO Central Dispatch immediately upon arrival at the Incident Site and relay any operations or information that may impact Emergency Services response times 100% of the time.

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2001.02 DEFINITIONS

2001.03 CONTRACTOR RESPONSIBILITIES AND OBLIGATIONS

2001.04 OUTCOME TARGETS

2001.01 SCOPE

This performance requirement covers the responsibilities and obligations of the Contractor for the maintenance of roadway surfaces and shoulders to ensure the safety of the travelling public and efficient use of public assets and resources.

2001.02 DEFINITIONS

The following definitions are specific to this Performance Requirement.

Asphalt Pavement means a road surface made of a mixture of heated asphalt cement, and aggregate, commonly referred to as “hot mix”.

Broken Up Areas means sections of the surface treated roadway that are severely cracked or have lost the surface treated component exposing gravel surfaces.

Curb and Gutter means a border and channel typically made of concrete at the edge of a street or road for carrying off surface water.

Deterioration means a physical breakdown of the pavement and/or pavement foundation.

Distortion means deviations of the pavement surface from its original profile. These Defects usually take the shape of a bump or depression and are noticeable in a moving vehicle.

Ditches means a ditch is an open drainage facility constructed to carry water to an outlet.

Fully Paved Shoulders means an area is hard surfaced, usually with asphalt, adjacent to the through or auxiliary lane

Joint Failure means an excessive breakdown of the concrete adjacent to the joint, which may include upward buckling of the concrete slab.

Partially Paved Shoulder means a minimum width of 0.5metres closest to the adjacent through or auxiliary lane is hard surfaced, usually with asphalt and the remaining shoulder surface is gravel.

Pothole means dents or holes in the roadway surface

Preventable Condition means a detected or observed condition which the Contractor should reasonably have expected or was Made Aware

Rippling and Shoving means a regular wavy or "washboard" effect running across the pavement, or an unevenness of the pavement due to movement of the surface mat.

Scaling/Ravelling means a progressive deterioration of the concrete pavement surface and the loss of pavement material or fine aggregates from the pavement.

Sub-Grade means compacted layers of granular placed to form the pavement foundation

Water Ponding means the collection of water on the travelled portion of the Highway.

Wheel Track Rutting means dishing of the pavement surface developed in the wheel tracks.

2001.03 CONTRACTOR RESPONSIBILITY AND OBLIGATIONS

2001.03.01 General

The Contractor is solely responsible for the inspection and maintenance of the roadway surfaces and shoulders including, but not limited to, the features identified in this Maintenance Requirements.

2001.04 OUTCOME TARGETS

The Contractor shall ensure that the work performed under this Maintenance Requirement, meets or exceeds the Outcome Targets specified in this Maintenance Requirement.

Feature	Outcome Target
Pavement Surfaces	
Debris	• Accumulation of Gravel on paved driving surfaces and intersection aprons is removed upon Detection or being Made Aware • Accumulation of winter sand from paved driving surfaces, fully paved shoulders including medians, intersection aprons, curb & gutter, paved traffic islands, commuter parking lots and commercial vehicle inspection stations shall be removed by May 31st of every year

Feature	Outcome Target
Potholes	There is no: • No single Pothole that is deeper than 7.5 cm and greater than 0.04 m² • No more than three (3) Potholes greater than 0.04 m² within an area of 20 m² on Asphalt Pavement or Concrete Pavement • No single Pothole that is deeper than 4.0 cm and greater than 0.04 m^2 on Surface Treatment • No more than five (5) Potholes greater than 0.04 m^2 within an area of 20 m^2 on Surface Treatment • No more than 10 Potholes greater than 0.04 m² per lane km
Broken Up Areas	• There is no Broken Up Area larger than 5 m^2
Joint Failure	• All concrete joint failures exceeding a differential of 5 cm are signed
Distortion	• All bumps or depressions with a differential of 5 cm or more over a 3-metre length are signed
Pavement Edge Surface Loss	• There is no pavement edge surface loss which extends more than 15 cm inward from the edge of pavement
Shoulders	
Washouts	• There is no washout of 15.0 cm or deeper and measuring an area greater than 1.0 m² • there is no washout of 15.0 cm or deeper and measuring an area greater than 0.5 m² within 1.0 m of the travelled portion of the roadway
Debris	• Debris greater than 0.010 m^3 is removed Immediately upon Detection or being Made Aware • There is a maximum of 5 pieces of debris measuring more than 0.001m^3 and less than 0.010m^3 over a distance of 1 km
Drainage	• There is no preventable condition that impedes the shoulder drainage to function as designed
Drop Off	• There is no Drop-off exceeding 7.5 cm in depth.
Ruts	• There are no ruts deeper than 10.0 cm
General	
Dead Animals	• Dead animals are removed and disposed of as Detected

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2003.04 CONTRACTOR RESPONSIBILITIES AND OBLIGATIONS

2003.05 OUTCOME TARGETS

2003.01 SCOPE

This performance requirement covers the responsibilities and obligations for the retracing and reinstatement of pavement markings including but not limited to, centre line markings, lane line markings, edge line markings and pavement marking symbols.

2003.02 REFERENCES

This work requires the mandatory use of the following documents:

Ontario Traffic Manual

OTM Book 11, Pavement, Hazard and Delineation Markings.

Canadian General Standards Board:

CGSB-1-GP-12C-1983 - Standard Paint Colours

American Society for Testing and Materials:

ASTM D 2205-85	-	Traffic Paints
ASTM D 2244-85	-	Calculation of Colour Differences from Instrumentally Measured Colour Coordinates
ASTM D 3960-87	-	Determining Volatile Organic Content (VOC) of Paints and Related Coatings
ASTM D 6359-99	-	Minimum Retroreflectance of Newly Applied Pavement Marking Using Portable Hand-Operated Instruments
ASTM E 1347	-	Colour and Colour Difference Measurement by Tristimulus
ASTM E 1710	-	Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer.

United States Federal Standard:

U.S. FED-STD-595B - Colours Used in Government
Dec. 15, 1989 Procurement

International Commission on Illumination:

CIE 1976 - L^*, a^*, b^* Uniform Colour Space and Colour Difference Equation.

2003.03 DEFINITIONS

The following definitions are specific to this Performance Requirement.

Chromaticity – means the colour of the line by reference to Commission Internationale de l'Eclairage (CIE) chromaticity diagram to define the area within which the colour must fall, as measured in accordance with ASTM E-1347.

Durability – means the percentage of marking remaining on the roadway, as assessed in accordance with the MTO Durability Classification Guidelines.

Information Management – means the management of submissions, meetings and notices as specified in this performance requirement.

Luminance – means the luminous flux in a light ray, emanating from a surface or falling on a surface, in a given direction, per unit of projected area of the surface viewed from that direction, per unit of solid angle (reflective light), as measured in accordance with ASTM E-1347.

mcd/m^{2}lx – means a unit of measurement for retroreflectivity (milicandelas per square metre per lux).

Pavement Marking Material – means a material formulated for application onto bituminous or concrete pavement in order to delineate vehicle operating limits.

Pavement Markings – means directional dividing lines, lane lines, edge lines, transitional and continuity lines, interchange ramps and channelization lines, barrier lines, intersection markings, reserved facility markings, parking markings and including words, letters and symbols on pavements, used to delineate vehicle operating limits on highways conforming to the size and shape, as specified in OTM Book 11.

Pavement Marking Symbols – means words, letters and symbols on pavements, used to delineate vehicle operating limits on highways conforming to the size and shape, as specified in OTM Book 11.

Reinstatement of Pavement Markings – means the application of same type of pavement markings and in the same location as the previous existing markings on a resurfaced section of highway, including centre lines, edge of pavement lines, lane and turn lane lines and Pavement Marking Symbols, including stop bars, crosswalks, school crossings, railway crossings and arrows.

Retracing of Pavement Markings – means the routine recoating of existing markings, including centre lines, edge of pavement lines, lane and turn lane lines and Pavement Marking Symbols, including stop bars, crosswalks, school crossings, railway crossings, OPP Aircraft Markers and arrows on existing pavement.

Retroreflectivity means the property of a material or device in which, when directionally irradiated, the reflected rays are preferentially returned in direction close to the opposite of the direction of the incident rays, this property being maintained over wide variations in the direction of the incident rays.

Traffic Paint means refers to a water-borne or organic solvent based paint specifically formulated for use as a pavement marking to delineate vehicle operating limits on concrete and bituminous pavements.

2003.04 CONTRACTOR RESPONSIBILITIES AND OBLIGATIONS

2003.04.01 General

The Contractor is responsible to meet all performance requirements for Pavement Markings and Pavement Marking Symbols in this schedule.

The Contractor shall be responsible for ensuring that all retraced pavement markings are compatible with existing pavement markings.

2003.04.02 Retroreflectivity Requirements

The Contractor shall be responsible for ensuring that the retroreflectivity of the Pavement Markings and Pavement Marking Symbols meet the minimum requirements identified in Table 1-Minimum Reflectivity Requirements (mcd/m^{2}lx). Minimum reflectivity requirements will be measured on any 1 km length of Pavement Markings and on any one Pavement Marking Symbol. No 100 metre segment shall be less than 100 mcd/m^{2}lx for white Pavement Markings, and 75 mcd/m^{2}lx for yellow Pavement Markings.

Table 1- Minimum Reflectivity Requirements (mcd/m^{2}lx)

Marking	Type	= or >90 km/hr	80 km/hr (2 lane Roadways with Centreline only)	80 km/hr	80 km/hr (Full width Surface Treated Roadways)
White	Edge	175	-	150	-
	Skips	175	-	150	-
	Symbols	100	100	100	100
Yellow	Centreline	150	150	125	100
	Edge	125	-	100	-

2003.04.03 Durability Requirements

The Contractor shall be responsible for ensuring that the durability of the Pavement Markings and Pavement Marking Symbols meet the minimum requirements identified in section 2003.06 Outcome Targets.

2003.04.04 Visibility Requirements

The Contractor shall be responsible for ensuring that the visibility of the Pavement Markings and Pavement Marking Symbols meet the minimum requirements identified in Visibility Table 2003-1.

Based on the posted speed limit in kilometres per hour (vehicle speed) a minimum preview distance of 3.65 seconds is required. Based on this time, the following minimum preview distance in meters (m), listed in the pavement marking visibility **Table 2003-1** shall be required:

Visibility Table 2003-1

Vehicle Speed (km/hr)	Preview Distance (m)
60	61
70	71
80	81
90	91
100	101

Note:

- No visual assessments shall be undertaken during any type of inclement weather.
- No visual assessments shall be undertaken after applications of sand salt or de-icing materials have been applied to the roadway until a duration period of 72 hours (3days) have elapsed after the last application of these materials.

2003.04.05 Colour Testing Requirements

The Contractor shall be responsible for ensuring that the Chromacity meets the requirements identified in section 2003.11 of this Performance Requirement at all times.

The colour shall be measured with a portable Minolta Colorimeter or equivalent in accordance with ASTM E1347. The instrument shall be set to read x, y, and Y coordinates with 45 degree/0 degree bidirectional geometry, observer angle of 2 degree and Illuminant C.

2003.04.06 Daytime Luminance Factor

The Contractor shall be responsible for ensuring that the Daytime Luminance Factor meets the minimum requirements in section 2003.05 Outcome Targets.

The luminance (daytime reflectance) shall be measured with a portable Minolta Colorimeter or equivalent in accordance with ASTM E1347. The instrument shall be set to read x, y, and Y

coordinates with 45 degree/0 degree bidirectional geometry, observer angle of 2 degree and Illuminant C.

2003.04.07 Submission Requirements

2003.04.07.01 Material Safety Data Sheets

The Contractor shall identify the selected pavement marking material(s) and provide Material Safety Data Sheets (MSDS) and Product Data Sheets to the City in advance of application.

2003.04.07.02 Annual Pavement Marking Application Report

The Contractor shall maintain a Pavement Marking Daily Work Log and/or Durable Marking Daily Work Log and submit it to the City bi-weekly.

2003.05 OUTCOME TARGETS

The Contractor shall ensure that the work performed under this Maintenance Requirement, meets or exceeds the Outcome Targets specified in this Maintenance Requirement.

Feature	Outcome Target
Retroreflectivity	• No Pavement Markings less than reflectivity readings identified in Table 1- Minimum Reflectivity Requirements (mcd/m^{2}lx) averaged over any 1 km segment at any time • No 100 metre segment shall be less than 100 mcd/m^{2}lx for white markings, and 75 mcd/m^{2}lx for yellow (excluding full width surface treated roadways) • No Pavement Marking Symbol less than reflectivity readings identified in Table 1- Minimum Reflectivity Requirements (mcd/m^{2}lx) averaged on any one Symbol at any time
Durability	• No more than 25% material loss on any 100 m segment of Pavement Markings at any time • No more than 25% material loss on any Pavement Marking Symbol at any time
Visibility	• Visibility readings meeting the requirements of Table 2003-1 on all Pavement Markings and Pavement Marking Symbols on all highways at all times.
Colour	• Chromacity meets the requirements of the Chromaticity Coordinates in section 2003.11 of this Performance Requirement at all times
Daytime Luminance Factor	• Daytime Luminance Factor meets a minimum of 45% for white and 25% for yellow as measured by ASTM E-1347 at all times

Feature	Outcome Target
Submission and Documentation	• The required documents specified in Section 2003.04.08 are Accurate, Timely and Complete 100% of the time
Appearance	• All lines straight and true at all times • Severe tracking and splatter corrected within 5 days after Detection or being Made Aware. • OTM Book 11 complied with 100% of the time

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MAINTENANCE REQUIREMENT 4001 – ROADSIDE FEATURES

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4001.02 REFERENCES

4001.03 DEFINITIONS

4001.04 CONTRACTOR RESPONSIBILITIES AND OBLIGATIONS

4001.05 CONTRACT SPECIFIC REQUIREMENTS

4001.06 OUTCOME TARGETS

4001.01 SCOPE

This Maintenance Requirement covers the obligations and responsibilities of the Contractor for the maintenance of Roadside Features including, but not limited to: Cable Guide Rail; Steel Beam Guide Rail; Box Beam Guide Rail; Concrete Barrier (Temporary and Permanent); Energy Absorbing Systems; Anti-Glare Screen; Box Culverts(of less than 3 metres) & Pipe Culverts; Curb and Gutter; Drainage; Ditches; Catch basins and Ditch Inlets; Maintenance Access Points; Fences; Highway Signs; Sound Barriers; Snow Protection Barriers; Roadside Vegetation Management; Sewers; Sidewalks.

4001.02 REFERENCES

This contract requirement includes the mandatory use of the following documents for the performance of the work:

- Ontario Traffic Manual
- Concrete Barrier Repair and Rehabilitation Maintenance Manual (Draft)
- King's Highway Guide Signing Policy Manual
- Sign Support Inspection Guidelines
- Sign Support Manual
- Traffic Counting Station Layout MTOD's

4001.03 DEFINITIONS

The following definitions are specific to this Performance Requirement.

Accurate means the information provided is a true representation of an actual situation, accomplishment or occurrence.

Barrier Systems means the physical barriers set along the road, including cable guide rail, steel beam guide rail, concrete barrier temporary and permanent, safety items such as energy-attenuating systems and crash cushions, box beam, anti glare screen, which are intended to provide additional protection to motorists when vehicles leave the roadway, protecting vehicle occupants from a more severe hazard, thereby reducing the degree of injury and damage.

Catch Basin means a drainage structure that collects storm water surface runoff and transports it into a culvert or storm sewer system. They may be located in a paved area or an unpaved drainage ditch.

Concrete Barrier, Temporary and Permanent means pre-cast and cast-in-place concrete barrier walls in the median and edge of pavement; commonly installed in highway medians to separate traffic.

Complete means that all required and relevant information has been provided.

Culvert means a drainage structure designed to allow the passage of surface water, livestock or pedestrians under a roadway, railway or roadside entrance. For the purposes of these Performance Requirements, culverts are less than 3 metre span and may be a Concrete Culvert, Corrugated Steel Culvert (CSP), Timber Culvert or Plastic Culvert.

Curb and Gutter means a border and channel typically made of concrete at the edge of a street or road for the transportation of surface water.

Defects means any damage, such as debris, holes, vandalism, fallen trees or other condition that may pose a threat to wildlife or would prevent the proper function of any ministry owned Farm, Ungulate and Reptile Fence or Ungulate Fence Escape.

Drainage Features means the features that function to control or convey storm-water runoff. Drainage features may include, but are not limited to the following: curb and gutter, culverts with spans less than 3m, ditches and ditch inlets, drainage channels, swales, catch basins and manholes and sewers.

Energy Absorbing System means Energy Absorbing Systems (EAS's) are either: cylinders filled with energy absorbing materials, or; mechanical devices with or without energy absorbing cartridges. EAS's are installed at designated locations to improve motorist safety and protect Ministry property. The principle behind EAS's is to prevent vehicles from coming into contact with fixed obstacles/structures or being redirected into traffic by safely stopping them in a relatively short distance. Energy Absorbing Terminals are generally attached to concrete barrier, steel beam guide rail, or other fixed objects

Information Sign means are essential for directing motorists; identifying intersecting routes; identifying geographical locations and distances; and directing motorists to towns, cities, and other important destinations.

Maintenance Access Point means a maintenance access point is a structure having an opening to provide access to underground services, in this case, storm water flow.

Overhead Sign Support Structure means a permanent structure with a foundation, used to support an over-head sign over a roadway.

Qualified Person means a person with knowledge of sign support maintenance practices and the ability to identify sign support defects gained through a minimum of (3) three years experience relating to inspection of Highway sign supports.

Regulatory Sign means a sign that informs highway users of traffic laws or regulations and indicates the legal requirements that would otherwise not be apparent. Examples are Stop, Speed Limit.

Roadside means the area between the outside edge of the shoulder rounding and the right-of-way limits and features within the Roadway that do not form an integral part of the driving surface, such as drainage features and guiderails.

Roadside Assets means includes, but are not limited to: ditches, curb and gutter, culverts with a span less than 3m, manholes, catch basins and ditch inlets, sewers, check dams, water management ponds, cable guide rail, steel beam guide rail, concrete barrier temporary and permanent, safety items, noise barrier, box beam, anti glare screen, security fences, farm fences, regulatory, warning and information signs, sidewalks, trails, vegetation, slopes and rock faces.

Roadway means the driving surfaces of the highway, including the travelled lanes, shoulders and shoulder rounding.

Roadway Assets means assets that form an integral part of the driving surface, i.e. pavement, pavement markings, pavement markers, gravel driving surfaces, gravel shoulders, shoulder rounding, partially paved shoulders and fully paved shoulders.

Safety Items means devices that operate as impact attenuators which bring vehicles to a safe stop, or by redirecting, preventing errant vehicles from impacting fixed object hazards by gradually decelerating the vehicle away from the hazard. Safety items may include, but not limited to the following: eccentric loaders, crash cushions, extruders, energy attenuators, energy absorbing systems, and Connecticut Impact Attenuation Systems.

Standard means mandatory requirement of the Contract

Timely means that all required information is provided within the prescribed or Reasonable time frame

Tree Trimming means tree branches or shrubs that obscure Regulatory Signs or impede traffic.

Warning Sign means a sign that indicates conditions on or adjacent to a highway or street are actually or potentially hazardous to traffic operations. e.g. Curve Sign

4001.04 CONTRACTOR RESPONSIBILITIES AND OBLIGATIONS

4001.04.01 General

The Contractor is responsible for the inspection and maintenance of the roadside features including, but not limited to the features identified in this Performance Requirement.

4001.04.02 Signs

Should the Contractor identify a condition or situation that would warrant a sign that is not currently prescribed in the OTM, the Contractor shall have the proposed sign design and sign installation approved by the Ministry prior to the installation.

All approved Temporary Condition and Specialty signs shall comply with the requirements of the Ontario Traffic Manual (OTM). The Contractor shall be required to supply and install all other Temporary Condition and Specialty Signs that are not supplied by the Ministry.

The Contractor shall be responsible for the installation of snowplow markers, delineator markers, median markers, Barrier System markers, hazard markers and reflectorized guide rail strips. These signs/markers will also be supplied by the Ministry and ordered through the Contract Administrator.

When replacement is required due to damage, deterioration and/or missing sign supports, the Contractor shall replace all non-standard signs supports with supports meeting current standards.

For repairs to ground-mounted extruded aluminium signs with steel columns, or timbers the Contractor will supply all materials for the sign support structure except the sign. This also includes an annual inspection completed by August 1st of every year.

4001.04.03 Inspection and Reporting Requirements

<u>Engineer-Designed Sign Structures</u>
The Contractor will be responsible to inspect annually all Engineer-Designed Structures such as overhead steel column/truss, cantilever and bridge mounted sign supports. The annual inspection shall be completed by a professional engineer and document any deficiencies requiring attention. The inspection shall be completed by August 1st of every year. The inspection report shall include recommendations and shall be provided to the City. The Ministry will provide the standard inspection template forms, upon request.

4001.05 CONTRACT SPECIFIC REQUIREMENTS

4001.05.01 Designated Areas for Enhanced Grass Mowing and Litter pick-up on Hwy 417 Ottawa Queensway

The Contractor will be responsible to maintain all grassy areas visible to traveling public, including ramps and interchanges at not more than 15 centimeters for the Ottawa Queensway from the Nicholas Avenue interchange (inclusive) to the Hwy 417/174 split (inclusive) For the period between April 15th – November 15th of each year, the

Contractor will be responsible to remove all litter from the same grassy areas. All litter shall be removed upon Detection or being Made Aware.

Note: The National Capital Commission is responsible for mowing roadside vegetation and removal of litter from the grassy areas along Hwy 417 from the Hwy 417/Ottawa Rd 174 easterly to the Ramsayville Rd / Russell Rd overpass.

4001.05.02 City of Ottawa Graffiti

The Contractor shall abide by the City of Ottawa Graffiti By-Law requirements at all times.

4001.05.03 Snow Protection Barrier

The Contractor shall inspect all snow protection barriers and report any damages to the Contract Administrator. Damage caused by the Contractors operations will be repaired as part of the lump sum work.

4001.06 OUTCOME TARGETS

The Contractor shall ensure that the work performed under this Performance Requirement, meets or exceeds the Outcome Targets specified in this Performance Requirement.

Feature	Outcome Target
Barriers and Energy Absorbing Systems	
Steel Beam Guide Rail	• No more than two consecutive posts that are missing, broken, excessively split or cracked or generally unsound. • No more than 10% of the posts in the system (terminal to terminal) missing, broken, excessively split or cracked or generally unsound. • No dented, bent, twisted or rusted rails or channels that are affecting the integrity and effectiveness of the system • Any broken post repaired within 30 days upon Detection or being Made Aware • When ground is not frozen all damaged Attenuation Systems which compromise the integrity and effectiveness of the system are repaired or replaced within 7 days upon Detection or being Made Aware • All damaged Attenuation Systems which compromise the integrity and effectiveness of the system are temporarily repaired within 24 hours upon Detection or being Made Aware.

Feature	Outcome Target
Temporary Concrete Barriers	• Any two adjacent sections of temporary/modular barriers are not misaligned by more than 7.5 cm or longitudinally separated by greater than 2.5cm. • All temporary repairs are removed and are permanently repaired between April 1 and October 1 of each year • Any "break out" area is secured within 24 hours of occurrence.
Concrete Barriers	• All temporary repairs are removed and are permanently repaired between April 1 and October 1 of each year • Any "break out" area is secured within 24 hours of occurrence.
Energy Absorbing Systems	• All damaged Energy Absorbing Systems which compromise the integrity and effectiveness of the system are repaired or replaced within 7 days upon Detection or being Made Aware • All Energy Absorbing Systems which have shifted or moved out of original position are realigned within 7 days upon Detection or being Made Aware • All systems that contain moving parts are cleaned by June 1st every year
Anti Glare Screens	• All damaged or missing anti-glare screens are repaired or replaced within 14 days upon Detection or being Made Aware.
Snow Protection Barriers	• All damaged snow protection barriers are to be reported to the CA within 7 days upon Detection or being Made Aware.
Signs	
Regulatory Signs	• Missing, damaged, illegible, obscured, twisted or deflected Regulatory signs replaced/repaired Immediately upon Detection or being Made Aware.
Warning Signs	• Missing, damaged, illegible, obscured, reduced reflectivity, faded, twisted or deflected warning signs are Addressed within 7 days upon Detection or being Made Aware • Missing, damaged, illegible, obscured, reduced reflectivity, faded, twisted or deflected delineators are Addressed within 30 days upon Detection or being Made Aware
Information Signs	• Missing, damaged, illegible, obscured, reduced reflectivity, faded, twisted or deflected information signs are Addressed within 30 days upon Detection or being Made Aware
Sign Hardware	• No missing/broken/loose/cracked/bent fasteners and brackets
Sign Posts	• No more than 3 twisted, cracked, out of plumb, bent, unsound posts or posts not solid in the ground within a 5 linear kilometer area of the Highway.

Feature	Outcome Target
Sign Supports	• All debris against the structure is removed upon Detection or being Made Aware • Annual inspection reports completed for all structures and submitted to the ministry by August 1st of every year.
Unauthorized Signs	• All unauthorized signs removed as Detected.
Curb and Gutter	
Obstructions	• All obstructions impeding proper drainage are removed.
Gaps/Separation	• Gaps between curb and gutter and pavement surface not to exceed 5 cm
Erosion	• Erosion damage to the shoulder and embankment behind the curb where water may flow over the curb is repaired as Detected
Drainage Systems	
Catch Basins and Maintenance Access Points	• All missing catch basins and maintenance access – frames or grates are replaced Immediately • All damaged catch basins and maintenance access – frames or grates are repaired or replaced within 7 days upon Detection or being Made Aware • Sumps not filled to capacity
Erosion Damage	• All erosion damage is repaired and all obstructions to proper functioning of the drainage system are removed by October 1 of every year.
Sub Drains	• All obstructions impeding water flow are removed within 30 days of Detection or being Made Aware. • No crushed or buried pipe ends • No missing and damaged rodent/wildlife screens
Culverts	
Debris	• All debris causing blockage in culverts is removed Immediately. • All debris restricting water flow through culverts is removed when Detected
Washout/Erosion	• Washouts of culvert backfill and erosion damage under or around the culverts are repaired within 30 days upon Detection or being Made Aware
Components	• No damaged or missing bars, screens or grids installed for the prevention of entry by animals or unauthorized personnel
Ditches	
Erosion/Slope Protection	• Eroded or damaged ditch slopes, linings, back slopes and slope protection are repaired within 60 days of Detection or being Made Aware
Inlets/Outlets	• Erosion of ditch inlets/outlets is repaired within 60 days of Detection or being Made Aware • Obstructions that may reduce flow capacity are removed upon Detection or being Made Aware

Feature	Outcome Target
Obstructions	• All non-planned obstructions that stop, reroute, or reduce the free flow of water; or may cause flooding are addressed immediately
Vegetation Control	
Grass Mowing	• All grassy areas visible to traveling public, including ramps and interchanges at not more than 15 centimeters for the Ottawa Queensway from the Nicholas Avenue interchange (inclusive) to the Hwy 417/174 split (inclusive) For the period between April 15th – November 15th of each year, the Contractor will be responsible to remove all litter from the same grassy areas. All litter shall be removed upon Detection or being Made Aware.
Ground Cover	• Removed or destroyed ground cover causing a negative environmental impact or impacting the infrastructure restored within 30 days upon Detection or being Made Aware
Concrete/Asphalt Joints	• Vegetation between curb and asphalt joints in curb and gutter and between asphalt shoulders and a concrete barrier is eradicated during the months of July and August every year.
Fences and Other Barriers	
Fences	• Damaged or missing security or farm fence allowing access to the highway is repaired (temporarily if necessary) Immediately.
Security Fence	• No damaged or missing security fence not permanently repaired
General	
Graffiti	• All graffiti visible by the public is removed by soda blasting within 28 days upon Detection or being Made Aware • All offensive graffiti is removed Immediately upon Detection or being Made Aware. • Meets the City of Ottawa Graffiti By-Law 100% of the time
Litter Control	• All litter within the Roadside measuring more than 0.015m3 removed upon Detection or being Made Aware. • All litter in Designated Areas as per section 4001.05 to be removed upon Detection or being Made Aware.

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5001.01 SCOPE

This Maintenance Requirement covers the responsibilities and obligations for Electrical Maintenance Operations and Services for Highway Lighting, and High Mast Lighting and other electrical systems as specified in this Performance Requirement.

5001.02 DEFINITIONS

The following definitions are specific to this Performance Requirement.

Accurate means the information provided is a true representation of an actual situation, accomplishment or occurrence

Complete means that all required and relevant information has been provided

Critical Failure means any failure related to the System Components, which causes the improper operation of, or the failure System Components such that they are operating under substantial Degraded Performance; or the failure of any System Component that adversely affects the Electrical System or impacts on the public safety.

Degraded Performance means the operation of any Electrical System or subsystem with less than 100% performance of the operational System Components.

Distribution Assembly means low voltage equipment within an enclosure with switching and control devices used to provide a source of power for electrical systems.

Electrical System means the system encompassed by all Contract items for Electrical Work in the Contract.

Electrical Work means any work associated with the installation, modification or removal of electrical equipment including work required for all auxiliary concrete, mechanical, metallic or associated non-electrical components or equipment.

Electrician Apprentice means a person registered in the Electrician apprenticeship training program administered by the Ministry of Training, Colleges and Universities.

Electrician means a person in possession of a certificate of qualification for the trade of Electrician, Construction and Maintenance issued by the Ministry of Training, Colleges and Universities.

High Voltage Specialist means a person who is a competent worker (as defined by the OHSA), knowledgeable and experienced in the special work to be performed and has successfully completed approved courses as related to the testing of high voltage equipment/transformers by either E.U.S.A or the manufacturer's of the specific testing equipment used.

Highway Lighting System means a system of luminaries, poles, sign luminaires, underpass illumination, navigation lighting, cables, power supply equipment, control system and all associated materials required to provide illumination on a Highway or associated appurtenances.

Luminaire means a complete lighting unit consisting of a lamp or lamps together with the parts designed to distribute the light, to position and protect the lamps and to connect the lamps to the power supply.

Minor Maintenance means inspection and checking of items, elementary testing, and cleaning, lubricating and minor repairs. This may require the use of an aerial device.

Major Maintenance means overhauling, testing and replacement of components, which may require a scheduled power outage, and includes work done under Minor Maintenance.

Non-Routine Maintenance means activity required to repair unexpected failure of equipment components. It requires Immediate action and takes precedence over routine maintenance activities for the duration of the required action.

Permanent Repair means the component is fully functioning to its original intention and service life.

Response means a maximum of two hours from the time the Contractor is Made Aware of the situation until the appropriate qualified staff and an appropriate amount of material and equipment are on site.

Routine Maintenance means preventative maintenance carried out on equipment at specified intervals and includes, but is not limited to checking, testing, cleaning, tightening, lubricating, etc. of equipment as well as minor repairs (generally with hand tools and with materials at hand). The purpose of Routine Maintenance is to ensure that problems are solved before failures occur. Minor Maintenance problems that cannot be corrected "on the spot" shall be logged and scheduled for further follow-up. Routine Maintenance includes Minor and Major Maintenance.

System Components means all hardware and software components, devices, parts and materials included in the Electrical System.

Temporary Repairs means Work that is done to serve a specific temporary function and removed upon completion of the temporary usage required for this contract and shall comply with Ontario Regulation 626 of the Ontario Highway Traffic Act

Timely means that all required information is provided within the prescribed or Reasonable timeframe

Temporary Repair means a short term measure to regain some functionality for the least possible duration until a Permanent Repair can be made.

5001.03 REFERENCES

This contract requirement includes the mandatory use of the following documents for the performance of the work:

- Ontario Electrical Safety Code including all appending bulletins issued by the Electrical Safety Authority of Ontario.
- CSA, Standards pertinent to the Electrical Work.
- Roadside Safety Manual
- Designated Sources Materials (DSM)

5001.04 CONTRACTOR RESPONSIBILITIES AND OBLIGATIONS

The Contractor shall be responsible to provide all electrical maintenance and services. These activities shall be performed in accordance to the requirements of the Contract. The Contractor shall identify, document and take the appropriate action necessary to correct all defects whether by Routine Maintenance or Non-Routine Maintenance.

5001.04.01 The Ontario Electrical Safety Code

The Ontario Electrical Safety Code identifies that all work performed on traffic signals and roadway lighting systems must be inspected by the Electrical Safety Authority (ESA). The Contractor or sub-contractor performing the Electrical Work shall enter into an annual inspection agreement with the ESA by completing the “Contractor Application for the Inspection of Electrical Maintenance Work Performed on Roadway Electrical Systems”. This application and additional information can be found on the Electrical Safety Authority’s website at www.esainspection.net. The costs associated with this agreement and the follow up inspections as requested by ESA will be the responsibility of the Contractor. The Contractor shall be required to keep Copies of all ESA inspection reports on file throughout the duration of the Contract and shall make them available to the Owner.

5001.04.02 Canadian Standards Association (CSA)

When required for the purposes of the Electrical Work all Electrical Components shall meet with CSA requirements. Provincial, Federal and local laws and by-laws pertaining to the Work, as well as by the latest issue of CSA Standards pertinent to the Work shall govern all Work. In the event of conflict of regulations, the strictest regulation shall apply.

5001.04.03 Non-Routine Maintenance

The Contractor shall be available 24 hours a day, 7 days a week for the duration of the Contract. Non-routine Maintenance shall be required whenever there is a Critical Failure of any System Component of the Electrical System or whenever vehicular accidents, weather or other factors caused damage to System Components. Critical failures of Traffic Signals, Flashing Beacons, and Illumination are identified in Table 5001 below.

The Contractor shall respond to Non-Routine Maintenance calls within 2 hours of being Made Aware or upon Detection.

The Contractor shall complete the Traffic Signal Callout Report for all Critical Failures to Traffic Signals and submit to the Contract Administrator within 3 Days after the call.

The Contractor shall notify Central Dispatch upon being Made Aware of Non-Routine Maintenance calls. The Contractor shall notify Central Dispatch upon arriving and leaving the site.

The Contractor shall respond to non-routine calls for communications and power outages to RWIS and PDCS within 24 hours after Detection or being Made Aware of a problem.

The Contractor shall respond to non routine calls for communications and power outages to PVMS within 2 hours after Detection or being Made Aware of a problem

Table 5001 – Critical Failures in Electrical Systems

Reported Problem	Traffic Signals	Illumination	Flashing Beacons
Aerial Span Wire Down	N/A	X	N/A
Pole Knocked Down or Hit	N/A	X	N/A
Power Supply Knocked Down	N/A	X	N/A
Power Supply Failure	N/A	X	N/A
Navigation Light Out	N/A	X	N/A
Overhead equipment unfastened or hanging over roadway	N/A	X	N/A
Emergency Cable Locates	N/A	X	N/A
Faulty Photo Control Circuit	N/A	X	N/A
Unbalance, unlatched or partially unlatched high mast lighting ring	N/A	X	N/A

5001.04.04 Highway Lighting

The Contractor shall perform routine inspections of Highway Lighting Systems to identify defects and perform Minor and Major Maintenance activities required to maintain the system in good repair. All inspections and work performed shall be recorded on the Highway Lighting Inspection Report.

Routine Maintenance activities on all Highway Lighting Systems within the contract shall include:

- Inspecting, checking, elementary testing, cleaning, lubricating and performing minor repairs on all Highway Lighting System Components including luminaires, lighting brackets, wiring, poles, frangible and safety bases, pads and footings, lowering and raising devices, sub-stations, distribution assemblies, cabinets and power supplies within the contract a minimum of once per year.

- Overhauling, testing and replacement of faulty components on all Highway Lighting System Components including luminaires, lighting brackets, wiring, grounding, poles, pole bases, frangible and safety bases, pads and footings, lowering and raising devices, sub-stations, distribution assemblies, cabinets and power supplies within the Contract in Years 2016, 2020 and 2024 of this contract. Luminaires that are replaced shall be replaced with the same type, including the exact same photometric distribution.

- Replace all bulbs on conventional, high mast, underpass and facility lighting on a 4-year cycle in Years 2016, 2020 and 2024 of this contract. Bulbs shall be replaced with the same type, including the exact same photometric distribution.

- Replace all bulbs on navigational lighting on a 2-year cycle in Years 2013, 2015, 2017, 2019, 2021 and 2023 of this contract. Bulbs shall be replaced with the same type, including the exact same photometric distribution.

5001.04.05 High Mast Lighting

Electrical Work on high mast lighting systems shall be performed by Electricians who have a certificate of training from the manufacturer of the high mast lighting raising and lowering equipment. The training certificate shall be dated and signed by officers of the manufacturer and shall indicate the dates on which the training was held. The training certificates shall be less than 5 years old.

The training certificate shall state that the manufacturer certifies that the individual has successfully completed an in-depth training course in the following areas:

- Assembly of the pole sections
- Assembly of the raising and lowering equipment
- Operation of the raising and lowering equipment
- Installation of high mast poles and lighting equipment
- Levelling of the luminaire ring assembly

- Inspection of high mast poles and lighting equipment
- Maintenance and repair techniques for sectional steel high mast lighting equipment
- Safety procedures

The Contractor shall perform routine inspections of High Mast Lighting Systems to identify defects and perform Minor and Major Maintenance activities required to maintain the system in good repair. All inspections and work performed shall be recorded on the High Mast Lighting Inspection Report.

Routine Maintenance activities on all High Mast Lighting Systems within the contract shall include:

- Inspecting, checking, elementary testing, cleaning, lubricating and performing minor repairs on all Non-Latching High Mast Lighting System Components including luminaires, lighting supports, wiring, poles, lowering and raising devices, pads and footings, lowering and raising devices, sub-stations, distribution assemblies, cabinets and power supplies within the contract a minimum of once every 6 months.

- Overhauling, testing and replacement of faulty components on all Non-Latching High Mast Lighting System Components including luminaires, lighting supports, wiring, poles, lowering and raising devices, pads and footings, lowering and raising devices, sub-stations, distribution assemblies, cabinets and power supplies within the contract.

- Inspecting, checking, elementary testing, cleaning, lubricating and performing minor repairs on all Top-Latching High Mast Lighting System Components including luminaires, lighting supports, wiring, poles, lowering and raising devices, pads and footings, lowering and raising devices, sub-stations, distribution assemblies, cabinets and power supplies within the contract a minimum of once every 2 years.

- Overhauling, testing and replacement of faulty components on all Top-Latching High Mast Lighting System Components including luminaires, lighting supports, wiring, poles, lowering and raising devices, pads and footings, lowering and raising devices, sub-stations, distribution assemblies, cabinets and power supplies within the contract. Luminaires that are replaced shall be replaced with the same type, including the exact same photometric distribution.

- Replace all bulbs on high mast lighting on a 4-year cycle of this contract. Bulbs shall be replaced with the same type, including the exact same photometric distribution.

In addition to Routine Maintenance activities, the following shall be required for all high mast lighting systems within the contract:

- The Contractor shall ensure top-latching raising and lowering systems are inspected, operationally tested, and maintained at least once every 2 years.

- The Contractor shall ensure non-latching raising and lowering systems are inspected, operationally tested, and maintained at least once every 6 months.

- The ministry may conduct its own inspections of high mast lighting poles and other lighting poles. The Contractor shall coordinate its routine maintenance work, including traffic control, with the ministry in order to allow the ministry to perform its inspection work concurrent with the Contractor's routine maintenance work. The Contractor shall take all necessary measures to facilitate and accommodate the ministry inspectors' access to the poles when the Contractor is performing routine maintenance work.

5001.04.06 Power Supply

The Contractor shall perform routine inspections of Electrical Systems power supply to identify defects and perform Minor and Major Maintenance activities required to maintain the system in good repair. All inspections and work performed shall be recorded on the Power Supply Inspection Report.

5001.04.07 Electrical Power Supply for other Facilities

The Contractor is advised that some power supplies provide power to both Highway Lighting Systems and Advanced Traffic Management Systems and other electrical facilities. Maintenance on the highway lighting systems shall be performed without de-energizing the other system.

5001.04.08 Cable Locates

A Qualified Person performing cable locate services must have successfully completed the Electrical Utilities Safety Association Cable Locating Course or the manufacturer course for their specific Cable Locating Device. The Contractor shall be responsible for locating cables at Flashing Beacons, Permanent Data Collection Stations (PDCS), Highway Illumination, Traffic Signals and High Mast Lighting within the Contract. The Contractor will complete the non emergency/routine/scheduled cable locates at the earliest possible opportunity and within 5 days.

All requests for cable locates will be through the Contractor. The Contractor will provide a copy of the completed field locate document to the Contract Administrator within 48 hours of the completion of the cable locate. All field updates of the drawings will be the responsibility of the Contractor.

The Contractor will be provided by the Owner with phone number overlays with the Contractor's phone number to replace the existing number on buried cable signs. It is the Contractor's responsibility to install the overlays during the first routine maintenance cycle.

5001.04.09 Information Management Requirements

The Contractor shall complete maintenance documents including, but not limited to Maintenance and Inspection Reports. These detailed records of all maintenance activities shall be kept for the duration of this Contract. If the Contractor proposes not to use the documents as supplied, the Contractor's forms must be submitted to the Owner for Approval before they can be used. All time of day references in all documentation shall be in the 24-Hour clock format. All entries in logbooks shall be signed and dated.

The Contractor shall enter the time the Contractor was Made Aware and the time of arrival of the Contractor on site. In addition the Contractor shall enter the time the repair was completed and the component became fully operational. This Information shall be recorded in a Non-Routine Maintenance logbook. These records shall be made available to the Owner for inspection upon request.

5001.04.10 Routine Maintenance and Inspection Reports

Maintenance and Inspection Reports shall be completed for all activities and shall, at a minimum, contain the following information:

- Date, time and origin of report
- Location of deficiency
- Date and time of arrival at the site
- Weather conditions at the site
- Defects as observed
- Steps taken to rectify the defects
- Inspection reports shall include status of the following functions:
    - operational status
    - status of all protection equipment – mov's, surge protectors, breakers
    - conditions and status of all hardware, poles, luminaries, etc.
- Status of all protection equipment – mov's, surge protectors, breakers, etc.
- Conditions and status of all hardware, poles, luminaries, etc.
- Any additional or follow-up work that may be required and the relative urgency of the follow-up work required and temporary repairs made.
- Note of any police officer's name and badge number and complete a damage report detailing material and repairs required.
- All reports must contain full details of work performed.
- Date and time repairs were completed

If a collision occurs while the Contractor is on site then the Contractor shall record the time, date and description of the collision.

The Contractor shall complete and make available to the Ministry all routine maintenance and inspection reports within 14 days after completion of the work.

5001.05 OUTCOME TARGETS

The Contractor shall ensure that the work performed under this Performance Requirement, meets or exceeds the Outcome Targets specified in this Performance Requirement.

Feature	Outcome Targets
Highway Lighting	• Response to all Critical Failures within 2 hours of Detection or Being Made Aware. • Permanent or Temporary Repairs completed before leaving the site • Permanent repairs completed within 10 days. • For continuous lighting, no more than 30% of the luminaires per any kilometre of highway not functioning, and no more than 2 consecutive luminaires not functioning. • For partial lighting, no more than 30% of the luminaires connected to a power supply not functioning, and any luminaire not functioning for more than 7 days of being Made Aware or upon Detection.
High Mast Lighting	• Response to all Critical Failures within 2 hours of Detection or Being Made Aware. • Permanent or Temporary Repairs completed before leaving the site • Permanent repairs completed within 10 days • No more than 25% of the luminaires per high mast lighting pole not functioning
Cable Locates	• Response to cable locates within 5 days • Field locate document provided to Contract Administrator within 48 hours upon completion of the locate
Maintenance and Inspection reports	• 100% of all required information is Complete, Timely and Accurate
Qualified Person	• A Qualified Person performing any work under this Performance Requirement 100% of the time
Central Dispatch	• Notifying Central Dispatch on all non-routine calls

PART A - MTO GENERAL CONDITIONS

SECTION GC 1.0 - INTERPRETATION

GC 1.01 Captions

.01 The captions appearing in these MTO General Conditions have been inserted as a matter of convenience and for ease of reference only and in no way define, limit, or enlarge the scope or meaning of these General Conditions or any provision hereof.

.02 In the event of a conflict of a reference to the number and caption of a subsection, clause, or paragraph, reference shall be made to the caption.

GC 1.02 Abbreviations

.01 The abbreviations listed on the left below are commonly found in the Contract Documents and represent the organizations and phrases listed on the right:

AASHTO	-	American Association of State Highway Transportation Officials
ANSI	-	American National Standards Institute
ASTM	-	ASTM International - formerly American Society for Testing and Materials
AWG	-	American Wire Gauge
AWWA	-	American Water Works Association
CESA	-	Canadian Engineering Standards Association
CGSB	-	Canadian General Standards Board
CSA	-	CSA Standards - formerly Canadian Standards Association
CWB	-	Canadian Welding Bureau
CVOR	-	Commercial Vehicle Operator's Registration
DSM	-	Designated Sources for Materials
GC	-	MTO General Conditions
MOE	-	Ministry of the Environment (Ontario)
MTO	-	Ontario Ministry of Transportation
MTC	-	Ministry of Transportation and Communications, now MTO
MUTCD	-	Manual of Uniform Traffic Control Devices, published by MTO
OPS	-	Ontario Provincial Standards
OPSS	-	Ontario Provincial Standard Specification
OPSD	-	Ontario Provincial Standard Drawing
OTM	-	Ontario Traffic Manual
PEO	-	Professional Engineers Ontario
SAE	-	Society of Automotive Engineers
SSPC	-	Structural Steel Painting Council
TRA	-	The Road Authority
UL	-	Underwriters Laboratories
ULC	-	Underwriters Laboratories Canada

GC 1.03 [Reserved]

GC 1.04 Ontario Provincial Standards

.01 Regardless of the publishing date on OPSSs and OPSDs contained in the OPS manuals and on a MTO website, the Standards applicable to this Contract are listed in the schedule of Provisions, Plans, Standard Drawings, Specifications and MTO General Conditions.

.02 When an OPSS contains an appendix, the appendix is deleted in its entirety and is not invoked unless specified elsewhere in the Contract Documents. When an appendix is invoked, the information contained in the appendix shall form part of the specification.

GC 1.05 Ontario Traffic Manual

.01 All references in the Contract Documents to the MUTCD, including all Parts and Divisions thereof, or MTO Traffic Control Manual for Roadway Work Operations, or Traffic Control Manual for Roadway Operations Field Edition are hereby deleted and replaced by the following books of the Ontario Traffic Manual:

Book 1 - Introduction to the Ontario Traffic Manual;
Book 1A - Illustrated Sign and Signal Display Index;
Book 1B - Sign Design Principles;
Book 1C - Positive Guidance Toolkit;
Book 5 - Regulatory Signs;
Book 6 - Warning Signs;
Book 7 - Temporary Conditions (and Temporary Conditions Field Edition);
Book 11 - Pavement, Hazard and Delineation Markings;
Book 12 - Traffic Signals.

.02 Any reference in the Contract Documents to OTM shall be deemed to be the Ontario Traffic Manual Books 1, 1A, 1B, 1C, 5, 6, 7, 11, and 12.

.03 Project Co shall comply with the applicable requirements of the above OTM books.

GC 1.06 [Reserved]

GC 1.07 Definitions

For the purpose of this Annex G, the following definitions apply:

Aggregate means gravel, sand, clay, earth, shale, stone, limestone, dolostone, sandstone, marble, granite, or rock other than metallic ores, slag, and clinkers.

Base means a layer of Material of specified type and thickness placed immediately below the Pavement, driving surface, finished grade, curb with gutter, or sidewalk.

Commercial Motor Vehicle means as defined under Section 16 of the *Highway Traffic Act*, R.S.O. 1990, and c.H.8, as amended.

Construction Signs means all traffic control devices and signs, including vehicles, trailers, and the like that are provided to support signs, and equipment to supply sign lighting, but excludes Contract identification signs and Highway number markers, all as may be described in the OTM.

Constructor means, for the purposes of, and within the meaning of the *Occupational Health and Safety Act*, R.S.O. 1980, c. 321 and amendments thereto, Project Co who executes this Contract.

CVOR Abstract means a level 1 Commercial Vehicle Operator's Registration (CVOR) abstract obtained from MTO.

CVOR Certificate means a Commercial Vehicle Operator's Registration certificate issued under the Highway Traffic Act, R.S.O. 1990, c.H.8, as amended.

CVOR Holder means a person or company to whom a CVOR Certificate was issued that has not been cancelled nor currently under suspension.

Daily Work Records means daily records for any part of the Work detailing the work in question, names, and categories of workers and hours worked or on standby; types and quantities of Equipment and number of hours in use and/or on standby; and description and quantities of Material used.

Day means a calendar day.

Earth Grade means the earth surface, whether in cut or fill, as prepared for the Base or Subbase.

Engineer means a professional engineer licensed by the Professional Engineers Ontario to practice in the Province of Ontario.

Environmental Incident means an event such as a spill, discharge, emission, release, or escape of a material, pollutant, contaminant, deleterious substance, or dangerous good as defined in the legislation referenced in paragraph GC 7.13.02.01.

Equipment means all machinery and equipment used for preparing, fabricating, conveying, or erecting the Work and normally referred to as construction machinery and equipment.

Grade means the required elevation of work.

Inspector means any person, partnership, or corporation appointed by the Consultant to participate in the inspection of the Work and the Material to be used in the Work.

Material means material, machinery, equipment, and fixtures forming part of the Work.

Pavement means a wearing course or courses placed on the Roadway and consisting of asphaltic concrete, hydraulic cement concrete, or other bituminous surfaces.

Plan Quantity means that quantity as computed from within the boundary lines of the Work as shown in the Contract Documents.

Profile Grade means the required elevation of the surface of the Base.

Quantity Sheet Form means the form as defined in GC 8.01.01.

Record Drawings mean marked-up Contract Drawings prepared by Project Co that show all differences, design changes, and deviations from the original Contract Drawings.

Records mean any books, payrolls, accounts, or other information that relate to the Work or Claims arising there from.

Regional Contracts Office means the Contracts Office in the MTO Region administering the Contract.

Release from Warranty Certificate means the certificate prepared by the City releasing Project Co from all warranty obligations at the end of the last expiring warranty period.

Roadway means that part of the Highway designed or intended for use by vehicular traffic and includes the shoulders.

Shoulder means that portion of the Roadway between the edge of the travelled lane and the top inside edge of the ditch or fill slope.

Special Provision means special direction within the Contract Documents containing requirements peculiar to the Work.

Standard means, when used alone, the generic term for Standard Specifications and Standard Drawings.

Standard Specification or Standard Drawing means a standard practice required and stipulated by the City for performance of the Work.

Subbase means a layer of material of specified type and thickness between the Subgrade and the Base.

Subgrade means the Earth Grade or Rock Grade.

Substructure means all of that part of a structure, including backwalls, wingwalls, and wing protection railings, below:

a) The bearings of single and continuous span bridges.

b) Skewbacks of arches and tops of footings of rigid frame bridges.

Superstructure means all that part of a structure, excluding backwalls, wingwalls, and wing protection railings, above:

a) The bearing seat of single and continuous span bridges.

b) Skewbacks of arches and tops of footings of rigid frame bridges.

Surety means the person, partnership, or corporation, other than Project Co, executing a bond provided by Project Co.

Utility means a facility maintained by a municipality, public utility authority, or regulated authority and includes sanitary sewer, storm sewer, water, electric, gas, steam, data, telephone, and cable television services.

Working Area means all the land and all the easements owned or acquired by the City for the construction of the Work.

Working Drawings or Working Plans means any drawings or plans prepared by Project Co for the execution of the Work and may, without limiting the generality thereof, include falsework and formwork plans, roadway protection plans, shop drawings, shop plans, or erection diagrams.

GC 1.08 [Reserved]

GC 1.09 Interpretation of Certain Words in Annex G

.01 The words "acceptable," "approval," "authorized," "considered necessary," "directed," "required," "satisfactory," or words of like import shall mean approval of, directed, required, considered necessary, or authorized by and acceptable or satisfactory to the Consultant unless the context clearly indicates otherwise.

.02 The words “Ministry of Transportation,” “ministry,” and the abbreviations “MTO” and “MTC” shall mean the Ontario Ministry of Transportation.

GC 1.10 [Reserved]

SECTION GC 2.0 - CONTRACT DOCUMENTS

GC 2.01 [Reserved]

GC 2.02 [Reserved]

SECTION GC 3.0 - ADMINISTRATION OF THE CONTRACT

GC 3.01 Consultant's Authority

.01 The Consultant shall be the City's representative during construction and until the issuance of the Release from Warranty Certificate. All instructions to Project Co including instructions from the City shall

be issued by the Consultant. The Consultant shall have the authority to act on behalf of the City only to the extent provided in the Contract Documents.

.02 [Reserved].

.03 The Consultant may inspect the Work for its conformity with the Contract Drawings and Standard Specifications and all Drawings, and to record the necessary data to make an assessment of the value of the work completed in the case of a lump sum price Contract.

.04 The Consultant shall approve the amounts owing to Project Co under this Contract.

.05 The Consultant shall, with reasonable promptness, review and take appropriate action upon Project Co's submissions such as Working Drawings, product data, and samples according to the Contract Documents. Unless specified otherwise, the Consultant shall respond to submissions requiring approval according to the Contract as soon as possible but not longer than 5 Business Days excluding any requests for extensions of Contract Time.

.06 The Consultant shall investigate all allegations of a change in the character of the Work made by Project Co and issue appropriate instructions.

.07 The Consultant shall be, in the first instance, the interpreter of the Contract Documents and the judge of the performance there under by both parties to the Contract. Interpretations and decisions of the Consultant shall be consistent with the intent of the Contract Documents.

.08 The Consultant shall have the authority to reject work or Material which does not conform to the Contract Documents.

.09 Defective work, whether the result of poor workmanship, use of defective Material, or damage through carelessness or other act or omission of Project Co and whether incorporated in the Work or not, that has been rejected by the Consultant as failing to conform to the Contract Documents shall be removed promptly from the Work by Project Co and replaced or re-executed promptly according to the Contract Documents at no additional cost to the City.

.10 Any part of the Work destroyed or damaged by such removals, replacements, or re-executions shall promptly be made good at no additional cost to the City.

.11 If, in the opinion of the Consultant, it is not expedient to correct defective work or work not performed according to the Contract Documents, the City may deduct from monies otherwise due to Project Co the difference in value between the work as performed and that specified in the Contract Documents, the amount of which shall be determined in the first instance by the Consultant.

.12 Notwithstanding any inspections made by the Consultant or the issuance of any certificates or the making of any payment by the City, the failure of the Consultant to reject any defective work or Material shall not constitute acceptance of defective work or Material.

.13 The Consultant shall have the authority to temporarily suspend the Work for such reasonable time as may be necessary to facilitate the checking of any portion of Project Co's construction layout or the inspection of any portion of the Work. There shall not be any extra compensation for this suspension of work.

GC 3.02 Working Drawings

.01 Project Co shall arrange for the preparation of clearly identified and dated Working Drawings as specified in the Contract Documents.

.02 Project Co shall submit Working Drawings to the Consultant with reasonable promptness and in orderly sequence so as to not cause delay in the Work. If either Project Co or the Consultant so requests, they shall jointly prepare a schedule fixing the dates for submission and return of Working Drawings. At the time of submission, Project Co shall notify the Consultant in writing of any deviations from the Contract requirements that exist in the Working Drawings.

.03 Project Co shall make any changes in Working Drawings that the Consultant may require consistent with the Contract Documents and resubmit, unless otherwise directed by the Consultant. When resubmitting, Project Co shall notify the Consultant in writing of any revisions other than those requested by the Consultant.

.04 Project Co shall keep one set of the Working Drawings at the site at all times.

GC 3.03 [Reserved]

GC 3.04 [Reserved]

GC 3.05 Working Area

.01 Project Co's sheds, site offices, toilets, other temporary structures, and storage areas for Material and Equipment shall be grouped in a compact manner and maintained in a neat and orderly condition at all times.

.02 Project Co shall confine his construction operations to the Working Area so as not to interfere with public use. Should Project Co require more space than that shown on the Contract Drawings, Project Co shall obtain such space at no additional cost to the City.

.03 Project Co shall not enter upon or occupy any private property for any purpose, unless Project Co has received prior written permission from the property owner.

GC 3.06 [Reserved]

GC 3.07 [Reserved]

GC 3.08 [Reserved]

GC 3.09 [Reserved]

GC 3.10 [Reserved]

GC 3.11 [Reserved]

GC 3.12 [Reserved]

GC 3.13 Use and Occupancy of the Work Prior to Substantial Performance

.01 Where it is not contemplated elsewhere in the Contract Documents, the City may use or occupy the Work or any part thereof prior to Substantial Performance, provided that at least 30 Days written notice has been given to Project Co.

.02 The use or occupancy of the Work or any part thereof by the City prior to Substantial Performance shall not constitute an acceptance of the Work or parts so occupied. In addition, the use or occupancy of the Work shall not relieve Project Co or Project Co's Surety from any liability that has arisen, or may arise, from the performance of the Work according to the Contract Documents. The City shall be responsible for any damage that occurs because of the City's use or occupancy.

GC 3.14 [Reserved]

GC 3.14.01 [Reserved]

GC 3.14.02 [Reserved]

GC 3.14.03 [Reserved]

GC 3.14.04 [Reserved]

GC 3.14.05 Daily Work Records

.01 After Project Co issues a request for information in accordance with Section 11.18(a) of Schedule 40 to the Project Agreement, notifying the Consultant of a Highway Design Issue, Project Co shall immediately:

a) Begin to keep Daily Work Records relating to the request for information as the Work is performed, as set out in subsection GC 8.03.02 Daily Work Records.

b) Limit such Daily Work Records to the work directly impacted by the request for information.

c) Keep separate Daily Work Records for each individual request for information.

.02 The keeping of Daily Work Records by Project Co and any process to review or comment on those records shall not be construed to be the City's acceptance of any claim for additional payment to which the Daily Work Records may relate.

GC 3.14.06 [Reserved]

SECTION GC 4.0 - CITY'S RIGHTS AND RESPONSIBILITIES

GC 4.01 Working Area

.01 The City shall acquire all property rights which are deemed necessary by the City for the construction of the Work, including temporary working easements, and shall indicate the full extent of the Working Area on the Contract Drawings.

GC 4.02 Management of Excess Materials

.01 The City shall identify in the Contract Documents the materials to be moved within or removed from the Working Area, and any characteristics of those materials which shall necessitate special materials management and disposition.

.02 The City shall be responsible for any additional costs of removing, management and disposition of any material not identified in the Contract Documents, or where conditions exist that could not have been reasonably foreseen at the time of tendering.

GC 4.03 Construction Affecting Railway Property

.01 When construction affects railway property, the City shall pay the costs of all flagging and other traffic control measures required and provided by the railway company within the Working Area.

SECTION GC 5.0 - MATERIAL

GC 5.01 Supply of Material

.01 All Material necessary for the proper completion of the Work, except that listed as being supplied by the City, shall be supplied by Project Co.

GC 5.02 Quality of Material

.01 All Material provided by Project Co shall be new, unless otherwise specified in the Contract.

.02 Material shall be supplied from sources identified in the MTO DSM available on TRA website http://www.roadauthority.com that is current at the time of supply of the product. If there are revisions to the DSM, these shall be posted on TRA website on the first Business Day of the months of February, April, June, August, October, and December. Material for which there is no category in the DSM shall be supplied according to the Contract Documents. Material which is not specified shall be of a quality best suited to the purpose required and the use of such Material shall be subject to the approval of the Consultant.

Sources in the DSM have demonstrated their ability to produce material according to specified material specifications. However, the MTO does not warrant that these sources shall produce acceptable or sufficient Material for any contract. Project Co shall make such independent investigation and examination as Project Co deems necessary, to satisfy Project Co as to the quality and quantity of the Material available from these sources, and to ensure that all Material supplied by them satisfies the requirements of the Contract Documents.

.03 As specified in the Contract Documents or as requested by the Consultant, Project Co shall make available for inspection or testing a sample of any Material to be provided by Project Co.

.04 Project Co shall obtain for the Consultant the right to enter upon the premises of the Material manufacturer or supplier to carry out such inspection, sampling, and testing as specified in the Contract Documents or as requested by the Consultant.

.05 Project Co shall complete and submit, on MTO Standard Form PH-A-106, List of Materials from Designated Sources, to the Consultant indicating where Project Co intends to obtain the designated source materials for the Contract. Project Co shall notify the Consultant of the sources of supply of all Material sufficiently in advance of the Material shipping dates to enable the Consultant to perform the required inspection, sampling, and testing.

.06 The City shall not be responsible for any delays to Project Co's operations where Project Co fails to give sufficient advance notice to the Consultant to enable the Consultant to carry out the required inspection, sampling, and testing before the scheduled shipping dates.

.07 Where the Standards require Project Co to supply a Material designated by a trade or other name, the tender shall be based only upon supply of the Material so designated, which shall be regarded as the standard of quality required by the Standard.

.08 Prior to the commencement of Work Project Co shall provide to the Consultant a list of those products controlled under the Workplace Hazardous Material Information System (WHMIS) that Project Co expects to use on the Contract. Related Material Safety Data Sheets shall accompany the submission. All containers used in the application of products controlled under WHMIS shall be labelled. Project Co shall notify the Consultant of changes to the list in writing and provide relevant Material Safety Data Sheets.

.09 When a Material or Material source is deleted from the DSM list of pre-qualified Materials or Material sources after the tender opening date, the City shall be responsible for the extra costs of Material supply

only, unless the Material production or Material source is controlled by Project Co or Subcontractor. If the type of Material or Material source is pre-qualified after the date of tender opening, permission to use the Materials or Material sources shall not be given until an agreement has been reached on the estimated value of the cost savings to the City.

GC 5.03 Rejected Material

.01 Rejected Material shall be removed from the Working Area expeditiously after the notification to that effect from the Consultant. Where Project Co fails to comply with such notice, the Consultant may cause the rejected Material to be removed from the site and disposed of in what the Consultant considers to be the most appropriate manner, and Project Co shall pay the costs of disposal and the appropriate overhead charges.

GC 5.04 City Supplied Material

GC 5.04.01 Ordering of Excess Material

.01 Where Material is supplied by the City and where this Material is ordered by Project Co in excess of the amount specified to complete the Work, such excess Material shall become the property of Project Co on completion of the Work and shall be charged to Project Co at cost plus10% for administration.

GC 5.04.02 Care of Material

.01 Project Co shall, in advance of receipt of shipments of Material supplied by the City, provide adequate and proper storage facilities acceptable to the Consultant; and, on the receipt of such Material, promptly place it in storage except where it is to be incorporated forthwith into the Work.

.02 Project Co shall be responsible for acceptance of Material supplied by the City, at the specified delivery point and for its safe handling and storage. If such Material is damaged while under the control of Project Co, it shall be replaced or repaired by Project Co at no expense to the City, and to the satisfaction of the Consultant. If such Material is rejected by the Consultant for reasons which are not the fault of Project Co, it shall remain in the care and at the risk of Project Co until its disposition has been determined by the Consultant.

.03 Where Material supplied by the City arrives at the delivery point in a damaged condition or where there are discrepancies between the quantities received and the quantities shown on the bills of lading, Project Co shall immediately report such damage or discrepancies to the Consultant who shall arrange for an immediate inspection of the shipment and provide Project Co with a written release from responsibility for such damage or deficiencies. Where damage or deficiencies are not so reported, it shall be assumed that the shipment arrived in good order and any damage or deficiencies reported thereafter shall be made good by Project Co at no extra cost to the City.

.04 The full amount of Material supplied by the City in each shipment shall be accounted for by Project Co and such Material shall be at the risk of Project Co after taking delivery. Such Material shall not be used by Project Co for purposes other the Work under the Contract.

.05 Empty reels, crates, containers, and other types of packaging from Material supplied by the City shall become the property of Project Co when they are no longer required for their original purpose and shall be disposed of by Project Co, unless otherwise specified in the Contract Documents.

.06 Project Co shall provide the Consultant, immediately upon receipt of each shipment, copies of bills of lading, or such other documentation the Consultant may require to substantiate and reconcile the quantities of Material received.

.07 Where Material supplied by the City is ordered and stockpiled prior to the award of the Contract, Project Co shall, at no extra cost to the City, immediately upon commencement of operations, check the

Material, report any damage or deficiencies to the Consultant, and take charge of the Material at the stockpile site. Where damage or deficiencies are not so recorded by Project Co, it shall be assumed that the stockpile was in good order when Project Co took charge of it and any damage or deficiencies reported thereafter shall be made good by Project Co at no extra cost to the City.

SECTION GC 6.0 – [RESERVED]

SECTION GC 7.0 - PROJECT CO'S RESPONSIBILITIES AND CONTROL OF THE WORK

GC 7.01 General

GC 7.01.01 [Reserved]

GC 7.01.02 Commencement of Work

.01 Project Co shall not commence the Work nor deliver anything to the Working Area until Project Co has received written permission from the City and the Consultant.

GC 7.01.03 [Reserved]

GC 7.01.04 [Reserved]

GC 7.01.05 Project Co's Representatives

.01 Project Co shall have an authorized representative on the Highway Site while any work is being performed, to act for or on Project Co's behalf. Prior to commencement of the Work, Project Co shall notify the Consultant of the names, addresses, positions, and telephone numbers of Project Co's representatives who can be contacted at any time to deal with matters relating to the Contract.

.02 Project Co shall designate a person to be responsible for traffic control and highway work zone safety. The designated person shall be a competent worker who is qualified because of:

a) Knowledge, training, and experience to perform the duties;

b) Is familiar with Book 7 of the OTM; and

c) Has knowledge of all potential or actual danger to workers and motorists.

Prior to the commencement of the Work, Project Co shall notify the Consultant of the name, address, position, and telephone number of the designated person. The designated person may have other responsibilities, including other construction sites, and need not be present in the Working Area at all times.

.03 Project Co shall maintain a daily, hard bound diary of the signs in use for temporary and long term traffic control. The diary shall be submitted with the final payment documents. For the duration of the Work and within 24 hours of a request by the Consultant, Project Co shall provide the Consultant full access to the diary. The following information shall be included in the diary:

a) A schematic of the location of each existing sign by station, offset, and height above pavement.

b) A schematic of the placement and re-location of all construction signs by station, offset, and height above pavement.

c) Traffic accidents, including time of inspection, location of incident, and photographs.

d) Time and date of daily sign inspections.

GC 7.01.06 [Reserved]

GC 7.01.07 [Reserved]

GC 7.01.08 [Reserved]

GC 7.01.09 Utilities

.01 Project Co shall arrange with the appropriate Utility authorities for the stake out of all underground Utilities and service connections that may be affected by the Work. Project Co shall be responsible for any damage done to the underground Utilities by Project Co's forces during construction. Project Co shall also be responsible for any damage done to the service connections. Project Co shall attend such meetings with the Consultant and the Utility authorities as may be required by the Consultant to ensure coordination of activities among Project Co and the Utility authorities for each Utility affected by the Contract.

.02 In the case of damage to, or interference with any Utilities, pole lines, pipe lines, conduits, farm tiles, or other public or privately owned works or property, Project Co shall immediately notify the City and the Consultant of the location and details of such damage or interference.

GC 7.01.10 Public Ceremony

.01 Only the City shall be permitted to make the first public announcements or hold the first public ceremonies about the award or acceptance of the Contract, project milestones, and Contract Completion. Project Co shall not hold any public ceremony or make any public announcements about the above matters prior to the City doing so, without first obtaining the prior written approval of the City. Project Co shall refer all media inquiries regarding such initial announcement and ceremonies to the City.

In the above paragraph “project milestones” means any significant event in the completion of the Work, which includes the completion of a major component of the Work; the opening or closing of lanes, ramps, and structures; and any Work associated with incentives and disincentives described in the Contract.

GC 7.02 Layout

.01 Prior to commencement of construction, the Consultant and Project Co shall locate on site those property bars and benchmarks that are necessary to delineate the Work Area and to lay out the Work, as shown on the Contract Drawings.

.02 Project Co shall be responsible for the preservation of all property bars while the Work is in progress, except those property bars that require removal to facilitate the Work. Any property bars disturbed, damaged, or removed by Project Co's operations shall be replaced under the supervision of an Ontario Land Surveyor, at no cost to the City.

.03 Project Co shall provide qualified personnel to layout and establish all lines and grades necessary for construction. Project Co shall notify the Consultant of any layout work carried out.

.04 Project Co shall assume full responsibility for alignments, elevations, and dimensions of each and all parts of the Work.

.05 All stakes, marks, and reference points provided by the Consultant shall be carefully preserved by Project Co. In the case of their destruction or removal, such stakes, marks, and reference points shall be replaced by Project Co at no cost to the City.

.06 [Reserved]

.07 Certification shall be required for the layout of the following components of the work:

a) Bridges;

b) Retaining walls;

c) Culverts having a span of 5m or more;

d) Tunnelling, excluding augered tunnels;

e) Sewers of 2m diameter or more.

For each of the identified components above, Project Co shall provide to the Consultant, on MTO Standard Form PH-CC-811, Certification of the Component, over the seal and signature of either an Engineer or an Ontario Land Surveyor, the following:

a) Certification of the final pile location before proceeding with footings.

b) Certification that the footings have been constructed to the designated lines and grades before proceeding with any work above the footings.

c) Final elevations of bridge seats and certification of span dimensions before proceeding with any work on the superstructure of each bridge.

d) Actual profiles on the beams before proceeding with any work on the deck of each bridge.

e) Certification of the final screed rail elevations before proceeding with the deck placement.

f) Certification that each of the identified components of the Work has been constructed to the designated lines and grades before the Contract Completion Certificate.

.08 Project Co shall supply the City with all as-constructed horizontal and vertical data related to the layout of the Work before the Contract Completion Certificate.

.09 Project Co shall advise the Consultant of the intended layout schedule at the weekly meeting by identifying the survey activities planned for the following week, including any miscellaneous surveying items.

.10 For the grading layout, stakes 25 mm x 50 mm x 600 mm, minimum, shall be installed left and right of centreline at or near the right-of-way limits and in the areas where additional staking is required, (e.g., intersections, bridges, and on horizontal and vertical curves). Staking intervals shall be as specified in Table 7.02-1 and Table 7.02-2. The only data to be shown on these stakes shall be profile grade, off-set distance from centreline, and station location. Project Co shall erect butterfly rods or batter boards at grade stake locations.

.11 Project Co shall provide a complete set of off-set stakes with finished grade and stations for the following components of the Work:

a) Drainage Items

Sewers, road culverts, entrance culverts, manholes, and similar items.

b) Pavement Items

Concrete base, concrete pavement, stabilized base, asphalt, Pavement, and similar items. Fine grading stakes shall be used for this work when Pavement items form part of grading or granular work.

c) Miscellaneous Items

Sidewalk, curb and gutter, slope paving, structures, fencing, noise barrier, lighting, guide rail barrier, rip-rap, and similar items as required by the City.

.12 For fine grading layout, including paving, fine grading stakes 25 mm x 50 mm x 600 mm in size shall be installed left and right of the control line at or near the Subgrade Shoulder break. These stakes shall be installed at an interval of 30 m or less where the Consultant deems appropriate, on horizontal and vertical curves, widening of intersections, and similar locations. The only data to be shown on these stakes shall be Profile Grade, elevation, off-set distance from the control line, and station.

.13 For resurfacing layout, offset stakes shall be installed left or right of the control line and at or near the edge of Shoulder at an interval of 50 m or less. The only data to be shown on the stake shall consist of the final Pavement elevation, off-set distance from the control line, and station.

GC 7.03 [Reserved]

GC 7.04 Excess Loading of Motor Vehicles

.01 Where a vehicle is hauling Material, in whole or in part upon a Highway, and where motor vehicle registration is required for such vehicle, Project Co shall not cause or permit such vehicle to be loaded beyond the legal limit specified in the Highway Traffic Act, whether such vehicle is registered in the name of Project Co or otherwise, except where there are designated areas within the Working Area where overloading is permitted. Project Co shall bear the onus of weighing disputed loads.

.02 Vehicles hauling Materials shall be accompanied by a MTO Standard Form SR-E-121, Record of Allowable Gross Weight certificate, on. The legal limit shall be the vehicle's registered gross weight or the allowable gross weight, whichever is less. Project Co shall ensure that a copy of the Record of Allowable Gross Weight form is left with the weigh person for City use.

GC 7.05 Use of Construction Equipment and Unlicensed Vehicles

.01 Unlicensed vehicles and construction equipment, with the exception of rock trucks, shall not travel, work, or stop within 4 m of a lane carrying traffic, except where construction operations necessitates the Working Area be less than 4 m from the traffic in which case, Project Co shall erect delineators along the edge of the travelled lane, according to paragraph GC 7.08.01.

.02 The use of unlicenced rock trucks on facilities open to public traffic shall be permitted only when hauling rock material within the construction zone and subject to the following:

a) For unlicenced rock trucks that are less than 3.2 m wide and equipped with foot operated brakes, headlights, and front and rear turn signals, flagging is required at entrance and exit points to warn public traffic.

b) For all other unlicenced rock trucks, flagging is required at entrance and exit points and either pilot vehicles or flagging is required along the route to warn public traffic and control movement.

GC 7.06 Carrier Safety Compliance

GC 7.06.01 Project Co Operation of a Commercial Motor Vehicle

.01 Where Project Co is a Commercial Vehicle Operator's Registration (CVOR) Holder who intends to operate a Commercial Motor Vehicle in the performance of the Contract or in the haulage of Materials to, on, or from the Working Area, Project Co shall provide to the City a copy of Project Co's CVOR Abstract as follows:

a) The first CVOR Abstract shall be provided to the City before Project Co operates a Commercial Motor Vehicle in the performance of the Contract or in the haulage of Materials to, on, or from the Working Area, and

b) CVOR Abstracts shall be submitted to the City:

i. Annually in October.
ii. Periodically upon request anytime during the period of the Contract.

The search date recorded on any CVOR Abstract shall not exceed 30 Days from the date that it is provided to the Consultant.

.02 If at any time Project Co holds an unsatisfactory or conditional CVOR rating, Project Co shall advise the Consultant within 72 hours:

a) Project Co's Commercial Motor Vehicles shall not operate in the performance of the Contract or in the haulage of materials to or from the Working Area while Project Co holds an unsatisfactory CVOR rating.

b) The Consultant may permit Project Co with a Conditional CVOR rating to operate its vehicles in the performance of the Contract or in the haulage of materials to or from the Working Area, subject to the following performance criteria:

i. Within 10 Days of having a Conditional CVOR Rating, Project Co produces an approved plan confirming that drivers and vehicles safety programs are in place to ensure compliance with the safety rating requirement, the Highway Traffic Act and National Safety Code; and

ii. Achieve a satisfactory, satisfactory unaudited, or excellent safety rating under the MTO Carrier Safety Rating Program and have a violation rate of under 70% within 12 months of the date the plan is submitted to the City, or show improvement in the Carrier's Safety Performance over the term of the Contract by reducing the Carrier's pointable accidents, pointable convictions and out of service inspections.

Where Project Co fails to achieve the performance criteria outlined above, the Consultant may require Project Co to subcontract all work requiring a CVOR Certificate and Project Co's bidding privileges on future work with the City may be affected.

Provisions GC 7.06.01.02, b), i and ii, are in addition to any carrier interventions or sanctions imposed through the MTO CVOR program.

GC 7.06.02 Subcontractor and Other Operation of a Commercial Motor Vehicle

.01 Prior to any CVOR Holder operating a Commercial Motor Vehicle in the performance of the Contract or in the haulage of material to, on, or from the Working Area, Project Co shall examine the CVOR Abstract of every CVOR Holder with whom Project Co intends to subcontract, directly or indirectly, to operate a Commercial Motor Vehicle in the performance of the Contract or in the haulage of materials

to, on, or from the Working Area. Project Co shall provide the Consultant with the CVOR Holder's name and CVOR Certificate number of all Subcontractors.

The search date of any CVOR Level 1 Abstract shall not exceed 30 Days from the date that it is provided to Project Co.

Project Co shall retain copies of all CVOR Abstracts for examination by the City, upon request.

.02 The CVOR Holder shall not hold a dormant or inactive CVOR certificate at any time during the period of the Contract.

Project Co shall, at all times throughout the duration of the Contract, ensure that no CVOR Holder with an unsatisfactory CVOR rating works, directly or indirectly, for Project Co in the operation of a Commercial Motor Vehicle in the performance of the Contract or in the haulage of materials to, on, or from the Working Area. Project Co shall require Subcontractors, in turn, to require compliance with this subsection from any Person with whom they contract.

If a CVOR Holder holds an unsatisfactory CVOR rating at any time during the period of the Contract, Project Co shall inform the Consultant, in writing, within 72 hours of becoming aware, having exercised all due diligence, of such CVOR Holder having an unsatisfactory CVOR rating.

Project Co Administrator may permit a Subcontractor with a conditional CVOR rating to operate their vehicles subject to the following:

a) Within 10 Days of having a conditional CVOR record, the Subcontractor produce an approved plan confirming that drivers and vehicles safety programs are in place to ensure compliance with the safety rating requirement, the Highway Traffic Act and National Safety Code; and

b) Achieve a satisfactory, satisfactory unaudited, or excellent safety rating under the ministry's Carrier Safety Rating Program and have a violation rate of under 70% within 12 months of the date the plan is submitted to the City, or show improvement in the Carrier's Safety Performance over the term of the contract by reducing the Carrier's pointable accidents, pointable convictions, and out of service inspections.

Where a Subcontractor fails to achieve the performance criteria above Project Co shall within 1 month replace the Subcontractor or CVOR Holder and Project Co's bidding privileges on future work with the City may be affected.

Provisions GC 7.06.02.02, a), and GC 7.06.02.02, b), are in addition to any carrier interventions or sanctions imposed through the MTO CVOR program.

GC 7.07 Condition of the Working Area

.01 Project Co shall maintain the Working Area in a tidy condition and free from the accumulation of debris, other than that caused by the City or others.

.02 During night work, Project Co shall ensure that the worksite is adequately illuminated to the Consultant's satisfaction for work operations and inspections and the advance warning to traffic.

.03 Project Co shall take such steps as may be necessary to control dust resulting from Project Co's operations or by public traffic, where it is Project Co's responsibility to maintain a road through the Work, such that it does not:

a) Affect traffic;

b) Enter surface waters; or

c) Escape beyond the right-of-way to cause a nuisance to residents, businesses, or Utilities.

GC 7.08 Maintaining Roadways and Detours

.01 Where an existing Roadway is affected by construction, it shall be kept open to traffic, and Project Co shall, except as otherwise provided in section GC 7.08, Maintaining Roadways and Detours, be responsible for providing and maintaining a road through the Work for the duration of the Work, whether along an existing Highway, including the road under construction, or on detours within or adjacent to the Highway according to the OTMs. The minimum Maintenance requirements are outlined in Notice to Contractor – Queensway Maintenance Requirements.

.02 Project Co shall not be required to maintain a Roadway through the Working Area before Project Co has commenced the Work. Responsibility for maintenance shall be transferred between Project Co and the City at the commencement of the Work and the start of the Highway Warranty period. A minimum of 10 Business Days prior to an anticipated transfer date of responsibility for maintenance, the Consultant, Project Co and a representative of the City's maintenance contractor shall perform a pre-turnover field inspection. The pre-turnover field inspection shall identify deficiencies within the right-of-way and the anticipated timeframe for correction. The Consultant shall be the sole judge or whether or not the noted deficiencies require correction prior to or after the turnover date. Provided that Project Co was given advance written notice of the pre-turnover inspection date, Project Co shall not delay commencement of the Work or the assumption of responsibility for maintenance because of the existence of deficiencies. A Turnover Agreement Form PH-CC-771, prepared by the Consultant, which identifies the date and time that responsibility for maintenance shall be transferred between parties shall be executed by both the Consultant and Project Co prior to the actual turnover date. Where work under the Contract is discontinued for any extended period, Project Co shall, when directed by the Consultant, open and place the roadway and detours in a passable, safe and satisfactory condition for public travel. Project Co shall not be required to apply deicing chemicals or abrasives or carry out snow-plowing on a public road.

.03 [Reserved].

.04 [Reserved].

.05 Project Co shall bear the cost of maintaining, in a satisfactory condition for public traffic, a Roadway through the Working Area. Project Co shall bring any defects to the attention of the Consultant as soon as they are identified. Such defects include potholes, distortions, pavement edge loss, washouts, drop-offs, and soft or wet areas. The Highway Milestone Payment shall include all compensation for labour, Equipment, and Materials to address such defects.

.06 Compliance with the foregoing provisions shall in no way relieve Project Co of obligations under section GC 6.01, Protection of Work, Persons, and Property, dealing with Project Co's responsibility for losses and damage.

.07 Project Co shall ensure that earth, mud, aggregate, and other construction debris are not tracked onto the Roadway by construction vehicles.

GC 7.09 Access to Properties Adjoining the Work and Interruption of Utility Services

.01 At all times, Project Co shall provide the following to properties adjoining the Working Area at no additional cost to the City:

a) Pedestrian and vehicular access; and

b) Continuity of Utility services.

.02 At all times, Project Co shall provide access to fire hydrants and water and gas valves located in the Work Area at no additional cost to the City.

.03 Where any interruptions in the supply of Utility services are required and are authorized by the Consultant, Project Co shall give the affected property owners notice according to section GC 7.13, Notices by Project Co, and shall arrange such interruptions so as to create a minimum of interference to affected property owners.

GC 7.10 [Reserved]

GC 7.11 [Reserved]

GC 7.12 [Reserved]

GC 7.13 [Reserved]

GC 7.13.01 [Reserved]

GC 7.13.02 Environmental Incident Management Under Legislation Protecting the Environment and Natural Resources

.01 Project Co shall be in strict compliance with the requirements of the following legislation regarding Environmental Incidents under the control of Project Co or that are a result of Project Co's operations:

a) Environmental Protection Act, RSO 1990

b) Fisheries Act, RSC 1985

c) Gasoline Handling Act, RSO 1990

d) Ontario Pesticides Act, RSO 1990

e) Ontario Water Resources Act, RSO 1990

f) Transportation of Dangerous Goods Act, RSC 1992

.02 The requirements of the legislation listed in paragraph of GC 7.13.02.01 include but are not restricted to:

a) Immediate containment of the material, pollutant, contaminant, deleterious substance, or dangerous good;

b) Immediate notification of the Environmental Incident to the proper authority; and

c) Cleanup and restoration of the environment to preconditions.

.03 Project Co shall possess a plan demonstrating that Environmental Incidents shall be managed to satisfy the requirements of paragraphs GC 7.13.02.01 and GC 7.13.02.02.

.04 Project Co shall also be responsible for informing the Consultant forthwith of:

a) An Environmental Incident when it occurs; and

b) Any actions taken or intended to be taken by Project Co regarding the Environmental Incident.

.05 Within 48 hours of an Environmental Incident, Project Co shall provide to the Consultant, on MTO Standard Form PH-CC-818, Environmental Incident Notification Form, details of such incident.

.06 Project Co shall indemnify and save the City harmless from any additional expense that the City may incur to have the Work performed as a result of Project Co's failure to comply with the requirements of the legislation listed in paragraph GC 7.13.02.01.

GC 7.14 Obstructions

.01 Except as otherwise noted in these MTO General Conditions and the Project Agreement, Project Co assumes all the risks and responsibilities arising out of any obstruction encountered in the performance of the Work and any traffic conditions, including traffic conditions on any Highway or road giving access to the Working Area caused by such obstructions, and Project Co shall not make any claim against the City for any loss, damage, or expense occasioned thereby.

.02 [Reserved]

.03 During the course of the Contract, it is Project Co's responsibility to consult with Utility companies or other appropriate jurisdictions for further information in regard to the exact location of these Utilities, to exercise the necessary care in construction operations, and to take such other precautions as are necessary to safeguard the Utilities from damage.

GC 7.15 [Reserved]

GC 7.16 [Reserved]

GC 7.17 Record Drawings

.01 Project Co shall provide 3 hard copies and 1 digital file, in PDF format, of Record Drawings prior to Contract Completion.

.02 Record Drawings shall show all differences, design changes, and deviations from the original Contract Drawings in red with references to Project Co's survey and quality control inspection records beside each entry.

SECTION GC 8.0 – MEASUREMENT

GC 8.01 Quantity Sheets

.01 Project Co shall measure and record all work done and Material supplied on a form and in a level of detail similar to the form and level of detail evident in the Quantity Sheets Book included in the Contract Documents (the "Quantity Sheet Form").

.02 The method of measurement for reporting of quantities shall be as set out in the specifications, section titled: Measurement for Quantity Reporting and Quality Control.

.03 Within 10 Business Days following the end of each calendar month from Financial Close until the Highway Final Completion Date, Project Co shall submit an updated Quantity Sheet Form to the Consultant for review. Within 5 Business Days of receiving any comments on the submitted Quantity Sheet Form from the Consultant, Project Co shall prepare and resubmit an updated Quantity Sheet Form based on the Consultant's comments.

.04 Notwithstanding any other provision in the Project Agreement, before Substantial Completion of the Highway Work can be achieved, Project Co must provide a Quantity Sheet Form with final actual quantities of work completed and Material supplied.

GC 8.02 [Reserved]

GC 8.03 [Reserved]

GC 8.03.01 [Reserved]

GC 8.03.02 Daily Work Records

.01 The Daily Work Records reporting the labour and Equipment employed and the Material used shall be prepared by Project Co's representative. The Daily Work Records shall be signed each Day by both Project Co's representative and the Consultant. The Consultant will note disagreements on the Daily Work Record prior to signing and return a copy to Project Co.

.02 Daily Work Records shall report the labour and Equipment employed, both working time and downtime, and the Material used on MTO Standard Form PH-CC-754 Daily Work Record. Daily Work Records shall include a brief description of the work being carried out and location of such work.

.03 For each Day that a Daily Work Record is required under these provisions, Project Co shall deliver daily to the Consultant's representative at the working area a Project Co signed copy of the Daily Work Record.

.04 Project Co's failure to keep or deliver Daily Work Records or to keep complete Daily Work Records may limit Project Co's ability to recover its costs.

GC 8.04 [Reserved]

GC 8.05 Records

.01 Project Co shall maintain and keep accurate Records relating to the Work, Variations, and claims arising there from in sufficient detail to support the total cost of the Work, Variations, and claims. Project Co shall preserve all such original Records until 12 months after the Release from Warranty Certificate is issued or until all claims have been settled, which ever is longer. Project Co shall require that Subcontractors preserve all original Records pertaining to the Work, Changes in the Work, and Claims arising there from for a similar period of time.

.02 If, in the opinion of the Consultant, Daily Work Records are required, Project Co shall complete such Daily Work Records for the Work or such specific part of the Work requested.

Table 7.02-1
Layout Intervals and Measurement Accuracy
For Construction Survey - Layout

Activity	Interval m	Measurement Accuracy mm	Remarks
Layout - Rock - Earth	10 25	-	With the exception of plus sections, layout is normally at the same interval as the cross-sections/grade calculations. This may be varied when extreme changes in horizontal and vertical alignment are encountered.
Maximum for setting structure footing grades	10	-	
Set structure grades	-	1	
Adjustment to slope stake distances to allow for grubbing losses	-	300	
Set grades for earth grading	-	10	
Set grades for granular	-	5	
Layout stake offset for curb and gutter	-	-	2 m but may be varied to suit conditions
Stake layout for curb and gutter	10	-	May be necessary to reduce for very sharp curves
Set curb and gutter grades	-	1	
Staking maximum for layout of a radius, intersections	3	-	
Layout stake offset for concrete pavement	-	-	2 m offset
Set concrete pavement grades	-	1	

Table 7.02-2
Layout Intervals and Measurement Accuracy
For Construction Survey – Cross-Sections

Activity	Interval m	Measurement Accuracy mm	Remarks
Backsight and foresight readings	-	1	
Maximum allowable error between adjacent Bench Marks	-	5	
Intermediate road readings - earth cut - rock cut - rock cut with overburden - muskeg excavation - fills with stripping, sub-excavation, or ditching - transition from cut to fill - fills - earth or rock fills - borrow pits	 25 10 10 25 25 25 25 25 25	10	
Maximum transverse interval for cross-section elevations - earth - rock - borrow	 25 10 25	-	
Measure offset distances	-	100	

PART B – ADDENDA

Attach Addenda

PART C – SPECIAL CONDITIONS

Attach MTO Special Conditions

SCHEDULE 40

HIGHWAY WORK

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ANNEX A LIST OF HIGHWAY DRAWINGS AND HIGHWAY SPECIFICATIONS

ANNEX B HIGHWAY COMMISSIONING PROGRAM

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ANNEX D LIST OF PROJECT CO PARTIES

ANNEX F LEGAL DESCRIPTION OF HIGHWAY SITE

ANNEX G HIGHWAY SUPPLEMENTARY CONDITIONS

ANNEX H HIGHWAY FINAL COMPLETION NOTICE

1. DEFINITIONS AND INTERPRETATION

1.1 Definitions and Interpretation

(a) This Schedule 40 is comprised of this schedule and the following documents, all of which are hereby incorporated by reference into and form part of the Project Agreement:

Schedule No.	Description
Annex A	List of Highway Drawings and Highway Specifications
Annex B	Highway Commissioning Program
Annex C	Risk Assessment Guidelines
Annex D	List of Project Co Parties
Annex E	[Reserved]
Annex F	Legal Description of Highway Site
Annex G	Highway Supplementary Conditions - Part A – MTO General Conditions - Part B – Addenda - Part C – Special Conditions
Annex H	Highway Final Completion Notice

(b) The intent of the Contract Documents is to include the labour, Products and services necessary for the performance of the Highway Work by Project Co in accordance with these documents.

(c) Neither the organization of the Highway Specifications into divisions, sections and parts, nor the arrangement of Highway Drawings shall control Project Co in dividing the Highway Work among the Project Co Parties or in establishing the extent of the Highway Work to be performed by a trade.

1.2 Conflict of Terms

(a) In the event of ambiguities, conflicts or inconsistencies between or among any of the provisions of this Schedule 40 and the other Contract Documents, the provisions shall govern in the following order of precedence with each taking precedence over those listed subsequently, unless otherwise expressly provided therein or herein:

(i) the provisions of amendments in writing to this Schedule 40 signed by the Parties and Variation Confirmations shall govern and take precedence only over those specific provisions of this Schedule 40 and the other Contract Documents expressly amended thereby;

(ii) any provision establishing a higher standard of safety, reliability, durability, performance or service shall take precedence over a provision

establishing a lower standard of safety, reliability, durability, performance or service;

(iii) the body of this Schedule 40;

(iv) the Annexes to this Schedule 40, excluding Annex G, in the order in which they are listed in Section 1.1(a);

(v) the preamble to Annex G, including paragraphs 1 to 29.

(vi) the Addenda;

(vii) Special Provisions set out in Part C of Annex G to this Schedule 40;

(viii) Highway Drawings;

(ix) Standard Specifications listed in Part C of Annex G to this Schedule 40;

(x) Standard Drawings listed in Part C of Annex G to this Schedule 40;

(xi) Part A of Annex G to this Schedule 40;

(xii) Highway Shop Drawings;

(xiii) drawings of larger scale shall govern over those of smaller scale of the same date;

(xiv) dimensions shown on drawings shall govern over dimensions scaled from drawings;

(xv) later dated documents shall govern over earlier documents of the same type;

(xvi) if an item is shown on one document, it shall be deemed to be part of the Highway Work;

(xvii) written descriptions and words shall govern over graphic depictions; and

(xviii) detailed drawings shall govern over general drawings.

(b) In the event of any conflict in the contents of Standards (as such term is defined in Part A of Annex G to this Schedule 40), the following order of precedence shall govern:

(i) Ontario Provincial Standard Specifications and Drawings; and

(ii) other Standards referenced by OPSSs and OPSDs (e.g. CSA, CGSB, ASTM, and ANSI) (all abbreviations as defined in Part A of Annex G to this Schedule 40).

(c) If the ambiguity, conflict or inconsistency is between a provision of general application and a provision that applies only to a specific part of the Highway Work, the provision that applies to the specific part of the Highway Work shall govern for that specific part of the Highway Work.

(d) If any ambiguity, conflict or inconsistency is not readily resolved by the foregoing provisions of this Section 1.2, then Project Co or City, upon discovery of same, shall immediately give notice to the Consultant. The Consultant shall, within 10 Business Days after such notice, make a determination of which provision governs and give notice of such determination, in writing, to Project Co.

(e) City and Project Co shall comply with the determination of the Consultant pursuant to this Section 1.2 unless City or Project Co disputes the decision of the Consultant, in which event such dispute may be referred for resolution in accordance with Schedule 27 - Dispute Resolution Procedure.

2. [RESERVED]

3. [RESERVED]

4. [RESERVED]

5. [RESERVED]

6. [RESERVED]

7. [RESERVED]

8. CONSULTANT AND KEY PERSONNEL

8.1 Authority of the Consultant

(a) The Consultant will have authority to act on behalf of City only to the extent provided in the Contract Documents, unless otherwise modified by written agreement as provided in Section 8.1(b).

(b) The duties, responsibilities, and limitations of authority of the Consultant as set forth in the Contract Documents shall be modified or extended only with the written consent of City, Project Co and the Consultant.

(c) If the Consultant's employment is terminated, City shall immediately appoint or reappoint a Consultant whose status shall, upon notification to Project Co of such appointment or reappointment, be that of the former Consultant.

8.2 Role of the Consultant

(a) The Consultant will provide administration of this Schedule 40 as described in the Contract Documents during construction until the end of the Highway Warranty,

and subject to Section 8.1 and with City's concurrence, from time to time until the completion of any additional warranties as provided for in the requirements under this Schedule 40 and/or Annex G to this Schedule 40.

(b) The Consultant will visit the Highway Site at intervals appropriate to the progress of construction to become familiar with the progress and quality of the Highway Work and to determine if the Highway Work is proceeding in general conformity with the Contract Documents.

(c) If City and the Consultant agree, the Consultant will provide at the Highway Site, one or more project representatives to assist in carrying out the Consultant's responsibilities. The duties, responsibilities, and limitations of authority of such project representatives shall be as set forth in writing to Project Co.

(d) The Consultant will provide to Project Co a complete set of the issued for construction Highway Drawings and Highway Specifications under the Contract Documents incorporating all Addenda issued by the MTO from June 11, 2012 to the Submission Date as soon as reasonably practical following such date of execution. The Consultant shall review the progress of the Highway Work and the general conformance of the Highway Work to the requirements of the Contract Documents.

(e) The Consultant will not be responsible for and will not have control, charge, or supervision of construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs required in connection with the Highway Work in accordance with Applicable Law or general construction practice. The Consultant will not be responsible for Project Co's failure to carry out the Highway Work in accordance with the Contract Documents. The Consultant will not have control over, charge of, or be responsible for the acts or omissions of Project Co or any Project Co Party or any other persons performing portions of the Highway Work.

(f) The Consultant will be, in the first instance, the interpreter of the requirements of the Contract Documents and shall make findings as to the performance thereunder by both Parties. When making any interpretations or findings or performing any other functions or exercising any right or performing any obligation under the Contract Documents, the Consultant will act reasonably and in good faith and in accordance with generally accepted professional standards and will not show partiality to either City or Project Co. Any dispute between City and Project Co as to any decision, determination, direction, interpretation or finding of the Consultant or any other action taken by the Consultant pursuant to or in connection with the Contract Documents shall be resolved in accordance with the provisions of Schedule 27 – Dispute Resolution Procedure.

(g) Claims, disputes, and other matters in question relating to the performance of the Highway Work or the interpretation of the Contract Documents, shall be referred initially to the Consultant by notice in writing given to the Consultant and to the

other party for the Consultant's interpretation and finding which will be given by notice in writing to the parties within a reasonable time.

(h) The Consultant will have authority to reject Highway Work which does not conform to the requirements of the Contract Documents. Whenever the Consultant considers it necessary or advisable, the Consultant will have authority to require inspection or testing of Highway Work in accordance with Section 21.3 of the Project Agreement, whether or not such Highway Work is fabricated, installed, or completed. However, neither the authority of the Consultant to act nor any decision either to exercise or not to exercise such authority shall give rise to any duty or responsibility of the Consultant to Project Co, any Project Co Party, or other persons performing any part of the Highway Work.

(i) When a request for information is submitted by Project Co in accordance with Section 11.2(a)(i), the Consultant will endeavour to provide a response to Project Co as soon as practical, taking into account the impact of the request for information on the critical path. If the request for information relates to an item on the critical path or is reasonably likely to affect an item on the critical path, the Consultant shall respond within 5 Business Days or such longer period of time mutually agreed to by the Consultant and Project Co. If the request for information does not relate to an item on the critical path and is not reasonably likely to affect an item on the critical path, the Consultant and Project Co shall establish a mutually agreed response time that is consistent with the Highway Construction Schedule.

(j) The Consultant will review and take appropriate action upon Project Co's submittals such as Highway Shop Drawings, Product data and samples, as provided in the Contract Documents.

(k) The Consultant will prepare Variation Enquiries, Variation Confirmations and Variation Directives as provided in Schedule 22 - Variation Procedure.

(l) The Consultant will:

(i) conduct reviews of the Highway Work to determine the Highway Substantial Completion Date, as provided in Section 16.1, and make determinations as required in respect of the Highway Commissioning, as contemplated in Annex B – Highway Commissioning Program; and

(ii) conduct reviews of the Coventry Bridge Work to determine when the Coventry Bridge Work has been completed in accordance with the Project Agreement including the Civic Works Specifications in respect of the Coventry Bridge Work, at which point the Consultant will certify that the Coventry Bridge Work is complete as part of the Substantial Completion of the Civic Works.

(m) All certificates issued by the Consultant shall be to the best of the Consultant's knowledge, information and belief. By issuing any certificate, the Consultant does not guarantee that the Highway Work is correct or complete.

(n) The Consultant will receive and review written warranties and related documents required by this Schedule 40 and provided by Project Co and will forward such warranties and documents to City for City's acceptance.

(o) Without limiting the generality of the responsibilities of the Consultant in accordance with this Section 8.2, the Consultant shall be responsible for reviewing and making a finding on Highway Design Issues and issuing all final documentation in accordance with Section 11.18.

(p) **[Reserved]**.

(q) City has retained the City's Project Manager to assist City in the overall implementation of the Highway Work. The City's Project Manager shall provide services and interface with Project Co and the Consultant in relation to coordination of the Highway Work for existing operations, schedule overview, and communicating decisions and directions of City. City may, upon notification to Project Co, appoint a new City's Project Manager whose status shall be that of the former City's Project Manager.

(r) **[Reserved]**.

(s) Notwithstanding the foregoing or anything to the contrary in this Schedule 40 or the Contract Documents, the Consultant will not be responsible for the administration or interpretation of those aspects of this Schedule 40 that are not related or do not pertain to the construction, installation, testing, Highway Commissioning and completion of the Highway Work, and other like activities, and for greater certainty, will not have any responsibility or obligation for any matter related to the financing with the Lenders.

8.3 Supervisors

(a) Project Co shall employ competent supervisors and necessary assistants who shall be in attendance at the Highway Site while work is being performed, and shall specifically include a competent Construction Manager, Quality Manager, Health and Safety Officer, Traffic Manager, Traffic Control Supervisor, Environmental Coordinator. Project Co acknowledges that these positions are Key Individuals. Project Co's supervisors shall, subject to Section 10.4 of the Project Agreement, devote their full time during working hours to the Project and remain at the Highway Site until the Substantial Completion of the Highway Work is achieved and thereafter, such positions shall, subject to the provisions of Section 10.4 of the Project Agreement, devote sufficient time and effort to the Project as necessary until the final certificate of payment has been issued by the Consultant and all Highway Minor Deficiencies have been rectified. Project Co shall include in its staff separate qualified environmental contractor and traffic management

coordinators who shall be responsible for (i) coordinating the general, quality, health and safety, environmental and traffic management Highway Shop Drawings submitted by the Subcontractors and Suppliers for various trades or divisions of the Highway Work; (ii) checking for any conflicts or interferences of the Highway Work of one division or trade with another; (iii) checking for completeness of the Highway Shop Drawings; and (iv) providing direction on any changes that may be required for compliance with the Contract Documents for submission to the Consultant and review of the Highway Shop Drawings. The Quality Manager and Traffic Manager shall be active participants in the Highway Commissioning and shall work closely with the Highway Commissioning Agents in accordance with Annex B – Highway Commissioning Program.

(b) The supervisor and project manager appointed by Project Co and identified in Schedule 9– Key Individuals of the Project Agreement shall represent Project Co at the Highway Site and shall have full authority to act on written instructions given by the Consultant, City and/or the City's Project Manager. Instructions given to the supervisor or the project manager shall be deemed to have been given to Project Co and both the supervisor and any project manager shall have full authority to act on behalf of Project Co and bind Project Co in matters related to this Schedule 40.

9. LICENCE AND TITLE

9.1 Licence to Highway Site

(a) Effective from the date of Financial Close and subject to this Schedule 40, City hereby grants to Project Co and all Project Co Parties such non-exclusive licence rights of use and access to, on and over the Highway Site and Highway as are required by Project Co to allow Project Co to perform the Highway Work or Project Co's obligations in respect of the Highway Warranty.

(b) None of the rights granted pursuant to this Section 9.1 shall extend beyond the boundaries of the Highway Site, or to any lands other than the Highway Site, other than easements and similar interests of City which benefit the Highway Site, obtained after the date of this Project Agreement, to the extent the same are necessary for the Highway Work.

(c) Notwithstanding Section 9.1(a), in the event that the MTO, acting reasonably, determines that the performance of the Highway Work would pose a risk to the safety and security of the drivers, passengers and pedestrians using the Existing Highway Infrastructure or a conflict with certain Additional Works, or any contractor hired by the MTO that is working on the Existing Highway Infrastructure, the MTO may direct the City to limit or suspend Project Co's licence to all or part of the Highway Site and the licence shall be so limited or suspended until such time as such measures required to address such risks or conflicts have been taken by the MTO or the City and the City provides Project Co with notice of same.

(d) The licence provided in this Section 9.1 shall automatically terminate on the expiry of the Highway Warranty or upon the earlier termination of this Project Agreement in accordance with its terms.

9.2 Non-Exclusive Licence of Highway Site

(a) Project Co acknowledges and agrees that the rights granted to Project Co and the Project Co Parties hereunder shall be non-exclusive and that City and any person authorized by City may occupy and possess the Highway Site and Highway. In exercising such rights Project Co shall not, and shall require that the Project Co Parties shall not, compromise Highway User care and safety and, except as permitted under the Project Agreement, disrupt the ongoing operation of the Highway.

(b) Without limiting Section 9.2(a), Project Co acknowledges that City may, from time to time, use or develop (including by way of subdivision), or permit the use or development of, portions of the Highway Site other than those portions of the Highway Site contained within the footprint of the Highway and those other portions of the Highway Site necessary for the performance of the Highway Work. To the extent that such use or development materially adversely interferes with Project Co's licence rights hereunder or materially adversely interferes with Project Co's ability to perform the Highway Work, such use or development shall, subject to and in accordance with Schedule 22 – Variation Procedure, result in a Variation Confirmation.

(c) Project Co shall use commercially reasonable efforts to keep the Highway open for public use at all times from Financial Close until the Highway Final Completion Date, except for lane closures or diversions of traffic flow by Project Co in accordance with the provisions of the Highway Traffic Control Plan and, except as otherwise expressly provided in this Project Agreement, Project Co shall not have any claim whatsoever against the City, any City Person, Emergency Service Provider or any other Governmental Authority for or in respect of any lane closure or diversion, including any lane closure or diversion referred to in this Section 9.2(c) or as a result of the exercise of any other rights or powers or the discharge of any other duties or functions by any such authority affecting all or any part of the Highway Site or the Highway at any time.

9.3 Naming and Signage

(a) Project Co acknowledges that City reserves and retains (i) all rights to designate the name for the Highway and any part of the Highway; (ii) all rights to signage in relation to the Highway Site and the Highway; and (iii) all rights, trade-marks, naming or branding regarding the Highway or any part of the Highway. It is agreed, however, that with the prior written consent of City, not to be unreasonably withheld or delayed and which may take into consideration any applicable governmental guidelines including the guidelines set out in Schedule 18 – Communications and Public Consultation Protocol to the Project

Agreement, Project Co, the Project Co Parties and the Lenders' Agent may, for the period prior to Substantial Completion of the Highway Work, erect and maintain signage at or on the Highway Site (which may include such parties' logos and trade names) identifying their respective roles in connection with the Highway Work, in a number and location and having a size and quality previously approved by City.

9.4 No Interest in Land or Highway

(a) Subject to Section 9.6, Project Co acknowledges and agrees that it acquires no estate, right, title or ownership interest in the Highway Site or the Highway or any other interest in land pursuant to the Project Agreement or otherwise, provided, that solely for the purposes of the obligation of Project Co to comply with the CLA, the licence granted to Project Co of use and access to, on and over the Highway Site and the Highway pursuant to Section 9.1 shall, for the duration of the performance of the Highway Work and Project Co's obligations in respect of the Highway Warranty, be an interest in the premises, and Project Co acknowledges and agrees that no disposition of an interest in the Highway Site or Highway arises as a result of the aforesaid grant.

9.5 Non-Disturbance Agreement

(a) If City or HMQ mortgages, charges or otherwise encumbers the Highway Site, City shall notify Project Co and, at the request of Project Co, provide Project Co with an agreement executed by the mortgagee of the Highway Site, permitting Project Co and Lenders' Agent to access and use the Highway Site under the licence granted pursuant to Section 9.1(a) and the Lenders' Direct Agreement, respectively, free from interference from the mortgagee or any person claiming by or through the mortgagee. This Section 9.5 shall not apply in respect of any portion of the Highway Site or Highway used or developed pursuant to Section 9.2(b) if neither the licence granted pursuant to Section 9.1(a) nor the Highway Work pertain to such portion of the Highway Site.

9.6 King's Highway/Title

(a) Project Co acknowledges that the Highway will be a King's Highway under all interpretations and for all purposes of Applicable Law with ownership vested in HMQ (except to the extent that any part of the Highway is a municipal road or structure with ownership vested in the applicable municipality or other relevant authority). For greater certainty, no provision of the Project Agreement, including this Schedule 40, shall confer upon Project Co any statutory or common law rights or privileges of HMQ with respect to a King's Highway (or of a municipality or other relevant authority with respect to a municipal road or structure) other than the licence rights and other rights specifically set out in this Schedule 40.

(b) Title to each item and part of the Highway, including any materials, supplies, equipment, facilities, parts and any other deliverable or component items, but not the risk of loss or damage or destruction thereto or thereof, shall pass to HMQ (or as HMQ may direct) upon the receipt of such item on the Highway Site, provided however that title to items of tangible personal property (personal property that can be seen, weighed, measured, felt or touched or that is in any way perceptible to the senses and includes computer programs, natural gas and manufactured gas) that comprise the Highway or are to be affixed or attached to a phase of the Highway prior to the Substantial Completion of the Highway Work shall pass to HMQ (or as HMQ may direct) at the time that such items are included in the Highway or affixed or attached to the Highway.

10. [RESERVED]

11. PROJECT CO RESPONSIBILITIES AND CONSTRUCTION OBLIGATIONS HIGHWAY WORK

11.1 General Responsibilities, Standards and Highway Contract Time

(a) Project Co shall perform and complete the Highway Work:

(i) so as to satisfy and in strict accordance with the Contract Documents;

(ii) in accordance with the Highway Construction Schedule and in this regard, shall commence the Highway Work by February 25, 2013 and, subject to adjustment to the Highway Contract Time, as provided for in the Contract Documents: (A) achieve Substantial Completion of the Highway Work by the Highway Scheduled Substantial Completion Date; and (B) achieve Highway Final Completion by the Highway Scheduled Final Completion Date;

(iii) in compliance with Applicable Law, including giving all required notices;

(iv)

(A) in compliance with all Permits, Licences and Approvals and so as to preserve the existence and continued effectiveness of any such Permits, Licences and Approvals;

(B) without derogating from Project Co's obligations under the remainder of this Section 11.1(a), Project Co shall not commence the Highway Work until all necessary Permits, Licences and Approvals required to commence the Highway Work have been obtained and it has notified the City of such in writing at least 15 Business Days prior to commencing the Highway Work;

(v) in accordance with Good Industry Practice (Highway);

(vi) in a timely and professional manner;

(vii) with due regard to the health and safety of persons and property;

(viii) subject to the other provisions of this Schedule 40, in a manner which will not impair the ability of and which will enable City and the City Parties to comply with Applicable Law;

(ix) subject to the other provisions of this Schedule 40 and to the extent reasonably practicable, in a manner which will not impair the ongoing operation of the Existing Highway Infrastructure; and

(x) in accordance with all other terms of this Project Agreement and the other Contract Documents.

(b) Project Co shall furnish necessary certificates as evidence that the Highway Work installed conforms with Applicable Law, including all certificates necessary for the Consultant to certify as required to obtain approval for City's or any Highway User's use of the Highway. These certificates are to be final certificates giving complete clearance for the portions of the Highway Work for which they are obtained.

11.2 General Construction Obligations

(a) Without limiting Section 11.1, Project Co shall:

(i) have complete control of the Highway Work and shall effectively direct and supervise the Highway Work so as to ensure conformance with the Contract Documents, including the phasing or sequencing requirements for the Highway Work set out in the Contract Documents. With respect to the phasing and sequencing requirements set out in the Highway Drawings and Highway Specifications, the City shall approve any changes thereto proposed by Project Co provided, however, that no changes shall be made to the MTO Base Staging Requirements. During the progress of the Highway Work, subject to Section 8.2(i), Project Co shall endeavour to submit any request for information to the Consultant in a timely manner having regard to the Highway Construction Schedule, and to identify in the request for information the timeframe within which a Supplemental Instruction is needed to ensure there is no impact on the Highway Construction Schedule, including whether and how the information requested affects the critical path. Project Co shall develop and implement protocols in accordance with the Highway Specifications for the phasing or sequencing of the Highway Work as set out in the Contract Documents, including the coordination of the work of Other Contractors with the Highway Work. Without limiting the generality of the foregoing, Project Co is responsible for the intermeshing of the various parts and systems comprising any portions of the Highway Work so that no part shall be left in an unfinished or incomplete condition owing to any disagreement

between the Project Co Parties or between any of them and Project Co as to where the Highway Work of one begins and ends in relation to the Highway Work of the other;

(ii) subject to the MTO Base Staging Requirements, be solely responsible for all construction means, methods, techniques, sequences and procedures used to undertake the Highway Work and for coordinating the various parts of the Highway Work under this Project Agreement and shall coordinate the Highway Work so as to not interfere, interrupt, obstruct, delay or otherwise affect the work of others;

(iii) prior to commencing applicable procurement and construction activities, verify, at the Highway Site, all measurements and levels necessary for proper and complete fabrication, assembly and installation of the relevant Highway Work, and shall further carefully compare such field measurements and conditions with the requirements of the Contract Documents. Where dimensions are not included or exact locations are not apparent, Project Co shall immediately notify the Consultant in writing and obtain written instructions from the Consultant before proceeding with any part of the Highway Work affected thereby;

(iv) ensure that no work other than the Highway Work under this Schedule 40 is constructed on the Highway Site by Project Co, any Project Co Party or any person for whom Project Co is responsible at law, except as otherwise required to perform the Design and Construction Works in accordance with the terms of the Project Agreement;

(v) protect the Highway Work from all of the elements, casualty and damage in accordance with and subject to the Contract Documents;

(vi) in respect of plant, equipment, Products and materials incorporated in the Highway Work, use plant, equipment, Products and materials that:

(A) are of a kind that are consistent with the Contract Documents;

(B) are new, of good quality and are used, handled, stored and installed in accordance with Applicable Law, the Contract Documents and Good Industry Practice (Highway); and

(C) where they differ from the Contract Documents, have been substituted with City's prior written consent;

(vii) provide all the labour, Products, tools, construction machinery, equipment, water, heat, light, power, transportation and other facilities and services required for the performance and completion of the Highway Work and carry out, perform, observe, fulfil and abide by all the covenants, agreements, stipulations, provisions and conditions mentioned and

contained in the Contract Documents on the part of Project Co to be carried out, performed, observed and fulfilled;

(viii) exercise the standard of care, skill and diligence that would normally be provided by an experienced and prudent contractor supplying similar services for similar public highway projects, in a timely, good and workmanlike manner, it being acknowledged by Project Co that throughout this Schedule 40, Project Co's obligations, duties and responsibilities shall be interpreted in accordance with this standard and any default or alleged default by Project Co in the performance of its obligations, duties and responsibilities shall similarly be interpreted in accordance with this standard;

(ix) exercise the same standard of due care and diligence as set out in Section 11.2(a)(viii) in respect of any Products, personnel, or procedures which it may recommend to City;

(x) comply with all requirements of City set forth in the Contract Documents;

(xi) comply with all rules and directives issued by City regarding the continued operations of the Existing Highway Infrastructure so as not to disrupt the operations of City, and except for any requirements of City described in Section 11.2(a)(x), the cost, if any, and the additional time, if any, required to comply with any such rules and directives issued by City shall be adjusted and compensated for by way of a Variation Confirmation or Variation Directive, as applicable as provided in Schedule 22 – Variation Procedure; and

(xii) use the same project management software system(s) and/or online collaboration system(s) (including software and system(s) for project management, change management, request for information control, document management and other communications) as specified under the Project Agreement in respect of the Design and Construction Works. Project Co shall be responsible for its costs and expenses with respect to the implementation and use of such system(s).

11.3 Liability Unaffected

(a) Project Co shall not be relieved of any liability or obligation under this Schedule 40 by the retainer or appointment of any Project Co Party, and Project Co shall cause each Project Co Party, to the extent such Project Co Party performs, or is specified hereunder to perform, the Highway Work, to comply with the obligations of Project Co to City in the same manner and to the same extent as Project Co.

(b) No inspection, review, comment, approval, verification, confirmation, certification, acknowledgement or audit pursuant to the provisions of this Schedule 40 by City, the City's Project Manager, the Consultant, or anyone on

their behalf, nor any failure of any of them to do so, shall relieve Project Co from performing or fulfilling any of its obligations under this Schedule 40 or be construed as an acceptance of the Highway Work or any part thereof.

11.4 Project Co Delay

(a) It is agreed that one of the reasons Project Co was selected to perform the Highway Work is Project Co's covenant that it will achieve Substantial Completion of the Highway Work and Highway Final Completion by the dates set out in Section 11.1(a)(ii) of this Schedule 40, and Project Co acknowledges that it is critical to City that Substantial Completion of the Highway Work and Highway Final Completion be achieved by the prescribed dates set out in Section 11.1(a)(ii), and that time is of the essence of this Project Agreement.

11.5 [Reserved]

11.6 Safety

(a) From Financial Close until the Highway Substantial Completion Date, Project Co shall:

(i) keep the Highway Site, the Highway Work and the Highway in a safe and orderly state, as appropriate in accordance with Good Industry Practice (Highway), to avoid danger to persons on the Highway Site, in the Highway and in the immediate vicinity of the Highway Site; and

(ii) take such measures as are reasonable in accordance with Good Industry Practice (Highway) to prevent access to the Highway Site and the Highway of any persons or creatures not entitled to be there.

(b) Without limitation, Project Co acknowledges that the safety and security of the users of the Existing Highway Infrastructure and the safety of the drivers, passengers and pedestrians in the Existing Highway Infrastructure is paramount. If any of the employees of Project Co, or any Project Co Party is determined by City to be a concern for the safety and security of the Existing Highway Infrastructure or for the safety and security of the users or employees in the Existing Highway Infrastructure, in addition to its rights under Article 19, City may require that Project Co replace such employee or restrict access to the Highway Site to that employee and Project Co shall find or cause the Project Co Parties to find substitute employees to proceed with the Highway Work so as not to jeopardize security or safety or cause delay to the progress of the Highway Work contrary to the Highway Construction Schedule.

(c) Project Co shall perform all of the obligations of the 'constructor', within the meaning of OHSA, and shall be solely responsible for construction safety at the Highway Site and for compliance with the rules, regulations and practices required by OHSA.

(d) Prior to commencement of the Highway Work, Project Co shall submit to City:

(i) documentation of a valid WSIB clearance certificate and confirmation of Project Co's or the Construction Contractor's WSIB CAD-7 performance rating;

(ii) documentation of Project Co's insurance coverage;

(iii) documentation of Project Co's in-house safety-related programs; and

(iv) a copy of the Notice of Project filed with the Ministry of Labour.

(e) Project Co hereby represents and warrants to City that appropriate health and safety instruction and training have been provided to the Project Co Parties (to the extent same have access to the Highway Site), before the Highway Work of such Project Co Party is commenced and agrees to provide to City, if requested, proof of such instruction and training.

(f) Project Co shall tour the appropriate area to familiarize itself with the Highway Site prior to commencement of the Highway Work.

(g) Project Co shall perform the Highway Work in accordance with its corporate safety-related programs and Applicable Law. Project Co shall have a competent supervisor on site as required under OHSA at all times.

(h) Prior to commencing the Highway Work and prior to receiving payment on the Highway Milestone Payment Date and in respect of the final certificate for payment pursuant to Section 16.1(o), and for each application for payment, Project Co shall provide a clearance certificate, obtained by the applicable Project Co Parties from the WSIB, indicating compliance with workers' compensation legislation, including payments due thereunder. At any time during the term of this Schedule 40, when requested by City, Project Co shall provide such evidence of compliance by Project Co and/or the applicable Project Co Parties.

11.7 [Reserved]

11.8 Subcontractors and Suppliers

(a) Project Co shall preserve and protect the rights of the parties under this Schedule 40 with respect to Highway Work to be performed under Subcontract, and shall:

(i) enter into Subcontracts or written agreements with Project Co Parties to require them to perform their Highway Work as provided in the Contract Documents and without limiting the generality of the foregoing, shall advise the Project Co Parties of the transfer to Project Co of the design coordination, design errors and omissions and design completion risk as set out in Section 11.17;

(ii) incorporate the relevant terms and conditions of the Contract Documents into all contracts or written agreements with Project Co Parties, including those specified in Article 35; and

(iii) be as fully responsible to City for acts and omissions of the Project Co Parties as for acts and omissions of persons directly employed by Project Co.

(b) Attached as Annex D – List of Project Co Parties is a list of all Project Co Parties which Project Co has engaged or caused to be engaged for the performance of the Highway Work as of the date of execution of this Schedule 40. Project Co agrees to update such list from time to time as additional Project Co Parties are engaged. Subject to Section 59.3 of the Project Agreement, any of these named Project Co Parties listed by Project Co may be changed by Project Co upon prior notice to (but without the approval of) the Consultant, provided however, that if the Consultant reasonably objects to any change to a general contractor, environmental contractor or traffic management coordinator Subcontractor that is a Project Co Party, then Project Co shall select an alternative replacement general contractor, environmental contractor or traffic management coordinator Subcontractor to which the Consultant does not reasonably object.

(c) Project Co shall not be required to employ as a Project Co Party, a person to whom Project Co may reasonably object, provided City may require Project Co to use particular persons as specified in the Contract Documents for specific Highway Infrastructure in respect of the Highway to ensure City does not lose the benefit of any warranty in respect to such Highway Infrastructure. City shall have the right to assign to Project Co the work of Other Contractors in relation to the Highway and, if such assignment results in an increase in Project Co's cost or a delay in the Highway Construction Schedule, the same shall be addressed or compensated for in accordance with the provisions of Schedule 22 – Variation Procedure. Notwithstanding the foregoing provisions of this Section 11.8(c), Project Co shall use the Project Co Parties that have been identified in the Contract Documents for specific portions of the Highway Work and with respect to such Project Co Parties there shall be no increase in Project Co's cost or allowance for any delay in the Highway Construction Schedule.

(d) **[Reserved]**.

(e) **[Reserved]**.

(f) Notwithstanding Section 1.2(c), in the case of any item of the Highway Work being specified under the heading of more than one trade section, Project Co shall decide which of these trades is to perform the Highway Work.

11.9 Labour and Products

(a) Unless otherwise stipulated elsewhere in the Contract Documents or in other documents made available to Project Co by City, Project Co shall, as appropriate,

provide separate metering for all services and facilities necessary for the performance of the Highway Work. Project Co shall arrange for delivery of materials and equipment to the Project in accordance with the Highway Construction Schedule.

(b) Products shall be free from faults, improper workmanship and defects and in conformance with the Contract Documents. Products which are not specified shall be of a quality best suited to the purpose required and their use shall be subject to the approval of the Consultant.

(c) Project Co shall (i) maintain good order and discipline among all personnel engaged in respect of the Highway Work and shall promote and maintain a good relationship with all such personnel; (ii) not employ any persons to perform the Highway Work who is/are incompatible with other labour employed by Project Co in connection with the Highway Work; and (iii) act promptly on all problems of labour relations including grievances and jurisdictional disputes. Project Co shall not employ on the Highway Work anyone not skilled in the task assigned to him and shall adopt and enforce regulations with respect to safety, fire prevention, smoking, the use of alcoholic beverages, illegal drugs and other controlled substances and other activities that will or may constitute a danger to life, health or property.

(d) At City's instruction, Project Co shall promptly remove from the Highway Site any employee who represents a threat to the safety or progress of the Project or persons on the Project or whose conduct may be considered as harassment in the workplace of any person who is an employee of City under the *Human Rights Code* (Ontario).

(e) Project Co is responsible for the safe on-site storage of Products and their protection (including Products supplied by City and Other Contractors) in such a way so as to avoid dangerous conditions or contamination to the Products or other persons or property, and in locations at the Highway Site satisfactory to City.

(f) Title to the Products shall pass to HMQ (or as HMQ may direct) upon payment therefor or upon incorporation into the Project, whichever occurs first. For greater certainty, title to Products delivered, but not installed, shall pass to HMQ when paid for. Project Co shall promptly execute and deliver to City, from time to time as City may require, any further documentation required to identify, evidence, perfect or protect HMQ's interest in the Products, including any registrations pursuant to the *Personal Property Security Act* (Ontario). Subject to Section 11.19(d), notwithstanding the foregoing, Project Co shall continue to bear the risk of loss or damage with respect to the Highway Work until the date of issuance by the Consultant of its certificate under Section 16.2(e) stating the Highway Substantial Completion Date.

11.10 Documents at the Highway Site

(a) Project Co shall keep one copy of the current digital files of the Contract Documents, Highway Construction Schedule, submittals, reports, Supplementary Instructions, Variation Confirmations, Variation Enquiries, Variation Directives, Highway Design Issue resolution documents, partnering documents, records of meetings and all other documents necessary for the administration of the Project at the Highway Site, all in good order and available to City and the Consultant. Project Co shall keep a daily log available to City and the Consultant at all times.

(b) Project Co shall, where practical, keep one copy of current standards and manufacturers' literature specified in the Contract Documents at the Highway Site in good order and available to the Consultant and its representatives for the duration of the Highway Work.

11.11 Highway Shop Drawings

(a) Project Co shall provide Highway Shop Drawings as described in the Contract Documents or as the Consultant may reasonably request.

(b) Project Co shall review all Highway Shop Drawings prior to submission to the Consultant. Project Co represents by this review that:

(i) Project Co has determined and verified all field measurements, field construction conditions and Product requirements, or will do so; and

(ii) Project Co has checked and coordinated each shop drawing with the requirements of the Highway Work and of the Contract Documents.

Project Co shall confirm this review of each shop drawing by stamp, date and signature of the person responsible. At the time of submission, Project Co shall notify the Consultant in writing of any deviations in the Highway Shop Drawings from the requirements of the Contract Documents.

(c) At the commencement of the Highway Work, Project Co shall prepare, for the review and acceptance of the Consultant, a schedule (the "**Highway Shop Drawing Schedule**") of the dates for submission and return (which, in no event, will be less than 10 Business Days following submission and 5 Business Days following any re-submission or such shorter period as may be mutually agreed between Project Co and the Consultant) of Highway Shop Drawings to ensure there is no impact on the Highway Construction Schedule, including, on a reasonable basis, in respect of the Additional Works that apply to the Highway Site, as set out in the Contract Documents or as City has otherwise advised Project Co. The Highway Shop Drawing Schedule shall provide for the submission of Highway Shop Drawings in an orderly sequence and sufficiently in advance to allow for the Consultant's proper review and so as to cause no delay to the Highway Work or the work of Other Contractors which has been incorporated in the Highway Construction Schedule. Project Co shall submit Highway Shop

Drawings to the Consultant and the Consultant shall review and return Highway Shop Drawings in accordance with the Highway Shop Drawing Schedule. If, at any time, Project Co submits an unusually large number of Highway Shop Drawings not contemplated by the Highway Shop Drawing Schedule, such that the Consultant cannot process these drawings within the time permitted in the Highway Shop Drawing Schedule, the Consultant will, within 5 Business Days of receipt of such Highway Shop Drawings, provide Project Co with an estimate of the time necessary for processing such Highway Shop Drawings. Project Co shall periodically re-submit the Highway Shop Drawing Schedule to correspond to changes in the Highway Construction Schedule for the review and acceptance of the Consultant. Shop drawings which require approval of a Governmental Authority having jurisdiction shall be submitted first to the Consultant for its approval in accordance with the approval process set out in this Section 11.11(c) prior to submission by Project Co to such authority. Should the Consultant's review of such Highway Shop Drawings require significant changes to such Highway Shop Drawings, Project Co shall revise same and resubmit to the Consultant prior to submitting to the Governmental Authority having jurisdiction in accordance with the Highway Shop Drawing Schedule.

(d) Project Co shall submit Highway Shop Drawings in the form specified or as the Consultant may direct. The Consultant will review and return Highway Shop Drawings in accordance with the provisions of Section 11.11(c). The Consultant's review is for conformity to the design concept and for general arrangement only. The Consultant's review shall not relieve Project Co of responsibility for errors or omissions in the Highway Shop Drawings or for meeting all requirements of the Contract Documents.

(e) Upon the Consultant's request, Project Co shall revise and resubmit Highway Shop Drawings which the Consultant rejects as inconsistent with the Contract Documents unless otherwise directed by the Consultant. Project Co shall notify the Consultant in writing of any revisions to the re-submission other than those requested by the Consultant.

(f) Only Highway Shop Drawings indicated as 'Reviewed' or 'Reviewed as Noted', or words of similar intent, and bearing the Consultant's review date and initials, shall be used at the Highway Site or for the manufacture or fabrication of Products.

(g) The review of Highway Shop Drawings by the Consultant does not authorize a change in the Highway Milestone Payment and the Highway Final Payment or Highway Contract Time.

(h) Project Co shall prepare and maintain record drawings which shall consist of the Highway Shop Drawings and Highway Specifications revised by Project Co during the Highway Work, showing changes to the Highway Shop Drawings and Highway Specifications, which record drawings shall be kept current by Project Co and made available to the Consultant for review at its request.

(i) All required actions by Project Co under this Section 11.11 shall be taken promptly so as not to cause any delay in the Highway Construction Schedule.

11.12 Use of the Highway Work

(a) Project Co shall confine construction machinery and equipment, storage of Products, and operations of employees to limits indicated by Applicable Law or the Contract Documents and shall not unreasonably encumber the Highway Work with Products.

(b) Project Co shall not load or permit to be loaded any part of the Highway Work with a weight or force that will endanger the safety of the Highway Work.

(c) City shall have the right to enter and occupy the Highway Site in whole or in part for the purpose of placing equipment or for other uses, including the intended use of City before Substantial Completion of the Highway Work, as provided for in the Highway Construction Schedule. Project Co shall cooperate with City, the City's Project Manager and the Consultant, so as to permit City to occupy and to place such equipment in the most efficient manner possible. Such entry and occupation shall not be considered an acceptance of the Highway Work or in any way relieve Project Co from responsibility to complete this Project Agreement. Subject to Section 9.7(e) of the Project Agreement, Project Co is responsible to ensure the completion of the Highway Work in accordance with the Highway Scheduled Substantial Completion Date and that the Highway Work is ready for use by City in accordance with the Contract Documents including the requirements of paragraphs (b) and (c), and to the extent available, paragraph (d) of "Substantial Completion of the Highway Work", as defined in Schedule 1 – Definitions and Interpretation. Project Co acknowledges that Substantial Completion of the Highway Work is only achieved in respect of the Highway Work as a whole and not in respect of any phase.

11.13 Cutting and Remedial Highway Work

(a) Project Co shall do the cutting and remedial work required to integrate the several parts of the Highway Work in a cohesive manner.

(b) Project Co shall coordinate the Highway Work to ensure that this requirement is kept to a minimum.

(c) Cutting and remedial work shall be performed by specialists familiar with the Products affected and shall be performed in a manner to neither damage nor endanger the Highway Work.

11.14 Cleanup

(a) Project Co shall maintain the Highway Work in a tidy condition and free from the accumulation of waste products and debris, other than that caused by City, Other Contractors or their employees.

(b) Project Co shall remove waste products and debris, other than that resulting from the work of City, Other Contractors or their employees, and shall leave the Highway Work clean and suitable for use by City on the Highway Substantial Completion Date. Project Co shall remove products, tools, construction machinery, and equipment not required for the performance of the remaining Highway Work.

(c) Prior to application for the final certificate for payment, Project Co shall remove products, tools, construction machinery and equipment, and waste products and debris, other than that resulting from the work of City, Other Contractors or their employees.

(d) In the event of any dispute regarding the removal of waste products, debris, tools, equipment, and the like, City shall provide a written notice to Project Co to remove the said waste and debris and allow a reasonable period of time for Project Co to remove the said materials. If Project Co fails to remove the materials within the time specified, City may remove the waste products and debris and withhold an amount equal to such cost, in an amount that the Consultant shall determine to be reasonable.

11.15 Project Co Attending Meetings

(a) Project Co shall attend meetings with respect to the Highway Work as may be directed by the Consultant. Project Co shall not claim any extra compensation for attendance at these meetings. Each of Project Co and City shall designate a representative to attend such meetings who is able to make decisions on each of their respective behalfs.

11.16 Defective Highway Work

(a) Project Co shall promptly remove from the Highway Site and replace or re-execute defective Highway Work that fails to conform to the Contract Documents whether or not the defective Highway Work has been incorporated in the Highway Work and whether or not the defect is the result of poor workmanship, use of defective Products or damage through carelessness or other act or omission of Project Co. The correction of defective Highway Work shall be at Project Co's expense. Project Co shall rectify, in a manner acceptable to the Consultant, all defective Highway Work and deficiencies throughout the Highway Work, whether or not they are specifically identified by the Consultant, and Project Co shall prioritize the correction of any defective Highway Work so as not to interfere with or derogate from the Highway Construction Schedule, provided that Project Co shall prioritize the correction of any defective Highway Work that in City's Discretion is determined to adversely affect the day to day operation of the Highway.

(b) Project Co shall Make Good promptly Other Contractors' work destroyed or damaged by such rectifications at Project Co's expense.

(c) If in the opinion of the Consultant it is not expedient to correct defective Highway Work or Highway Work not performed as provided in the Contract Documents, City may deduct from the amount of the Highway Milestone Payment the difference in value between the work as performed and that called for by the Contract Documents. If City and Project Co do not agree on the difference in value, they shall refer the matter to the Consultant for a determination and the determination will be issued as a Variation Confirmation.

11.17 Project Co Highway Design Contingency

(a) The Cost of the Highway Work, the Highway Milestone Payment and the Highway Final Payment include the Project Co Highway Design Contingency.

(b) Subject to City's responsibilities under Section 11.17(c), the Project Co Highway Design Contingency shall apply to any and all changes, extras or costs attributable to:

(i) Highway Design Issues which are properly inferable, readily apparent or readily discoverable from the Contract Documents as forming part of the Highway Work or contrary to Good Industry Practice (Highway) as it relates to the constructability of the Highway Work which Highway Design Issues shall, for greater certainty, be limited to those Highway Design Issues arising under, or with respect to, or in connection with, matters requiring clarification, information and/or further instruction in the Contract Documents that do not constitute negligent design or engineering;

(ii) Highway Design Issues which are related to design coordination and are caused by inconsistencies, conflicts, exclusions, interferences or gaps that are properly inferable, readily apparent or readily discoverable from the Contract Documents, and particularly, the plans, Highway Drawings and Highway Specifications; and

(iii) Highway Design Issues which are related to design completion and where the design intent is properly inferable, readily apparent or readily discoverable from the Contract Documents and has not been fully detailed or specified,

(collectively, the "**Project Co Highway Design Issues**"). The terms "properly inferable", "readily apparent" and "readily discoverable" as used in this Schedule 40, shall be interpreted by taking into consideration Project Co's and the Construction Contractor's experience and the investigation and examination of the Contract Documents carried out by Project Co or by any Project Co Party during the Request for Proposals process prior to the Submission Date, as represented by Project Co to City in Sections 5.1 and 6.5(a) of the Project Agreement and having regard to the standard of care required under Section 11.2(a)(viii).

(c) City shall, as between itself and Project Co, assume full responsibility and liability for the use of the design by Project Co, in all respects other than Project Co Highway Design Issues, including the core efficacy and functionality of the design, both in terms of ability and capacity to:

(i) produce the desired effect in terms of the highway systems, including the structural, mechanical, electrical and information technology systems; and/or

(ii) meet the requirements of Annex G to this Schedule 40 in effect at Financial Close, but this shall not relieve Project Co of the obligation to provide for all standard requirements applicable to the installation of the Highway Work, whether or not set out in the Highway Specifications.

In assessing whether a Highway Design Issue is properly characterized as the responsibility of City, the Consultant shall have regard to the Risk Assessment Guidelines, which provide examples of the types of issues that may be encountered and the findings the Consultant would make regarding the categorization of each as a Project Co Highway Design Issue or a Highway Design Issue for which City is responsible. Project Co and City acknowledge that the Risk Assessment Guidelines are provided for information purposes only and are not complete or exhaustive.

(d) Subject to and without limiting City's responsibilities under Section 11.17(c) and provided that City fulfills its responsibilities under Section 11.17(c), Project Co shall deliver fully functional and operational systems and all components shown in the Highway Drawings shall be provided as fully complete and fully functional systems in accordance with the Contract Documents. Project Co shall verify the dimensions shown in the drawings before the layout of the Highway Work.

11.18 Procedure for Addressing Highway Design Issues

(a) When Project Co identifies a Highway Design Issue, Project Co shall promptly notify the Consultant in writing, under a request for information, of such Highway Design Issue and may propose a resolution to the Highway Design Issue. Upon receipt of Project Co's notification and proposed resolution, if any, the Consultant shall:

(i) if a proposed resolution is provided by Project Co, proceed to review the proposed resolution and either:

(A) confirm that such resolution is acceptable (and a resolution will be considered acceptable if such resolution meets the requirements of the first sentence of Section 11.18(c));

(B) reject the proposed resolution and request that additional information be provided or request that an alternative resolution be proposed by Project Co; or

(C) reject the proposed resolution and provide instructions to Project Co setting out an acceptable resolution;

(ii) if no resolution is proposed by Project Co, provide instructions to Project Co setting out an acceptable resolution.

As soon as the Consultant has confirmed to Project Co an acceptable resolution to the Highway Design Issue, Project Co shall proceed to implement such acceptable resolution. If the Consultant characterizes the Highway Design Issue as a Project Co Highway Design Issue, the Consultant shall issue a Supplemental Instruction and the cost, if any, of implementing the acceptable resolution to the Highway Design Issue shall form part of the Project Co Highway Design Contingency. If the Consultant characterizes the Highway Design Issue as a matter that is not a Project Co Highway Design Issue, the Consultant shall request that City issue a Variation Enquiry or a Variation Directive, as applicable in the circumstances, and the cost, if any, of implementing the acceptable resolution to the Highway Design Issue and the additional time, if any, required to implement the acceptable resolution to the Highway Design Issue shall be documented in a Variation Confirmation. If either City or Project Co is of the view that the Highway Design Issue is not properly characterized by the Consultant, or if either City or Project Co does not agree with the Consultant's decision regarding what constitutes an acceptable resolution to the Highway Design Issue, then either City or Project Co may dispute the characterization of the Highway Design Issue or the Consultant's decision regarding what constitutes an acceptable resolution to the Highway Design Issue, pursuant to Section 11.18(d). The Consultant's response to any Highway Design Issue will be provided in accordance with Section 8.2(i). Any professional design services of the Consultant, whether to issue the Supplemental Instruction, Variation Enquiry, Variation Directive or otherwise, will be a City cost. In assessing whether a Highway Design Issue is properly characterized as a Project Co Highway Design Issue, City and Project Co shall have regard to the Risk Assessment Guidelines. Project Co and City acknowledge that the Risk Assessment Guidelines are provided for information purposes only and are not complete or exhaustive.

(b) When the Consultant identifies a Highway Design Issue, the Consultant shall promptly notify Project Co of such Highway Design Issue in writing as a Supplemental Instruction or by providing a Variation Enquiry or a Variation Directive, as applicable in the circumstances. If issued as a Supplemental Instruction, Project Co may review the Highway Design Issue and propose an alternative resolution to the Consultant. Upon receipt of Project Co's proposed alternative resolution, the Consultant shall proceed to review the proposed alternative resolution and either:

(i) confirm that such resolution is acceptable (and a resolution will be considered acceptable if such resolution meets the requirements of the first sentence of Section 11.18(c));

(ii) reject the proposed resolution, request that additional information be provided or request a further alternative resolution be proposed by Project Co; or

(iii) reject the proposed resolution and provide instructions to Project Co setting out an acceptable resolution.

As soon as the Consultant has confirmed to Project Co an acceptable resolution to the Highway Design Issue, Project Co shall proceed to implement such acceptable resolution. If the Consultant characterizes the Highway Design Issue as a Project Co Highway Design Issue, the Consultant shall issue a Supplemental Instruction and the cost, if any, of implementing the acceptable resolution to the Highway Design Issue shall form part of the Project Co Highway Design Contingency. If the Consultant characterizes the Highway Design Issue as a matter that is not a Project Co Highway Design Issue, the Consultant shall request that City issue a Variation Enquiry or a Variation Directive, as applicable in the circumstances, and the cost, if any, of implementing the acceptable resolution to the Highway Design Issue and the additional time, if any, required to implement the acceptable resolution to the Highway Design Issue shall be documented in a Variation Confirmation. If either City or Project Co is of the view that the Highway Design Issue is not properly characterized by the Consultant or if either City or Project Co does not agree with the Consultant's decision regarding what constitutes an acceptable resolution to the Highway Design Issue, either City or Project Co may dispute the characterization of the Highway Design Issue or the Consultant's decision regarding what constitutes an acceptable resolution to the Highway Design Issue, pursuant to Section 11.18(d). The Consultant's response shall be provided in accordance with the provisions of Section 8.2(i). Any professional design services of the Consultant, whether to issue the Supplemental Instruction, Variation Enquiry or Variation Directive or otherwise, will be a City cost. In assessing whether a Highway Design Issue is properly characterized as a Project Co Highway Design Issue, City and Project Co shall have regard to the Risk Assessment Guidelines. Project Co and City acknowledge that the Risk Assessment Guidelines are provided for information purposes only and are not complete or exhaustive.

(c) An acceptable resolution to a Highway Design Issue shall be a resolution that (i) in all respects is consistent with the design intent and quality standards of the Contract Documents; (ii) will not interfere with the efficient operations of City; and (iii) will not increase the life cycle costs of the Highway. If the resolution to a Highway Design Issue proposed by the Consultant is of a higher quality, not consistent with the design intent and quality standards of the Contract Documents, Project Co will, subject to and in accordance with Schedule 22 – Variation Procedure, be entitled to a Variation in the Scope of the Highway Work.

(d) If either City or Project Co is of the view that a Highway Design Issue is not properly characterized by the Consultant or does not agree with the Consultant's decision regarding what constitutes an acceptable resolution to the Highway

Design Issue, either City or Project Co may dispute the characterization of the Highway Design Issue or the Consultant's decision regarding what constitutes an acceptable resolution to the Highway Design Issue, and such issues will be determined in accordance with Schedule 27 – Dispute Resolution Procedure. Project Co acknowledges that notwithstanding any such dispute, the Consultant may issue a Supplemental Instruction to Project Co for a resolution to the Highway Design Issue and Project Co shall proceed to implement such resolution to the Highway Design Issue in accordance with the Supplemental Instruction issued by the Consultant, pending resolution of the dispute and subject to Section 1A.3 of Schedule 27 – Dispute Resolution Procedure.

(e) The Project Co Highway Design Contingency is included in the Cost of the Highway Work, the Highway Milestone Payment and the Highway Final Payment and Project Co is solely responsible for all costs to remedy all Highway Design Issues that are properly characterized as Project Co Highway Design Issues, and Project Co will not be entitled to any additional compensation or change in the Highway Contract Time with respect to any and all Highway Design Issues that are properly characterized as Project Co Highway Design Issues, subject, in each case, to Section 11.18(c), and to the responsibility of City, at City's cost, for the provision of professional design services as specifically provided in Sections 11.18(a) and 11.18(b). Subject to the preceding sentence, and notwithstanding anything to the contrary in this Schedule 40, Project Co acknowledges and agrees that it shall have no recourse against City in respect of any Project Co Highway Design Contingency or any costs directly or indirectly arising out of a Highway Design Issue that is properly characterized as a Project Co Highway Design Issue. Project Co is not accountable to City for the expenditure of the amount Project Co has carried as the Project Co Highway Design Contingency and City has no entitlement to claim the unused portion, if any, of the Project Co Highway Design Contingency. Payment of the Highway Milestone Payment and the Highway Final Payment to Project Co (which, for greater certainty, shall include any unused portion of the Project Co Highway Design Contingency) shall fully satisfy Project Co in respect of its costs to carry the Project Co Highway Design Contingency and all costs of Project Co to remedy all Highway Design Issues that are properly characterized as Project Co Highway Design Issues. Further to and without limiting the foregoing, but, subject to the limitations set out in Section 57.4 of the Project Agreement, Project Co acknowledges and agrees that it shall have no recourse against the Consultant in respect of any Highway Design Issue, except for claims arising in relation to the professional negligence or errors and omissions of the Consultant.

(f) Project Co shall provide the Consultant, City and the City's Project Manager with a detailed weekly update report in form and substance satisfactory to the Consultant and City, on the status of all outstanding Highway Design Issues.

11.19 [Reserved]

11.20 Temporary Supports, Structures and Facilities

(a) Project Co shall have the sole responsibility for the design, erection, operation, maintenance, and removal of temporary supports, structures, and facilities and the design and execution of construction methods required in their use. Any review of Project Co's temporary supports, structures, or facilities or any Highway Shop Drawings related thereto by City or Consultant does not relieve Project Co of its "sole responsibility" under this section.

(b) Project Co shall engage registered professional engineering personnel skilled in the appropriate disciplines to perform those functions referred to in Section 11.20(a) where required by law or by the Contract Documents and in all cases, where such temporary supports, structures, and facilities and their method of construction are of such a nature that professional engineering skill is required to produce safe and satisfactory results.

(c) Subject to Section 11.17, but notwithstanding the provisions of Sections 11.2, 11.20(a) and 11.20(b) or provisions to the contrary elsewhere in the Contract Documents, where such Contract Documents include designs for temporary supports, structures and facilities or specify a method of construction in whole or in part, such facilities and methods shall be considered to be part of the design of the Highway Work and Project Co shall not be held responsible for that part of the design or the specified method of construction. Project Co shall, however, be responsible for the execution of such design or specified method of construction in the same manner as for the execution of the Highway Work.

11.21 Protection of Highway Work and Property

(a) Project Co shall protect the Highway Work and City and HMQ's property at the Highway Site, including the Existing Highway Infrastructure and property adjacent to the Highway Site, from damage which may arise as a result of Project Co's operations under this Schedule 40, and shall be responsible for such damage, except damage which occurs as a result of:

(i) Highway Design Issues (other than Highway Design Issues which are properly characterized as a Project Co Highway Design Issues under Section 11.17); or

(ii) acts or omissions by City, the Consultant or any contractor retained by City directly and whose contract is not assigned to Project Co, their respective agents and employees.

(b) Should Project Co, in the performance of this Schedule 40, damage the Highway Work, City or HMQ's property at the Highway Site, including the Existing Highway Infrastructure or property adjacent to the Highway Site, Project Co shall be responsible to Make Good such damage at Project Co's expense.

(c) Should damage occur to the Highway Work or City or HMQ's property at the Highway Site, including the Existing Highway Infrastructure for which Project Co is not responsible, as provided in Section 11.21(a), Project Co shall Make Good such damage to the Highway Work and, if City so directs, to City's property and the Highway Milestone Payment and the Highway Final Payment and Highway Contract Time shall be adjusted as provided in Schedule 22 – Variation Procedure.

(d) Project Co shall not undertake to repair and/or replace any damage whatsoever to adjoining property or acknowledge the same was caused or occasioned by Project Co, without first consulting City and receiving written instructions as to the course of action to be followed.

(e) Notwithstanding Section 11.21(d), where there is danger to life or property which arises out of or in connection with the performance of the Highway Work, either Party may, but Project Co shall, take such emergency action as is necessary to remove the danger.

11.22 No Highway Site Encumbrances

(a) Project Co shall not create, incur, permit or suffer to exist any Encumbrance to be filed, issued or registered against the Highway Site or any part thereof or any interest therein due to an act or omission of Project Co or any Project Co Party.

(b) In the event that the Highway Site or any part thereof or any interest therein becomes subject to any Encumbrance which has not been consented to in writing by City due to an act or omission of Project Co or any Project Co Party, Project Co shall immediately take all steps necessary to remove, vacate or discharge such Encumbrance. If such Encumbrance is not removed, vacated or discharged within 10 Business Days of the filing, issuance or registration of such Encumbrance then, without prejudice to any other rights or remedies it may have, City will be at liberty to take whatever steps it deems necessary and appropriate to remove, vacate or discharge the Encumbrance, including payment of any amount owing or claimed thereunder, and seek immediate recovery from Project Co of the amount of any such payment and any associated costs, including legal costs, all of which shall be payable on demand.

11.23 Highway Maintenance Services

(a) Project Co shall perform all of the maintenance and other work to be performed and services to be provided as described in Part A of Annex G - Highway Supplementary Conditions to this Schedule 40 referencing "Notice to Contractor – Queensway Maintenance Requirements", from the commencement of the Highway Work until the Highway Substantial Completion Date.

(b) Project Co shall perform all of the maintenance and other work to be performed and services to be provided in respect of the ATMS and landscaping as described in Item No. 277 – Maintenance and Warranty for Advanced Traffic Management

System Work and in Item No. 154 – Maintenance and Warranty for Landscape Planting in Part C of Annex G - Highway Supplementary Conditions to this Schedule 40 (the "**Highway Post Substantial Completion Maintenance**") from the Highway Substantial Completion Date until the expiry of the Highway Warranty.

12. HIGHWAY CONSTRUCTION SCHEDULE

12.1 The Highway Construction Schedule

(a) Project Co shall:

(i) review the proposed schedules and deadlines of City for the Highway Work and where City has not specified particular dates for the Highway Work, Project Co shall set those dates so as to achieve the Highway Work on an as early as achievable basis and include them in its proposed Highway Construction Schedule under Section 12.1(a)(ii);

(ii) prepare and submit to City and the Consultant as soon as practical and in any event within 45 days of Financial Close, a detailed computerized Highway Construction Schedule (in both hard paper copy and computer readable soft copy) using a critical path method ("**CPM**") network and a Highway Construction Schedule dependent cash flow forecast, each in a form approved by City. The planning and schedule software shall be "Primavera" with the most current release available to be used. The Highway Construction Schedule and any other schedule related reporting requirements of Project Co shall conform to the phasing and sequencing requirements for the Highway Work as set out in the Contract Documents, the Highway Scheduled Substantial Completion Date, the Highway Scheduled Final Completion Date, the Highway Specifications, the schedule for Highway Commissioning and for achieving the Highway Scheduled Substantial Completion Date and the Highway Scheduled Final Completion Date. City and the Consultant will respond to Project Co, in writing, within 10 Business Days of receipt of the Highway Construction Schedule, with either its detailed comments or acceptance of the Highway Construction Schedule as complete;

(A) Without limiting the generality of the foregoing, the Highway Construction Schedule shall:

1. show the sequence and interdependence of all activities required to complete the Highway Work, including time for review of Highway Shop Drawings and mix design submissions, early start date, early finish date, and float times. All network connections used to create a logical schedule and the corresponding durations shall be shown. Activities on the critical path shall be identified clearly on the diagram;

2. reflect operational constraints, interim completion dates, and other scheduling requirements with respect to the Highway Work specified in the Contract Documents; and

3. include all non-working periods and appropriate allowances for inclement weather.

(B) Project Co shall select the activities so that the Highway Work is identifiable and the progress of each activity can be determined. The City reserves the right to limit or increase the number of activities on the diagram.

(C) All revisions to the Highway Construction Schedule shall be highlighted on the updated schedule. Updated schedules submitted shall reflect actual progress of the Highway Work and any additions, deletions, or revisions to the Highway Work that have arisen since the previous update.

(iii) in the event that City and the Consultant do not accept Project Co's initial Highway Construction Schedule submission as complete, Project Co shall re-submit the Highway Construction Schedule as many times as necessary, revised in accordance with City's and the Consultant's detailed comments and each re-submission shall be provided within 5 Business Days of receipt of the Consultant's and City's detailed comments, who in turn shall also respond within 5 Business Days. When the Highway Construction Schedule has been accepted as complete by City and the Consultant, it shall be the baseline Highway Construction Schedule against which Project Co shall monitor progress of the Highway Work;

(iv) advise the Consultant promptly of any error or omission in the Highway Construction Schedule and correct such error or omission;

(v) continuously monitor the progress of the Highway Work in relation to the Highway Construction Schedule and the cash flow and update the Highway Construction Schedule, maintain the continuity of the Highway Construction Schedule's CPM network for all updates and revisions and immediately notify City of any variance or potential variance in the Highway Scheduled Substantial Completion Date and the Highway Scheduled Final Completion Date;

(vi) advise the Consultant of any revisions required to the Highway Construction Schedule as a result of extension of the Highway Contract Time in accordance with Schedule 22 – Variation Procedure;

(vii) identify potential variances between scheduling and scheduled completion dates, review the schedule of Highway Work not started or incomplete and implement necessary adjustments in the Highway Construction Schedule in order to meet the Highway Scheduled Substantial Completion Date and

the Highway Scheduled Final Completion Date set out in the Highway Construction Schedule, including the movement of manpower and equipment in response to availability of work areas;

(viii) comply with the Highway Construction Schedule so as not to interfere with the activities of the MTO and, if applicable, the City in the Existing Highway Infrastructure;

(ix) monitor the Subcontractors' personnel staffing and equipment and the availability of materials and supplies in order to meet the Highway Construction Schedule and take appropriate courses of action when the requirements of a Subcontract with any Project Co Party are not met;

(x) obtain from Project Co Parties a schedule showing the order number, vendor's name, shop drawing status, manufacturing lead time and delivery date of all critical material and equipment required for the Highway Work;

(xi) pre-order equipment, materials and supplies where necessitated by cost and/or time factors and expedite delivery of critical items; and

(xii) in consultation with the City's Project Manager and the Consultant, include in the Highway Construction Schedule the integration of the equipment specifications, rough-in requirements, supply and installation, including of City's equipment to ensure that the ordering, delivery, receiving and supply of equipment does not impact on the Highway Construction Schedule.

12.2 Changes to Critical Path

(a) Any changes to the critical path of the Highway Construction Schedule initiated by Project Co must be approved in writing by City. Subject to the terms of Schedule 22 – Variation Procedure, any City approval of such changes to the critical path does not entitle Project Co to a Variation Confirmation, an extension of the Highway Contract Time or an addition to the Highway Milestone Payment and the Highway Final Payment.

12.3 Failure to Maintain Schedule

(a) If Project Co is not meeting the deadlines set out in the Highway Construction Schedule consistent with its obligations under this Schedule 40, then at the written request of City or the Consultant, Project Co, and the Project Co Parties as required, shall promptly increase efforts on the Project, including the addition of more personnel to the Project during regular times and during periods of time for which overtime may be required, and if the delay is for any reason other than as described in Sections 40.1(a) of the Project Agreement, all expenses and costs incurred as a result shall be borne by Project Co. Any dispute between the parties as to whether Project Co is meeting the deadlines set out in the Highway

Construction Schedule shall be resolved in accordance with the provisions of Schedule 27 - Dispute Resolution Procedure.

13. [RESERVED]

14. CONTAMINATION

14.1 Contamination

(a) **[Reserved]**.

(b) Prior to Project Co commencing the Highway Work, City has:

(i) taken all reasonable steps to determine whether any Hazardous Substances are present at the Highway Site; and

(ii) provided the Consultant and Project Co with a report on any such Hazardous Substances, which report Project Co acknowledges is included in the Highway Site Information.

(c) Project Co shall take all reasonable steps to ensure that:

(i) no person suffers injury, sickness or death and no property is injured or destroyed as a result of exposure to or the presence of Hazardous Substances which were at the Highway Site prior to Project Co commencing the Highway Work, which are described in or are properly inferable, readily apparent or readily discoverable from the Highway Site Information ("**Disclosed Hazardous Substances**");

(ii) all necessary steps are taken under Applicable Law, to dispose of, store or otherwise render harmless Disclosed Hazardous Substances, save and except those not found on or affecting the area of the Highway Work on the Highway Site, unless otherwise expressly required pursuant to the Contract Documents; and

(iii) there is no discharge, escape, emission, leak, deposit, dispersion or migration into the environment ("**Release**") or threatened Release of any Disclosed Hazardous Substances at or from the Highway Site which has or may have an adverse effect upon the environment or human health or safety

as a result of the performance of the Highway Work by Project Co.

(d) Project Co shall take reasonable steps to ensure that:

(i) no person suffers injury, sickness or death and no property is injured or destroyed as a result of exposure to or the presence of Hazardous

Substances brought to the Highway Site by Project Co or any Project Co Party ("**Project Co Hazardous Substances**");

(ii) Project Co and each Project Co Party is responsible to comply with all Applicable Law relating to Project Co Hazardous Substances; and

(iii) there is no Release or threatened Release of any Project Co Hazardous Substances at or from the Highway Site which has or may have an adverse effect upon the environment or human health or safety.

(e) If Project Co:

(i) encounters Hazardous Substances at the Highway Site, or

(ii) has reasonable grounds to believe that Hazardous Substances are present at the Highway Site,

which were not disclosed by City, as required under Section 14.1(b) or which were not properly inferable, readily apparent or readily discoverable from the Highway Site Information (the "**Undisclosed Hazardous Substances**"), Project Co shall:

(iii) take all reasonable steps, including stopping the Highway Work, to ensure that no person suffers injury, sickness or death and that no property is injured or destroyed as a result of exposure to or the presence of the Hazardous Substances; and

(iv) immediately report the circumstances to the Consultant and City in writing.

(f) If Project Co is delayed in performing the Highway Work or incurs additional costs as a result of taking steps required under Section 14.1(e)(iii) (except where a Release or threatened Release is caused by a default by Project Co in the performance of its obligations under this Article 14), the Consultant shall issue appropriate instructions for a Variation in the Scope of the Highway Work as provided in Schedule 22 – Variation Procedure, and the Highway Contract Time shall be extended for such reasonable time as the Consultant may recommend in consultation with City and Project Co, and the Highway Milestone Payment and the Highway Final Payment shall be adjusted by a reasonable amount for costs incurred by Project Co as a result of the delay and as a result of taking those steps.

(g) Notwithstanding Sections 8.2(f), 8.2(g) and Schedule 27 – Dispute Resolution Procedure, the Consultant may select and rely upon the advice of an independent expert in a dispute under Section 14.1(f) and, in that case, the expert shall be deemed to have been jointly retained by City and Project Co and shall be jointly paid by them.

(h) In the event of any Release or threatened Release of any Hazardous Substances at or from the Highway Site, Project Co shall immediately, upon becoming aware of same, notify the Consultant and City of such event.

(i) [Reserved];

(j) If Project Co causes or permits:

(i) any Project Co Hazardous Substances to be dealt with by Project Co or any Project Co Party in a manner which does not comply with Applicable Law or which threatens human health and safety or the environment or causes material damage to the property of City or others; or

(ii) any Disclosed Hazardous Substances which were already at the Highway Site but which were then harmless or stored, contained or otherwise dealt with in accordance with Applicable Law, to be dealt with by Project Co or any Project Co Party in a manner which does not comply with Applicable Law or which threatens human health and safety or the environment or causes material damage to the property of City or others,

Project Co, upon becoming aware of same shall:

(iii) take all reasonable steps, including stopping the Highway Work, to ensure that no person suffers injury, sickness or death and that no property is injured or destroyed as a result of exposure to or the presence of the Hazardous Substances; and

(iv) upon becoming aware of same, report the circumstances to the Consultant and City by telephone, confirmed in writing.

(k) In the circumstances contemplated in Sections 14.1(c), 14.1(d), 14.1(e) or 14.1(j), Project Co shall perform its obligations thereunder, at Project Co's sole cost and expense (except in the circumstances contemplated by Section 14.1(e), which shall be at City's sole cost and expense in accordance with the provisions of Section 14.1(f)). Project Co shall perform its obligations under Sections 14.1(c), 14.1(d), 14.1(e) or 14.1(j), including, as applicable, any clean up, removal, containment, storage or other dealing with relevant Hazardous Substances and any remediation of damage caused thereby, in a manner which the Governmental Authorities determine will:

(i) meet all Applicable Law, including the applicable Table of the Soil Groundwater and Sedimentary Standards for use under Part XV.I of the *Environmental Protection Act* (Ontario), dated March 9, 2004, and ensure compliance with any applicable Permits, Licences and Approvals; and

(ii) rectify all material damage to the property of City and others.

15. SUBSTANTIAL COMPLETION OF THE HIGHWAY WORK

15.1 Substantial Completion of the Highway Work

(a) Project Co shall deliver a notice of the date anticipated to be the Highway Substantial Completion Date (the "**Highway Substantial Completion Countdown Notice**") to the City and the Consultant at least 180 days prior to Highway Scheduled Substantial Completion Date (the "**Required Highway Substantial Completion Notification Date**") confirming whether or not Substantial Completion of the Highway Work shall occur by the Highway Scheduled Substantial Completion Date . If Project Co fails to deliver the Highway Substantial Completion Countdown Notice on or before the Required Highway Substantial Completion Notification Date, it shall be deemed to be a notification that Substantial Completion of the Highway Work will not be achieved by the Highway Scheduled Substantial Completion Date. In the event that Project Co shall provide the Highway Substantial Completion Countdown Notice to the City on or before the Required Highway Substantial Completion Notification Date that Substantial Completion of the Highway Work shall occur by the Highway Scheduled Substantial Completion Date, but Project Co shall determine following such notification that Substantial Completion of the Highway Work shall not occur on or before the Highway Scheduled Substantial Completion Date, Project Co shall notify the City in writing in respect thereof (the "**Subsequent Highway Notice**").

(b) In the event that Project Co provided the Highway Substantial Completion Countdown Notice to the City on or before the Required Highway Substantial Completion Notification Date that Substantial Completion of the Highway Work shall occur by the Highway Scheduled Substantial Completion Date but Substantial Completion of the Highway Work does not occur by the Highway Scheduled Substantial Completion Date (whether or not Project Co sent a Subsequent Highway Notice to the City), the City shall be entitled to an amount of $1,000,000 on account of Liquidated Damages and Project Co shall pay such Liquidated Damages to the City. Such amount of Liquidated Damages shall constitute the City's sole recourse against Project Co in respect of a failure to achieve Substantial Completion of the Highway Work by the Highway Scheduled Substantial Completion Date.

(c) If the Highway Substantial Completion Countdown Notice (or a deemed notification or a Subsequent Highway Notice pursuant to Section 15.1(a)) is provided and states that Substantial Completion of the Highway Work will not be achieved by the Highway Scheduled Substantial Completion Date, Project Co shall deliver a Notice to the City as soon as possible thereafter and in any event before the end of the second month following the Required Highway Substantial Completion Notification Date as to the date on, which Substantial Completion of the Highway Work shall occur (the "**Highway Proposed Date**"), which Highway Proposed Date shall be at least one month plus the number of days to the first Monday after such one month period (the "**Highway Minimum Subsequent**

Time") following the Highway Scheduled Substantial Completion Date (or such earlier date as shall be approved by the City in its Discretion) and which Highway Proposed Date shall require the approval of the City within a period of 10 Business Days thereafter. Failure by the City to provide a response, either positive or negative, shall imply approval by the City. In the event that the City does not approve the Highway Proposed Date, the Highway Proposed Date shall be as mutually agreed upon between Project Co and the City, each acting reasonably, as soon as possible thereafter, and failing agreement within a period of 10 Business Days, the Highway Proposed Date shall be determined by the Dispute Resolution Procedure outlined in Schedule 27 – Dispute Resolution Procedure (which Highway Proposed Date shall in any event be at least the Highway Minimum Subsequent Time following the Highway Scheduled Substantial Completion Date) and take into account the City's operating booking and scheduling requirements. A Highway Proposed Date determined in accordance with this Section 15.1(c) is herein referred to as the "**New Highway Scheduled Substantial Completion Date**".

(d) In the event that Substantial Completion of the Highway Work is not achieved on or before the New Highway Scheduled Substantial Completion Date the procedure set out in Section 15.1(c) respecting the resetting of a New Highway Scheduled Substantial Completion Date shall be repeated (and such procedure shall continue to be repeated, if necessary). Such amount of Liquidated Damages shall constitute the City's sole recourse against Project Co in respect of a failure to achieve Substantial Completion of the Highway Work by the New Highway Scheduled Substantial Completion Date.

(e) In the event that Substantial Completion of the Highway Work is not achieved on or before the New Highway Scheduled Substantial Completion Date, the Liquidated Damages to which the City shall be entitled shall be the sum of $1,000,000 following the New Highway Scheduled Substantial Completion Date to and including the reset New Highway Scheduled Substantial Completion Date, provided that Substantial Completion of the Highway Work is achieved by such reset New Highway Scheduled Substantial Completion Date. Such amount of Liquidated Damages shall constitute the City's sole recourse against Project Co in respect of a failure to achieve Substantial Completion of the Highway Work by the New Highway Scheduled Substantial Completion Date.

(f) In the event that there is a Dispute concerning Substantial Completion of the Highway Work and such Dispute is ongoing, the City shall not be entitled to payment of Liquidated Damages unless and until such Dispute is resolved in accordance with the Dispute Resolution Procedure outlined in Schedule 27 – Dispute Resolution Procedure and, if resolved in favour of the City, the provisions, respecting Liquidated Damages contained in this Section 15.1 shall apply with retroactive effect, except that there shall be added to the amount payable by Project Co on account of Liquidated Damages, interest at the rate of 2 percent per annum from the date the Liquidated Damages were required to be paid in the absence of the Dispute to the date of payment.

(g) The payment of any amount of Liquidated Damages pursuant to this Section 15.1 shall not reduce the maximum amount of liability of Project Co as provided for in Section 57.4 of the Project Agreement.

16. HIGHWAY COMMISSIONING AND COMPLETION

16.1 Highway Commissioning and Completion

(a) Project Co shall give the Consultant and the City Representative notice (the "**Highway Substantial Completion Notice**") upon the satisfaction of all requirements for Substantial Completion of the Highway Work, which shall describe, in reasonable detail, the satisfaction of the requirements for the Substantial Completion of the Highway Work, together with Project Co's opinion as to whether the conditions for issuance of the Highway Substantial Completion Certificate have been satisfied. Project Co shall, by the date which is 20 days prior to the anticipated Highway Substantial Completion Date as set out in the Highway Substantial Completion Notice, prepare a list, in electronic format on software that identifies deficiencies by division, trade and location ("**Project Co's Preliminary Highway Minor Deficiencies List**") of Highway Minor Deficiencies, including an estimate of the cost of and the time for rectifying such Highway Minor Deficiencies.

At any time after receipt of the Highway Substantial Completion Notice, City may request one or more meetings to be attended by the Consultant and representatives of City, Project Co and the MTO to discuss the status of the requirements for Substantial Completion of the Highway Work.

(b) Project Co shall reconfirm the anticipated Highway Substantial Completion Date in a notice given to City and to the Consultant 20 days prior to the anticipated Highway Substantial Completion Date which notice shall include a copy of Project Co's Preliminary Highway Minor Deficiencies List. Project Co shall plan for start up and verification of all systems to be completed no later than 7 days prior to the anticipated Highway Substantial Completion Date. Project Co shall reconfirm the anticipated Highway Substantial Completion Date and when Project Co is satisfied that it has completed all of the requirements for Substantial Completion of the Highway Work, Project Co shall apply to City and the Consultant for certification of Substantial Completion of the Highway Work in a notice to City and the Consultant by the date which is 10 days prior to the anticipated Highway Substantial Completion Date. The Consultant shall in the next following 10 days, proceed to review and inspect the Highway Work for the purpose of: (i) confirming the achievement of Substantial Completion of the Highway Work and providing its report with respect thereto pursuant to Section 16.1(d); (ii) certifying substantial performance of the Highway Work in accordance with the test for substantial performance set out in the CLA pursuant to Section 16.1(c); and (iii) taking into account Project Co's Preliminary Highway Minor Deficiencies List, preparing its own list of Highway Minor Deficiencies (the "**Highway Minor Deficiencies List**") and its estimate of the cost of and the

time for rectifying the Highway Minor Deficiencies set out in the Highway Minor Deficiencies List, and the cost of completing any other work required to meet the requirements of Highway Final Completion.

(c) When the Consultant is satisfied that substantial performance of the Highway Work has been achieved in accordance with the test for substantial performance set out in the CLA, the Consultant shall provide Project Co and City with a certificate of substantial performance (the "**Highway CLA Certificate**"). Project Co shall publish the Highway CLA Certificate in accordance with Section 32(1) of the CLA.

(d) When the Consultant is satisfied that Substantial Completion of the Highway Work has been achieved, the Consultant shall provide to City and to Project Co a report confirming the Highway Minor Deficiencies List and the date on which the Consultant determines that Substantial Completion of the Highway Work was achieved. Failure to include an item on the Highway Minor Deficiencies List does not alter the responsibility of Project Co to complete the Highway Work. The Consultant shall also set out in its report the Net Highway Payment Adjustment, as calculated in accordance with Annex G to this Schedule 40.

(e) The Consultant shall state the Highway Substantial Completion Date as set out in its report delivered under Section 16.1(d) in a certificate (the "**Highway Substantial Completion Certificate**").

(f) The Consultant shall prepare the Highway Minor Deficiencies List before a certificate of Substantial Completion of the Highway Work is issued, and if the Highway CLA Certificate has been issued, then the Consultant shall not withhold the Highway Substantial Completion Certificate by reason solely that there are such Highway Minor Deficiencies.

(g) Project Co shall publish in a construction trade newspaper in the area of the location of the Highway Work, a copy of the Highway CLA Certificate and Project Co shall provide suitable evidence of the publication to the Consultant and City.

(h) On the Highway Milestone Payment Date, City may withhold from the Highway Milestone Payment a holdback amount that is equal to 200% of the amount estimated by the Consultant to complete and rectify the Highway Minor Deficiencies (the "**Highway Minor Deficiencies Holdback**"). The Consultant shall inspect the completion of the Highway Minor Deficiencies and shall provide a monthly progress report to City describing the Highway Minor Deficiencies which have been completed to the satisfaction of the Consultant, and City shall release from the Highway Minor Deficiencies Holdback the amount of any holdback allocated to the Highway Minor Deficiencies which have been completed. If, at any time after the period for completion of the Highway Minor Deficiencies referred to in Section 16.1(l), any of the Highway Minor Deficiencies are not completed in 10 Business Days following Project Co's receipt of a written notice from City to correct the deficient work or Project Co is

not diligently working towards completion of the deficient work to the satisfaction of the Consultant, and unless City otherwise agrees, or the reasons for any delay are acceptable to City, or the delay is caused by City or a City Party, City may engage others to perform the work necessary to complete and rectify the Highway Minor Deficiencies at the risk and cost of Project Co and City may deduct such cost from the Highway Minor Deficiencies Holdback or any other amount remaining owing by City to Project Co. If the cost of completion and rectification of any Highway Minor Deficiencies exceeds the remaining amount in the Highway Minor Deficiencies Holdback, then Project Co shall reimburse the City for all such excess costs.

(i) Project Co shall assign to City (or as City may direct) and submit with the application for Substantial Completion of the Highway Work, all guarantees, warranties (whether from manufacturers, suppliers, or Project Co Parties), certificates, preliminary testing and balancing reports, distribution system diagrams, maintenance and operation instructions, maintenance manuals and materials and any other materials or documentation required to be submitted under this Schedule 40 and otherwise required for the proper use and operation of the Highway Work (collectively, the "**Highway Work Deliverables**"). If Project Co requests, Project Co and the Consultant shall, within 60 days following the request of Project Co, settle and agree upon a list specifying in reasonable detail the items to be assigned and submitted under the foregoing sentence. If Project Co is unable to provide any of the Highway Work Deliverables for any reason, Project Co may submit a list of the outstanding Highway Work Deliverables and if a delay in the delivery of such outstanding Highway Work Deliverables will not impair the safety, security or health of any Highway User, such outstanding Highway Work Deliverables shall be included as Highway Minor Deficiencies. Failure to submit any of the Highway Work Deliverables that are required for the safe use of the Highway Work and as may be necessary for the safety, security and health of the Highway Users, shall be grounds for the Consultant to reject Project Co's application for Substantial Completion of the Highway Work. The assignment by Project Co of all guarantees and warranties shall expressly reserve the right of Project Co to make any claims under such guarantees and warranties for the repair or replacement of any Highway Work and such assignment shall in no way prejudice any rights of or benefits accruing to Project Co pursuant to such guarantees and warranties. For greater certainty, nothing herein is intended to constitute a release or waiver of the obligation of Project Co to submit and assign (as applicable) to City all of the Highway Work Deliverables.

(j) The submission of an application for payment upon Substantial Completion of the Highway Work shall constitute a waiver by Project Co of all claims whatsoever against City under this Schedule 40, whether for a change in the Highway Milestone Payment or the Highway Final Payment, extension of the Highway Contract Time or otherwise, except (i) those made in writing prior to Project Co's application for payment upon Substantial Completion of the Highway Work, and still unsettled; (ii) any third party claim which Project Co was not aware of at such time and with respect to which Project Co is entitled to indemnification from

City in accordance with the Project Agreement; and (iii) subject to any subsequent waiver, claims arising out of any act or omission of City or any City Party after the date of the waiver, and third-party claims arising after the date of the waiver. For greater certainty, for the purposes of clauses (i) and (ii) above, a third party claim does not include any claim by a Project Co Party.

(k) Project Co shall provide As-Built Highway Drawings and Highway Specifications, Record Documents, spare parts and Highway Shop Drawings as soon as possible and in any event within 30 days of the Highway Substantial Completion Date.

(l) Save and except with City's prior written approval, Project Co shall complete all Highway Minor Deficiencies and assign and provide all of the Highway Work Deliverables that remain outstanding no later than 120 days from the date when Substantial Completion of the Highway Work is certified, unless the reasons for any delay are acceptable to City or the delay is caused by City or a City Party.

(m) When Project Co considers the requirements for Highway Final Completion to have been achieved, Project Co shall give the Consultant and City Representative notice in the form set out in Annex H (the "**Highway Final Completion Notice**"), which shall include, in reasonable detail, support for Project Co's opinion that the requirements for Highway Final Completion have been achieved. The Highway Final Completion Notice shall also include the following documentation:

(i) a declaration that no written notices of lien arising from the performance of the Highway Work have been received by it;

(ii) Project Co's Statutory Declaration CCDC 9A;

(iii) Project Co's WSIB Certificate of Clearance;

(iv) a written statement that the Highway Work has been performed to the requirements of the Contract Documents and the Highway Final Completion has been achieved, itemizing approved changes in the Highway Work, the Consultant's written instructions, and modifications required by Governmental Authorities; and

(v) such other documentation as City may request, acting reasonably.

(n) The Consultant will, no later than 10 days after the receipt of an application from Project Co pursuant to Section 16.1(m), complete its review of the Highway Work to verify the validity of the application, and no later than the 3rd Business Day after completing the review, will notify Project Co and the City Representative whether the application is valid or give reasons why it is not valid.

(o) Subject to Article 17 of this Schedule 40, when the Consultant finds Project Co's application for final payment valid, the Consultant will issue a final certificate for payment (the "**Highway Final Completion Certificate**") and shall specify the Highway Final Completion Date.

(p) Subject to the other requirements of this Project Agreement, the Highway Final Payment Date shall be the later of:

(i) the 2nd Business Day following the expiration of all liens in respect of the Highway Work pursuant to the CLA; and

(ii) the 10th Business Day following the Highway Final Completion Date.

(q) No payment by City under the Project Agreement nor partial or entire use of the Highway Work by City or any Highway User shall constitute an acceptance of any portion of the Highway Work or Products which are not in accordance with the requirements of the Contract Documents.

17. APPROVAL OF THE MTO

17.1 Approval of the MTO

(a) Notwithstanding any other provision of the Project Agreement, the Consultant shall not issue the Highway Final Completion Certificate, and the Highway Final Completion Date shall not occur, before the MTO has provided notice of its acceptance of the Highway Work in writing to the Parties (the "**MTO Highway Acceptance**").

(b) As soon as practicable after the receipt of the Highway Final Completion Notice, City shall request, in writing, the MTO Highway Acceptance.

(c) In the event that the MTO indicates to City that the request for the MTO Highway Acceptance is incomplete or deficient, Project Co and City agree to respond promptly to requests of the MTO for additional information it requires to make its determination regarding the issuance of the MTO Highway Acceptance.

(d) In the event that the MTO does not respond in writing to City with respect to the MTO Highway Acceptance within 20 Business Days following the later of:

(i) City's initial request for the MTO Highway Acceptance; or

(ii) the date on which the MTO indicates to City that the request for MTO Highway Acceptance is now complete following the provision of additional information pursuant to Section 17.1(c).

City agrees to use commercially reasonable efforts to cause MTO to respond as soon as practicable.

18. [RESERVED]

19. [RESERVED]

20. [RESERVED]

21. [RESERVED]

22. [RESERVED]

23. [RESERVED]

24. [RESERVED]

25. [RESERVED]

26. [RESERVED]

27. [RESERVED]

28. [RESERVED]

29. [RESERVED]

30. [RESERVED]

31. [RESERVED]

32. [RESERVED]

33. [RESERVED]

34. [RESERVED]

35. WARRANTY

35.1 Project Co Warranty

(a) Project Co warrants that the Highway Work, including all Products, and in addition, all parts and workmanship replaced during the initial warranty period, shall conform to the specifications set out in the Contract Documents in all respects and shall be new, of good quality material, of merchantable quality and fit for their intended purpose, as described in the Contract Documents, and free of defects in materials, equipment and workmanship for a period of two (2) years from, with respect to the Highway Work, from the Highway Substantial Completion Date (the "**Highway Warranty**").

The Highway Warranty shall cover labour and material, including, the costs of removal and replacement of covering materials. The Highway Warranty shall not limit extended warranties on any items of equipment or material called for elsewhere in the Highway Specifications or otherwise provided by any manufacturer of such equipment or material. Project Co shall ensure that all extended warranties specified in the Contract Documents are provided and shall assign to City (or as City may direct) all such extended warranties in accordance with the provisions of Section 16.1(i).

35.2 Corrections

(a) Project Co agrees to correct promptly, at its own expense, in a manner approved by City, defects, deficiencies or non-compliant items in the Highway Work which appear prior to and during the warranty periods set out in Section 35.1. Project Co acknowledges that the timely performance of warranty work is critical to the ability of City to maintain effective operations of the Highway. Project Co shall use commercially reasonable efforts to respond to the requirement of City to correct defective, deficient or non-compliant items in the Highway Work within the time periods required by City which, for example, in relation to critical time periods such as rush hours. Project Co further acknowledges that if City is unable to contact Project Co and/or obtain the corrective work within such time period required by City that Additional Contractors may take such emergency steps as are reasonable and appropriate to correct such defects, deficiencies or non-compliant items in the Highway Work, at Project Co's sole cost and expense, and except in the case of damage caused by Additional Contractors, such emergency steps taken by Additional Contractors shall not invalidate any warranties in respect of such portion of the Highway Work affected by such corrective actions of Additional Contractors.

35.3 Make Good any Damage

(a) Subject to Section 35.2, Project Co shall promptly, and in any event not more than 30 days after receipt of written notice thereof from the Consultant or City, Make Good any defects, deficiencies or non-compliant items in the Highway Work which may develop within periods for which said materials, equipment, Products and workmanship are warranted, and also Make Good any damage to other Highway Work caused by the repairing of such defects, deficiencies or non-compliant items. All of such Highway Work shall be at Project Co's expense. None of such Highway Work shall be the basis of a claim for a Variation Confirmation, additional compensation or damages. The above-noted time period of 30 days shall be subject to the following:

(i) If the corrective Highway Work cannot be completed in the 30 days specified, Project Co shall be in compliance if Project Co:

(A) commences and is diligently proceeding with the correction of the Highway Work within the specified time;

(B) provides City with a schedule acceptable to City for such correction; and

(C) corrects the Highway Work in accordance with such schedule.

(b) If Project Co fails to correct the Highway Work in the time specified or subsequently agreed upon, without prejudice to any other right or remedy City may have, City may correct such Highway Work and deduct the cost and expense

thereof from any payment then or thereafter due to Project Co provided the Consultant has certified such cost to City.

35.4 Performance of Replacement Highway Work

(a) The performance of replacement work and Making Good of defects, deficiencies or non-compliant items for which Project Co is responsible, shall be commenced and completed as expeditiously as possible, and shall be executed at times convenient to City and this may require work outside normal working hours at Project Co's expense. Any extraordinary measures required to complete the Highway Work, as directed by City to accommodate the operation of the Highway or other aspects of the Project as constructed shall be at Project Co's expense.

35.5 Opening, Tests, Inspections

(a) Project Co shall, at any time or times prior to the expiry of said warranty period and when required to do so by City, make such openings, tests, inspections, excavations, examinations, or other investigations in, through, of or in the vicinity of the Highway Work as directed and shall, if required, Make Good again, to the satisfaction of City, any openings, excavations or disturbances of any property, real or personal, resulting therefrom. If any defect, deficiency or non-compliant item for which Project Co is responsible is found in the Highway Work by such investigations, the cost of such investigations and such Making Good shall be borne by Project Co; but if no such defect, deficiency or non-compliant item for which Project Co is responsible is found by such investigations, the said cost shall be borne by City.

35.6 Remedies Not Exclusive

(a) The foregoing express warranties shall not deprive City of any action, right or remedy otherwise available to City at law or in equity for breach of any of the provisions of the Contract Documents by Project Co, and the periods referred to in this Article 35, shall not be construed as a limitation on the time in which City may pursue such other action, right or remedy.

35.7 [Reserved]

35.8 No Limitation

(a) Subject to Section 9.7(f) of the Project Agreement, the performance of work by Other Contractors shall, except with respect to any damage caused by Other Contractors, limit the availability or terms of any warranty.

36. [RESERVED]

37. [RESERVED]

38. [RESERVED]

39. [RESERVED]

40. [RESERVED]

41. [RESERVED]

42. [RESERVED]

ANNEX A
LIST OF HIGHWAY DRAWINGS AND HIGHWAY SPECIFICATIONS

List of Highway Drawings

1. The list of Highway Drawings is comprised of the drawings listed in the sheets titled "INDEX" appearing in:

   a. The drawings book titled "CONTRACT DRAWING BOOK 1 of 4, GWP 4320-06-00, EASTERN REGION, MAY 17, 2012"; and

   b. The quantity sheets book titled "QUANTITY SHEETS, BOOK 1 OF 1, GWP 4320-06-00, EASTERN REGION, MAY 17, 2012".

List of Highway Specifications

The list of Highway Specifications is comprised of the Special Provisions and Specifications listed in Part C – Special Conditions to Annex G of this Schedule 40 as further described below:

1. Special Provisions listed in the Table of Contents on or about pages 48 to 640;

2. General Special Provisions listed under the heading "D. GENERAL SPECIAL PROVISIONS" on or about pages 40 and 41;

3. Item Specific Special Provisions listed under the heading "E. ITEM SPECIFIC SPECIAL PROVISIONS" on or about pages 41 to 43;

4. Standard Special Provisions listed under the heading "F. STANDARD SPECIFICATIONS" on or about pages 43 and 44; and

5. Referenced Standard Specifications listed under the heading "G. REFERENCED STANDARD SPECIFICATIONS" on or about page 44 to 46.

ANNEX B
HIGHWAY COMMISSIONING PROGRAM

1. Project Co acknowledges that the Highway Commissioning as required under the Contract Documents is an integral and important part of the Highway Work and undertakes to provide City with any assistance deemed necessary by City, the Consultant and the Highway Commissioning Agent, if any is appointed by City, in respect of the Highway Commissioning, including ensuring that the Project Co Parties provide whatever assistance City, the Consultant and the Highway Commissioning Agent may reasonably require. Project Co shall be responsible for including in the Highway Construction Schedule the schedule for all Highway Commissioning as it relates to the Highway Substantial Completion Date. A portion of the Highway Commissioning may, as set out in the Highway Specifications in the Contract Documents, be completed prior to Substantial Completion of the Highway Work and completion of Highway Commissioning shall be required prior to Highway Final Completion, except to the extent expressly provided in the Contract Documents to occur following Highway Final Completion.

2. City, the Consultant and the Highway Commissioning Agent will attend, in accordance with the schedule for Highway Commissioning set out in the Highway Construction Schedule, performance tests and demonstrations carried out by Project Co, the Project Co Parties, manufacturers, and other agents, in accordance with the Contract Documents and as is mutually satisfactory to both parties.

3. Project Co and the Project Co Parties will submit copies of all As-Built Highway Drawings, records, manufacturer's written performance equipment data and specification sheets and Highway Shop Drawings to City and the Consultant, and as City and the Consultant may reasonably request, and cooperate, and make reasonable efforts to ensure systems designated for Highway Commissioning are complete and pre-tested as fully operational prior to scheduling tests and demonstrations with City, the Consultant and the Highway Commissioning Agent.

EXHIBIT 1 TO ANNEX B

Commissioning Requirements and Sign Off

Item	Comments	Sign-Off
Enhanced Final Inspection of the Highway Work representation from • CA (Consultant) • City of Ottawa • Project Co-	The Project Agreement is intended to allow City staff, and the Consultant to review the completed Highway Work and ensure that there are no safety issues and that correct signing is in place. It is also important to confirm that all legislative and regulatory requirements are in place such as regulations for stop signs or speed limit signs. Items for review include <u>but are not limited to:</u> • Signs (correct and supported by required regulations) • Pavement markings • Alignment • Signals- temporary removals and permanent in place • Bike Lanes/Ped sidewalks in conformance with contract • Utility company sign offs • Traffic signal operations • Illumination • PHM-125 signed • Commercial and private entrances • Any safety devices are correctly located and operational i.e. guide rail, illumination, active advance warning signs etc. • Final electrical inspection • All contractor testing documentation available and submitted to City • Zone painting restored • Maintenance activities completed • All guiderail installed and verification of mounting heights • Todd signs restored and replaced if damaged by contractor • Erosion control temporary devices removed • All claims resolved	No obvious safety issues are present on this section of highway and all legislative and regulatory requirements are in place. _____ City Representative _____ Construction Company (“Project Co”) P.Eng. _____ Contract Administrator Engineer. (“Consultant”) (P.Eng.)

ANNEX C
RISK ASSESSMENT GUIDELINES

The following chart illustrates the expected treatment of a number of possible changes in the Highway Work:

RISK ASSESSMENT GUIDELINE:

A = Project Co's Highway Design Contingency (PDC)
B = Unforeseen (City's cost)
C = Scope Variation (City's cost)
D = Core design functionality (City's cost)

	A	B	C	D
Contamination is more widespread than shown in the Highway Drawings and Highway Specifications (is not properly inferable, readily apparent or readily discoverable from Highway Site Information).			X	
During the transition from stage 1 work to stage 2 work, temporary asphalt not identified in the quantity sheets or in the drawings is required in order to maintain traffic through a sub-stage lane shift.	X			
During the transition between stages relocation of temporary concrete barrier is required and is not identified in the Contract Documents.	X			
Concrete deck repair areas are laid out after the asphalt and waterproofing have been removed and the areas identified in the condition survey and drawings and specifications are the only areas that require repair however once the poor condition concrete is removed the actual areas are significantly larger than the estimated quantities. (excessive or unnecessary concrete removal).	X			
Concrete deck repair areas are laid out after the asphalt and waterproofing have been removed and areas are identified for repairs that were not indicated in the condition survey and drawings and specifications.		X		
There are discrepancies between the design and actual location of the existing edge of pavement white lines on Highway 417 resulting in: - Shifting of TCBs to the required offset - Obliterating existing edge of pavement white lines and reinstating to the required offset	X			

	A	B	C	D
Construction entrance locations shown in the drawings and specifications restrict some construction activities and limit access to the construction area or require that specialized equipment or construction methods be used.	X			
Mass concrete slab required under any/all abutment footings over existing rock due to the contour of the existing rock. This extra mass concrete was required to ensure a level surface for the top of concrete footing slab.	X			
A proposed light pole shown on the electrical drawings conflicts with a proposed sewer on the drainage drawings requires the proposed light pole location to be adjusted.	X			
On-site conditions (evident visually or on existing utility location drawings) require longer electrical feeds to connect new work to existing electrical utility.	X			
Size (diameter) of proposed new manhole must be increased to accommodate proposed and / or existing sewers.	X			
Culvert length stated in the Quantity Sheets is different than the length determined from station to station and offset information.	X			
The footings for the noise barrier wall are designed for the shallow rock indicated in the geotechnical report. For a 50m section of wall (were no boreholes within this 50m section) the rock is deeper than indicated and requires a different footing design.		X		
When Project Co starts to lay out the work for a structure they find that the piers constructed under a previous contract (by a different contractor) are not at the required elevation for the work. Design of structure must be modified.			X	
When the end treatment for a barrier wall is laid out for installation it is found that the type of end treatment will not function in the location due to the site conditions (proximity to hazards); a new type of end treatment is required.				X
As designed, the proposed slope and size of the sewer does not achieve the recommended self-cleaning velocity. A change in the pipe size or number of manhole structures is required.				X

Note 1: Project Co shall be responsible to meet all codes, regulations, bylaws and standards to the same extent as per industry standard on similar projects in Ontario.

Note 2: These examples are illustrative examples of the types of Highway Design Issues which may be encountered, and the findings the Consultant might reasonably make as to whether the issues are properly characterized as Project Co Highway Design Issues. These examples are not intended to be definitive or complete.

Note 3: It is the intent that the Project Co Parties should also be aware of the Project Co Highway Design Contingency, as defined in Schedule 40 to the Project Agreement.

ANNEX D
LIST OF PROJECT CO PARTIES

Type of Trade	Name of Project Co Party
Construction Contractor	Dragados Canada, Inc. SNC-Lavalin Constructors (Pacific) Inc. EllisDon Corporation

ANNEX E
[RESERVED]

ANNEX F
LEGAL DESCRIPTION OF HIGHWAY SITE

ANNEX G
HIGHWAY SUPPLEMENTARY CONDITIONS

- Part A – MTO General Conditions

- Part B – Addenda

- Part C – Special Conditions

ANNEX H
HIGHWAY FINAL COMPLETION NOTICE

To: Director, Rail Implementation **[●]** day of **[●]**,**[●]**
City of Ottawa
Finance Department, Supply Branch
100 Constellation Crescent
4th Floor West Tower
Ottawa, ON K2G 6J8

And To: Gord Perry, Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road
Carp, ON
K0A 1L0

Dear Sirs:

Re: Highway Final Completion Notice pursuant to a project agreement (as amended, supplemented or modified from time to time, the "**Project Agreement**") dated the 12th day of February, 2013 between the City of Ottawa (the "**City**") and Rideau Transit Group General Partnership ("**Project Co**")

This certifies that:

1. The Highway Work has been constructed to completion under (and in compliance with):
   - the terms of the Project Agreement, and
   - the Highway Commissioning and sign off sheet requirements have been met, and
   - the Highway Commissioning and sign off sheet has been signed by all parties; and,

2. Without limiting item 1:
   - all costs to others for labour, material, services, or otherwise incurred or suffered have been paid in full or otherwise resolved; and
   - no liens by others exist on the date of this certificate as to any cost or matter as provided for under the Agreement; and
   - Project Co's Statutory Declaration CCDC 9A has been provided to the City; and
   - Project Co's WSIB Certificate of Clearance has been provided to the City; and

Project Co therefore requests that the Highway Final Completion Date be _____ .

[Signed by a Project Co representative with appropriate signing authority]

SCHEDULE 41

INTELLECTUAL PROPERTY

1. INTERPRETATION

1.1 Definitions: In this Schedule 41, the following terms have the following meanings:

(a) **"City Intellectual Property"** means:

(i) Intellectual Property that is Owned, created, developed or acquired by the City or any City Personnel:

(A) prior to the Project Term; or

(B) during the Project Term but outside the Project Scope; or

(C) during the Project Term and within the Project Scope, but which is not Project Co Intellectual Property, Subcontractor Intellectual Property or Third Party Intellectual Property;

(ii) the Developed Intellectual Property, excluding any Developed Intellectual Property that is specified in a Variation or by separate agreement of the City and Project Co to be Owned by Project Co;

(iii) any Project Data and Drawings that are specified in a Variation or by separate agreement of the City and Project Co to be Owned by the City; and

(iv) all Modifications to any of the foregoing, whether made by or on behalf of Project Co, the City or any Subcontractor alone, jointly with each other or with any other person;

and which is used by the City, or required to be used by Project Co or a Subcontractor, in the performance of their respective obligations in respect of the Project or under the Project Agreement.

(b) **"City Personnel"** means persons acting on behalf of the City or employed, engaged or retained by the City in connection with the performance of the City's obligations in connection with the Project, including the City's consultants, contractors and subcontractors and the employees, officers, directors, volunteers and agents of the City and its direct and indirect consultants, contractors and subcontractors, excluding Project Co and any Subcontractor and their respective Personnel.

(c) "**City Third Party Intellectual Property**" means Intellectual Property Owned by a person other than the City, Project Co, a Subcontractor or any of their respective Personnel that is delivered, supplied or otherwise provided by the City to Project Co or a Subcontractor under the Project Agreement and which is required by Project Co or a Subcontractor for the performance of their obligations in respect of the Project or under

the Project Agreement (and includes, for the avoidance of doubt, all Intellectual Property Owned by DB Co which relates in any way to the Stage 2 System)

(d) **"Developed Intellectual Property"** means Intellectual Property that is:

(i) created or developed, or Ownership of which is acquired, by Project Co, any Subcontractor or any Project Co Personnel or Subcontractor Personnel, whether alone or together with each other or any other person, during the Project Term and within the Project Scope;

(ii) created, developed or acquired for the purposes of the Project or the System; and

(iii) designed based on functional, design and performance specifications provided by the City and is agreed between the City and Project Co to constitute Developed Intellectual Property;

and, for greater certainty, Developed Intellectual Property does not include any Project Co Intellectual Property used to develop or create the Developed Intellectual Property.

(e) **"Deliverable"** means any item required to be supplied or delivered by Project Co to the City within the Project Scope, including Equipment, Software, Project Data and Drawings and other deliverable requirements specified in Schedule 10.

(f) **"Delivered"** means, with respect to any Intellectual Property, that such Intellectual Property is:

(i) a Deliverable;

(ii) incorporated, embedded or otherwise included in any Deliverable, the System or any part of the Work;

(iii) necessary for the undertaking and completion of the Works, or the Maintenance or Operation of the System, or any Equivalent Activity; or

(iv) necessary for the Use by the City or a subsequent Licensee of any Deliverable, the System, any part of the Work or any Intellectual Property in accordance with the rights granted to the City hereunder;

or that the Use of such Intellectual Property for any of the purposes set out in clause (iii) or (iv) above would infringe the Intellectual Property Rights of any Person.

(g) **"Embedded Software"** means the Project Co Embedded Software, Subcontractor Embedded Software and Third Party Embedded Software.

(h) **"Equivalent Activity"** means any activity, undertaking or operation relating to the System done by the City, any permitted assignee of the City pursuant to section 59.2 of the Project Agreement or any other Person acting on behalf of or under the authority of the City, which activity, undertaking or operation if done by Project Co would be within

the Project Scope, including activities, undertakings and operations within the scope of the Works and the Maintenance of the System.

(i) **"Escrow Agent"** means a recognized provider of escrow services selected by Project Co and having a location within the Province of Ontario from which it will perform its obligations relevant to the Project Agreement.

(j) **"Escrow Agreement"** means an escrow agreement that meets the requirements of section 4.5 and pursuant to which Escrow Materials are held by the Escrow Agent and the City is designated as a beneficiary party.

(k) **"Escrow Materials"** means:

(i) with respect to Software, the Source Materials for that Software;

(ii) with respect to Embedded Software, the Source Materials for that Embedded Software; and

(iii) with respect to any Equipment or Vehicle, a complete copy, in English or such other language as is acceptable to the City, acting reasonably, in both electronic and paper form, suitable for long term archival storage, and appropriately labelled to describe the contents thereof, of all applicable documentation and other explanatory materials for such Equipment or Vehicle as may be required for a person skilled in the applicable technology other than the supplier of such Equipment or Vehicle to specify the performance of such Equipment or Vehicle or replacement parts thereof and to further develop, maintain and operate such Equipment or Vehicle without further recourse to the supplier which will include, to the extent such items have been or are created for such Equipment or Vehicles, pseudocode descriptions, flowcharts and state diagrams, and which shall be deemed to include those materials, as revised from time to time.

(l) **"Escrow Provider"** means:

(i) in respect of any Software, the Licensor of that Software;

(ii) Project Co in respect of the Project Co Embedded Software;

(iii) the applicable Subcontractor in respect of any Subcontractor Embedded Software;

(iv) the applicable third party licensor in respect of any Third Party Embedded Software; and

(v) in respect of any Equipment or Vehicle, whichever of Project Co and one or more Subcontractors is the supplier of such Equipment or Vehicle.

(m) **"Escrow Provider Event of Default"** means (i) where the Escrow Provider is Project Co, a Project Co Event of Default has occurred in accordance with Section 45.1 of the Project Agreement, (ii) where the Escrow Provider is a Contractor, a Construction

Contractor Event of Default or Maintenance Contractor Event of Default (both as defined under the applicable Contract) has occurred, and (iii) where the Escrow Provider is a Subcontractor, which is not one of the Contractors, any default has occurred in respect of the Escrow Provider under the applicable Subcontract as a result of which such Subcontract is or may be terminated.

(n) **"Intellectual Property"** means discoveries, research, developments, designs, industrial designs, improvements, innovations, inventions, software, computer programs and code of all types, layouts, interfaces, applications, tools, databases, hardware, methods, concepts, processes, know-how, formulae, mask works, works subject to copyright, and other technologies, works and creations now existing or developed in the future, whether or not registered or registrable, patentable or non-patentable, or confidential or non confidential.

(o) **"Intellectual Property Rights"** means all intellectual property rights of any kind whatsoever, whether or not registered or registrable, including copyright, patents and patent applications, database rights, industrial design registrations, rights in respect of trademarks, trade names, domain names, mask works, trade secrets and confidential information, and all applications, registrations, renewals, extensions, continuations, divisions, reissues, and restorations relating to any such rights (where applicable) now or hereafter in force and effect throughout all or any part of the universe.

(p) **"Licence"** means a non-exclusive licence, granting the rights and subject to the restrictions and limitations set out in this Schedule 41.

(q) **"Licensed Intellectual Property"** means, with respect to any Licence, the Intellectual Property and Intellectual Property Rights that are within the scope of that Licence as provided for in this Schedule 41.

(r) **"Licensee"** means, in respect of any Licence granted or required to be granted by Project Co pursuant to this Schedule 41, the City or any permitted assignee under section 59.2 of the Project Agreement that is the holder of that Licence at the relevant time.

(s) **"Licensor"** means Project Co in respect of the Project Co Licensed Software, the applicable Subcontractor in respect of any Subcontractor Licensed Software, or the applicable third party licensor in respect of any Third Party Licensed Software.

(t) **"Modification"** means all corrections, modifications, enhancements, improvements, supplements, customizations or derivative works, and **"Modify"** means to make a Modification.

(u) **"Ownership"** means, in respect of any Intellectual Property, ownership of all right, title and interest in and to that Intellectual Property, including all Intellectual Property Rights therein, and **"Own"**, **"Owned"** and **"Owner"** shall have corresponding meanings.

(v) **"Permitted Purposes"** means:

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(i) during the Project Term, performance of the City's obligations under the Project Agreement and any other agreements relating to the Project;

(ii) during the Project Term, all Operations and any activity, undertaking or operation within the Project Scope, including Design, Construction, Maintenance, Repair, Correction and Renovation of the System;

(iii) after the Project Term, any Equivalent Activity;

(iv) both during and after the Project Term, the integration and interoperation of the System, as Designed, Constructed, Operated, Maintained, Repaired, Corrected and Renovated hereunder, with any other light rail project undertaken by the City, including the System Extension;

(v) both during and after the Project Term, and so long as the Licensee is the City or other Governmental Authority:

(A) the provision of governmental services and the conduct of operations and activities provided in connection or otherwise associated with the System and the Lands by the City or any Governmental Authority or any emergency service provider; and

(B) the development of transportation standards, policies and procedures.

(w) **"Personnel"** means (i) in reference to Project Co, the Project Co Personnel, (ii) in reference to the City, City Personnel, and (iii) in reference to any Subcontractor, its Subcontractor Personnel;

(x) **"Project Co Services"** means the services provided by persons employed by Project Co or any Project Co Party (including all relevant grades of supervisory staff) engaged in the provision of the activities within the Project Scope.

(y) **"Project Data and Drawings"** mean any and all drawings, blueprints, schematics, sketches, layouts, designs, reports, documents, plans, calculations and other data prepared by Project Co or any Subcontractor during the Project Term for the purposes of the Project or the System.

(z) **"Project Intellectual Property"** means Intellectual Property that is created or developed, or Ownership of which is acquired, by Project Co, any Subcontractor or any Project Co Personnel or Subcontractor Personnel, whether alone or together with each other or any other person, during the Project Term and within the Project Scope, and which is created, developed or acquired for the purposes of the Project or the Systems, but excluding Software, Embedded Software, Escrow Materials, Project Data and Drawings, Developed Intellectual Property and Technical Information.

(aa) **"Project Co Embedded Software"** means computer software that is Owned by Project Co and that:

(i) is included, embedded or otherwise incorporated in Equipment;

(ii) is not licensed separately and apart from that Equipment; and

(iii) is not subject to a separate warranty, and is not subject to maintenance and repair separately from, that Equipment.

(bb) **"Project Co Intellectual Property"** means:

(i) Intellectual Property that is Owned, created, developed or acquired by Project Co or any Project Co Personnel:

(A) prior to the Project Term; or

(B) during the Project Term but outside the Project Scope; or

(C) during the Project Term and within the Project Scope, but which is not City Intellectual Property, Subcontractor Intellectual Property or Third Party Intellectual Property;

(ii) the Project Co Licensed Software (including the Source Materials therefor);

(iii) the Project Co Embedded Software;

(iv) Project Co's Technical Information;

(v) the Project Intellectual Property;

(vi) the Project Data and Drawings, excluding any Project Data and Drawings that are specified in a Variation or by separate agreement of the City and Project Co to be Owned by the City;

(vii) any Developed Intellectual Property that is specified in a Variation or by separate agreement of the City and Project Co to be Owned by Project Co; and

(viii) all Modifications to any of the foregoing, whether made by or on behalf of Project Co, the City or any Subcontractor alone, jointly with each other or with any other person.

(cc) **"Project Co Licensed Software"** means any computer software that is Owned by Project Co, is not Project Co Embedded Software and is delivered, supplied or otherwise provided by Project Co under the Project Agreement as or as part of any Deliverable.

(dd) **"Project Co Personnel"** means persons acting on behalf of Project Co or employed, engaged or retained by Project Co in connection with the performance of Project Co's obligations under the Project Agreement, including Project Co's consultants, contractors and Subcontractors and the employees, officers, directors, volunteers and agents of Project Co and its direct and indirect consultants, contractors and Subcontractors.

(ee) **"Software"** means any Project Co Licensed Software, Subcontractor Licensed Software and Third Party Licensed Software, but does not include Embedded Software.

(ff) **"Software Maintenance and Support"** means, with respect to any Software, the software maintenance and support services for that Software that form part of the Maintenance Services or that are provided separately under a software maintenance and support agreement with the Licensor of that Software.

(gg) **"Software Tools"** means, with respect to any Software or Embedded Software, any routines, compilers, bootstraps, analyzers, monitors, toolkits and other software tools used by the licensor of such Software or Embedded Software in connection with the programming, compiling, maintenance, debugging, analysis, configuration, customization, verification or monitoring of such Software or Embedded Software;

(hh) **"Source Materials"** means, with respect to any Software or Embedded Software:

(i) a complete source code version of the Software or Embedded Software, in machine-readable form which, when compiled, will produce the executable version of the Software or Embedded Software and in human-readable form with annotations in the English language or such other language as is acceptable to the City, acting reasonably, in both cases on a storage medium suitable for long term archival storage;

(ii) a complete copy, in English or such other language as is acceptable to the City, acting reasonably, in both electronic and paper form, suitable for long term archival storage, and appropriately labelled to describe the contents thereof, of all applicable documentation and other explanatory materials, including programmer's notes, technical or otherwise, for the Software or Embedded Software as may be required for a person other than the licensor of the Software or Embedded Software, using a competent computer programmer possessing ordinary skills and experience, to further develop, maintain and operate the Software or Embedded Software without further recourse to the licensor, which will include, to the extent such items have been or are created for such Software or Embedded Software, general flow charts, input and output layouts, field descriptions, volumes and sort sequence, data dictionary, file layouts, processing requirements and calculation formulae, circuit diagrams and the details of all algorithms and which shall be deemed to include those materials, as revised from time to time; and

(iii) all Software Tools for such Software or Embedded Software, to the extent not previously delivered with the Software or Embedded Software.

(ii) **"Subcontractor Embedded Software"** means computer software that is Owned by a Subcontractor and that:

(i) is included, embedded or otherwise incorporated in Equipment;

(ii) is not licensed separately and apart from that Equipment; and

(iii) is not subject to a separate warranty, and is not subject to maintenance and repair separately from, that Equipment.

(jj) **"Subcontractor Intellectual Property"** means, with respect to each Subcontractor:

(i) Intellectual Property that is Owned, created, developed or acquired by that Subcontractor:

(A) prior to the Project Term; or

(B) during the Project Term but outside the Project Scope; or

(C) during the Project Term and within the Project Scope, but which is not City Intellectual Property, Project Co Intellectual Property or Third Party Intellectual Property;

(ii) the Subcontractor Licensed Software (including the Source Materials therefor);

(iii) the Subcontractor Embedded Software;

(iv) the Subcontractor's Technical Information; and

(v) all Modifications to any of the foregoing, whether made by or on behalf of Project Co, the City or any Subcontractor alone, jointly with each other or with any other person.

(kk) **"Subcontractor Licensed Software"** means any computer software that is Owned by a Subcontractor, is not Subcontractor Embedded Software and is delivered, supplied or otherwise provided by the Subcontractor under the Project Agreement, the Subcontract as or as part of any Deliverable.

(ll) **"Subcontractor Personnel"** means, with respect to any Subcontractor, persons acting on behalf of that Subcontractor or employed, engaged or retained by that Subcontractor in connection with the performance of that Subcontractor's obligations under the Project Agreement or the Subcontract, including the Subcontractor's consultants, contractors and subcontractors and the employees, officers, directors, volunteers and agents of the Subcontractor and its direct and indirect consultants, contractors and subcontractors.

(mm) **"Technical Information"** means technical information relating to any Equipment supplied or Intellectual Property licensed under the Project Agreement, including software documentation, user and operating manuals, maintenance and repair manuals, parts lists and other materials relevant to the use, operation, maintenance or repair of such Equipment or Intellectual Property.

(nn) **"Third Party Embedded Software"** means computer software that is not Owned by the City, Project Co or a Subcontractor and that:

(i) is included, embedded or otherwise incorporated in Equipment;

(ii) is not licensed separately and apart from that Equipment; and

(iii) is not subject to a separate warranty, and is not subject to maintenance and repair separately from, that Equipment.

(oo) **"Third Party Intellectual Property"** means Intellectual Property Owned by a person other than the City, Project Co, a Subcontractor or any of their respective Personnel that is delivered, supplied or otherwise provided by Project Co or a Subcontractor under the Project Agreement as or as part of any Deliverable, including Third Party Licensed Software and Third Party Embedded Software.

(pp) **"Third Party Licensed Software"** means any computer software that is not Owned by the City, Project Co or a Subcontractor, is not Third Party Embedded Software and is delivered, supplied or otherwise provided by Project Co or a Subcontractor under the Project Agreement as or as part of any Deliverable.

(qq) **"Use"** means, with respect to any Intellectual Property, to do any and all things with that Intellectual Property that the Owner of that Intellectual Property and the Intellectual Property Rights therein could do, including to load, transmit, access, execute, use, store, display, copy, adapt, translate, incorporate into other materials, practice, make and have made, but specifically excluding the right to Modify and subject to any limitations in the provision of this Schedule 41 pursuant to which a Licence is granted.

1.2 Other: A reference in this Schedule 41 to a section or paragraph number is to the section or paragraph of this Schedule 41 bearing that number, unless expressly stated otherwise.

2. SUMMARY OF OWNERSHIP AND LICENCES

2.1 Summary Table: The following is a summary of the Ownership and Licences granted in respect of each category of Intellectual Property referred to in this Schedule 41.

IP Category	City	Project Co	Subcontractor
City Intellectual Property	Ownership	Licence to Use and Modify for the Project	Licence to Use and Modify for the Project
City Third Party Intellectual Property	Licence Rights	Licence to Use and Modify for the Project	Licence to Use and Modify for the Project
Project Co Intellectual Property (excluding items listed separately below)*	Licence to Use and Modify for the System	Ownership	Licence to Use and Modify for the Project (if required for Subcontractor's work)
Project Co Licensed Software*	Licence to Use for the System	Ownership	Licence to Use for the Project (if required for Subcontractor's work)

IP Category	City	Project Co	Subcontractor
Project Co Embedded Software*	Licence to Use for the System within the Equipment in which it is embedded	Ownership	Licence to Use for the Project (if required for Subcontractor's work)
Source Materials for Project Co Licensed Software and Project Co Embedded Software	Licence to Use and Modify for the System upon release from escrow	Ownership	Not applicable.
Subcontractor Intellectual Property (excluding items listed separately below)*	Licence to Use and Modify for the System	Licence to Use and Modify for the Project	Ownership
Subcontractor Licensed Software	Licence to Use for the System	Licence to Use for the Project	Ownership
Subcontractor Embedded Software	Licence to Use for the System within the Equipment in which it is embedded	Licence to Use for the Project	Ownership
Source Materials for Subcontractor Licensed Software and Subcontractor Embedded Software	Licence to Use and Modify for the System upon release from escrow	Not applicable	Ownership
Developed Intellectual Property	Unless otherwise agreed, Ownership	Unless otherwise agreed, Licence to Use and Modify for the Project	Licence to Use and Modify for the Project (if required for Subcontractor's work)
Project Intellectual Property	Licence to Use and Modify for the System	Ownership	Licence to Use and Modify for the Project (if required for Subcontractor's work)
Project Data and Drawings	Unless otherwise agreed, Licence to Use and Modify for the System	Unless otherwise agreed, Ownership	Licence to Use and Modify for the Project (if required for Subcontractor's work)
Third Party Intellectual Property	Subject to third party licence agreement, licence to Use and	Subject to third party licence agreement, licence to Use and	Subject to third party licence agreement, licence to Use and

IP Category	City	Project Co	Subcontractor
	Modify for the System	Modify for the Project	Modify for the Project

*Subject to the restriction in relation to **"**Permitted Purposes**"** set out in section 4.2(b) below.

2.2 **Conflicts:** In the event of any conflict between the summary table in section 2.1 and any other provision of this Schedule 41, the latter provision shall govern.

3. OWNERSHIP

3.1 **Project Co:** Project Co shall be and remain the sole and exclusive Owner of the Project Co Intellectual Property, provided that nothing in this Schedule 41 shall transfer to Project Co any Ownership of, or grant to Project Co any right in respect of, City Intellectual Property used in the creation or development of or that is embodied, incorporated, embedded, otherwise included or illustrated in any Project Co Intellectual Property, except for the Licence granted under section 4.1.

3.2 **City:** The City shall be and remain the sole and exclusive Owner of the City Intellectual Property, provided that nothing in this Schedule 41 shall transfer to the City any Ownership of, or grant to the City any right in respect of, the Project Co Intellectual Property used in the creation or development of or that is embodied, incorporated, embedded, otherwise included or illustrated in any City Intellectual Property, except for the Licence granted under section 4.2.

3.3 **Subcontractor:** As between the City and Project Co, but subject to any agreement to the contrary between Project Co and any Subcontractor, each Subcontractor shall be and remain the sole and exclusive Owner of its Subcontractor Intellectual Property.

3.4 Assignments

(a) If, notwithstanding section 3.1, 3.2 or 3.3, either party (the **"Assignor"**) retains, acquires or owns any right, title or interest, including any Intellectual Property Rights, in or to anything that is to be Owned by another person (the **"Assignee"**) pursuant to section 3.1, 3.2 or 3.3, as applicable, (the **"Assigned Intellectual Property"**), then the Assignor will assign, and for no further consideration and without any further act or formality does hereby irrevocably assign, to the Assignee all of the Assignor's worldwide right, title and interest in and to the Assigned Intellectual Property, including all Intellectual Property Rights therein, free and clear of all liens, claims, charges or encumbrances, but subject to any Licences granted or required to be granted by the Assignee to the Assignor pursuant to this Schedule 41.

(b) If and to the extent that the assignment pursuant to subsection 3.4(a) is not effective on the date hereof or on any future date, either generally or pursuant to the laws of any jurisdiction, then any and all right, title and interest, including Intellectual Property Rights, in and to the Assigned Intellectual Property that is retained, acquired or owned by

the Assignor (collectively, the **"Trust Rights"**), will be held by the Assignor in trust for the exclusive benefit and use of the Assignee, except for any Licences granted or required to be granted by the Assignee to the Assignor pursuant to this Schedule 41, and the Assignor will execute and deliver to the Assignee such transfers, assignments, documents and instruments as may be necessary to transfer and assign to the Assignee the Trust Rights, free and clear of all liens, claims, charges or encumbrances, promptly upon receipt thereof from the Assignee, and will otherwise cooperate with the Assignee to give effect to, record and register the Assignee's ownership of the Trust Rights.

(c) Project Co will include in each Subcontract provisions equivalent to subsections 3.4(a) and 3.4(b) with respect to City Intellectual Property, Developed Intellectual Property, Project Data and Drawings and any Modifications thereto, and shall enforce those provisions against each Subcontractor to the extent necessary to ensure that the City remains at all times the sole and exclusive Owner of all City Intellectual Property, including Developed Intellectual Property, Project Data and Drawings agreed to be Owned by the City and any Modifications thereto.

3.5 Personnel: The City and Project Co shall, and Project Co will include in each Subcontract an obligation of each Subcontractor to, ensure that their respective Personnel shall:

(a) by duly executed written agreement or by operation of law, irrevocably and unconditionally sell, assign and transfer to that party all right, title and interest, including all Intellectual Property Rights, that its Personnel may have in or to any and all Intellectual Property referred to in this Schedule 41 and all Modifications thereto, such that agreements as to Ownership of Intellectual Property pursuant to sections 3.1, 3.2 and 3.3 and the assignment by that party pursuant to section 3.4 include all right, title and interest, including all Intellectual Property Rights, of its Personnel; and

(b) by duly executed written agreement, irrevocably waive all non transferable rights, including moral rights, that they have or may have in any Intellectual Property assigned by such Personnel pursuant to subsection 3.5(a) in favour of the assignee and its successors, assigns and licensees.

3.6 Residuals: Notwithstanding any other provision of the Project Agreement to the contrary, Project Co and each Subcontractor and their respective Personnel shall be free to use and employ their general skills, know how and expertise, and to use, disclose and employ any generalized ideas, concepts, know-how, methods, techniques or skills gained or learned during the course of the Project and any services performed hereunder, provided that:

(a) Project Co and each Subcontractor will, and will require their respective Personnel to, not disclose or use the City's Confidential Information except as expressly permitted pursuant to the terms of the Project Agreement; and

(b) nothing in this section 3.6 shall be deemed to grant to Project Co, any Subcontractor or any Project Co Personnel or Subcontractor Personnel any right or licence in respect of any City Intellectual Property.

3.7 Use and Modification of Project Data and Drawings: Notwithstanding the Ownership by Project Co or the City of the Project Data and Drawings, the City agrees that:

(a) the City will not, nor will it permit any other person to, Use or Modify the Project Data and Drawings other than for the Permitted Purposes, without the prior written consent of Project Co; and

(b) the City will defend, indemnify and save harmless Project Co and Project Co Personnel from and against any Claims and Direct Losses that may be suffered or incurred by Project Co or any Project Co Personnel as a result of the Use or Modification of the Project Data and Drawings other than for the Permitted Purposes.

4. LICENCES

4.1 Licence by City to Project Co

(a) Subject to subsection 4.1(d), the City hereby grants to Project Co:

(i) a royalty free, fully paid-up, limited Licence to Use and Modify City Intellectual Property for the sole purpose of and only to the extent necessary for the performance by Project Co of the Project Scope and its obligations under the Project Agreement, including any Vehicle and Fixed Equipment Warranties;

(ii) a limited Licence to Use and Modify City Third Party Intellectual Property for the sole purpose of and only to the extent necessary for the performance by Project Co of the Project Scope and its obligations under the Project Agreement, including any Vehicle and Fixed Equipment Warranties.

(b) Subject to subsection 4.1(d), Project Co may sublicense its rights under the Licence granted in subsection 4.1(a) to any Subcontractor for the sole purpose of and only to the extent necessary for the performance by that Subcontractor of its obligations under its Subcontract, including any warranty obligations thereunder.

(c) Except as provided in subsection 4.1(b), Project Co may not transfer, assign, sublicense or otherwise dispose of the Licence granted under subsection 4.1(a) without the prior written consent of the City, which consent may be given or refused by the City in its absolute and unfettered discretion.

(d) The Licence of any City Third Party Intellectual Property pursuant to subsection 4.1(a) shall be subject to the terms and conditions of the licence agreement between the City and the licensor of the City Third Party Intellectual Property. The City will provide to Project Co a copy of any such third party licence agreement (which may be redacted as to financial and other terms not relevant to use of the City Third Party Intellectual Property by Project Co and Subcontractors), or where prohibited from doing so by obligations of

confidentiality to the third party licensor, a summary of the obligations, limitations and restrictions applicable to use of the City Third Party Intellectual Property by Project Co and Subcontractors. Project Co will comply, and will require any Subcontractor to comply, with the terms and conditions of such third party licence agreement (as set out in the copy of the third party licence agreement or summary thereof provided by the City to Project Co) to the extent applicable to Project Co and any Subcontractor in the performance of their respective obligations under the Project Agreement and any Subcontract. If requested by the City, Project Co will, and will require any Subcontractor to, execute and deliver to the City and the third party licensor an agreement that includes reasonable terms for the protection of the confidentiality of the City Third Party Intellectual Property and an acknowledgement of the third party licensor's ownership thereof, unless Project Co disputes such ownership. If Project Co or its Subcontractors are unable to, or will incur additional costs in order to, comply with any such third party licence agreement or refuse to enter into an agreement with the third party licensor on the terms contemplated in the preceding sentence, the System will be altered through the Variation Procedure to permit Project Co and its Subcontractors to comply with such third party licence agreement and to address the additional costs of compliance, or to exclude the use of such City Third Party Intellectual Property.

(e) The Licence granted to Project Co under subsection 4.1(a), and any sublicence granted by Project Co to a Subcontractor thereunder, will terminate upon the expiry or termination of Project Co Services and other obligations under the Project Agreement, including in respect of the Vehicle and Fixed Equipment Warranties.

(f) The City shall ensure that the Licence of the Intellectual Property Owned by DB Co (to the extent it falls within the definition of the City Third Party Intellectual Property) shall not be terminated pursuant to Schedule 24 – Intellectual Property of the DB Co Works Agreement by reason of any failure by the City to make payments due to DB Co under such agreement.

4.2 Licence by Project Co to the City

(a) Project Co hereby grants to the City a Licence to:

(i) Use and Modify Project Co Intellectual Property (excluding Project Co Licensed Software and Project Co Embedded Software) that is Delivered and the Subcontractor Intellectual Property (excluding the Subcontractor Licensed Software and the Subcontractor Embedded Software) that is Delivered;

(ii) Use Project Co Licensed Software that is Delivered and the Subcontractor Licensed Software that is Delivered; and

(iii) Use Project Co Embedded Software and the Subcontractor Embedded Software as part of and for the Use of the Equipment in which such software is included, embedded or otherwise incorporated;

for the Permitted Purposes. The Licences granted pursuant to this section 4.2 in respect of Software and Embedded Software apply to the only object code versions thereof, unless and until the Source Materials for any such Software or Embedded Software are released pursuant to the applicable Escrow Agreement and section 4.5, upon which the Licence granted in respect of such Source Materials pursuant to subsection 4.5(e) shall also apply.

(b) The Licence granted pursuant to this section 4.2 is limited as follows:

(i) with respect to Project Co Intellectual Property and Subcontractor Intellectual Property (excluding the Subcontractor Licensed Software and the Subcontractor Embedded Software) that is Delivered in relation to or as part of the Design and Construction Works for the Stage 1 System only, the reference to "Permitted Purposes" in section 4.2(a) shall be interpreted as if the Stage 2 Maintenance Services Variation had not been entered into;

(ii) [not used].

(c) The Licence granted pursuant to this section 4.2 will be irrevocable (except as provided in subsection 4.2(d)), perpetual, royalty free, fully paid-up (upon payment of the first Milestone Payment, Monthly Service Payment or Annual Service Payment (as applicable) in respect of the Deliverable which consists of or incorporates the Licensed Intellectual Property in respect of which the Licence is granted), and permit Use by the City on an enterprise basis without restriction or limitation as to users (whether by number, identity or otherwise), location, authorized system or otherwise, as part of the System.

(d) The Licence granted pursuant to this section 4.2 may be transferred, assigned, sublicensed and otherwise disposed of by the City subject to and in accordance with section 59.2 of the Project Agreement, provided that the Licence in respect of Project Co Embedded Software and Subcontractor Embedded Software may only be transferred together with the Equipment in which such software is included, embedded or otherwise incorporated.

(e) The Licence granted pursuant to this section 4.2 may not be terminated except in the following circumstances:

(i) the failure of the Licensee to pay the applicable fees as provided for in the Project Agreement for the specific Deliverable which consists of or incorporates the Licensed Intellectual Property; or

(ii) the Use or Modification by the Licensee of the Licensed Intellectual Property in any manner or for any purpose not permitted by this Schedule 41;

and in each case such failure is not remedied or such breach is not ceased by the Licensee within 30 days after notice by Project Co to the Licensee demanding that such failure be remedied or such breach cease, provided that any such termination shall apply only to the

Licensed Intellectual Property to which such failure or breach applied and not to any other Licensed Intellectual Property. Except as specifically provided in this subsection 4.2(d), Project Co shall not be entitled to terminate or rescind the Licence granted under this section 4.2, and if the Licensee commits any other breach of or default under this Schedule 41, whether material or not and whether that breach or default is or is not capable of being remedied, Project Co's rights and remedies in respect of that breach or default shall be limited to such rights and remedies other than termination or rescission of the Licence granted under this section 4.2 as may exist at law or in equity, it being acknowledged by Project Co that except as provided in this subsection 4.2(d) the Licence granted under this section 4.2 is perpetual and irrevocable. No breach of or default under this Schedule 41 by the City shall constitute a repudiation of the Licence granted under this section 4.2 by the City.

(f) The Licensee may provide and disclose the Licensed Intellectual Property to any employee, contractor, subcontractor, consultant, service provider, outsourcer or other person retained by the Licensee in connection with the Permitted Purposes, and any such employee, contractor, subcontractor, service provider, outsourcer or other person may exercise all rights to Use and Modify the Licensed Intellectual Property as may be granted by the Licensee to such person within the scope of the Licence granted by Project Co to the Licensee pursuant to this Schedule 41, provided that the Licensee shall be responsible for anything done or failed to be done by any employee, contractor, subcontractor, service provider, outsourcer or other person to whom the Licensee provides and discloses the Licensed Intellectual Property, including a breach by any such person of the City's obligations of confidentiality in respect of any Confidential Information that is or is part of Licensed Intellectual Property.

(g) The Licensee may Use Software that is licensed pursuant to this section 4.2 in multiple environments or instances, including for training, development, testing, staging, and disaster recovery and in a live, production or operating environment.

(h) The Licensee may make copies of the Licensed Intellectual Property as may be reasonably necessary for Use and Modification of the Licensed Intellectual Property in accordance with the Licence granted pursuant to this section 4.2. All such copies shall be Owned by Owner of the original Licensed Intellectual Property and licensed to the Licensee pursuant to this section 4.2. Except as permitted by this section 4.2 or the Escrow Agreement, the Licensee will not copy, Modify, disassemble, reverse engineer, decompile, translate or otherwise obtain or create the source code for any Project Co Intellectual Property, Project Co Licensed Software, Project Co Embedded Software, Subcontractor Intellectual Property, Subcontractor Licensed Software or Subcontractor Embedded Software.

(i) The Licensee will not remove from any Licensed Intellectual Property any markings or notices with respect to the ownership thereof, copyright therein or the confidentiality thereof.

(j) Project Co will provide maintenance and support for any Project Co Licensed Software and the Subcontractor Licensed Software on terms and conditions acceptable to the City.

4.3 Licences with Subcontractors

(a) Project Co will be responsible to obtain from each Subcontractor the right to grant the Licence under section 4.2 in respect of the Subcontractor Intellectual Property.

(b) Project Co will be responsible to obtain from each Subcontractor the right to Use and Modify the Subcontractor Intellectual Property to the extent necessary for Project Co to perform its obligations under the Project Agreement, on such terms as are not in breach of or conflict with the Project Agreement.

(c) Project Co will be responsible to grant to each Subcontractor the right to Use and Modify City Intellectual Property and Project Co Intellectual Property to the extent necessary for each Subcontractor to perform its obligations under its Subcontract, on such terms as are not in breach of or conflict with the Project Agreement.

4.4 Third Party Intellectual Property: Project Co will not, and will not permit any Project Co Personnel, Subcontractor or Subcontractor Personnel to, incorporate, embed or otherwise include in the System or any Deliverable any Third Party Intellectual Property unless:

(a) for Third Party Intellectual Property other than Third Party Embedded Software, such Third Party Intellectual Property is provided by the Owner thereof pursuant to a licence agreement that:

(i) grants to the Licensee rights equivalent to or better than the rights granted under the Licence in section 4.2, including being assignable in accordance with subsection 4.2(c), and, where the Third Party Intellectual Property is software or includes software, provides for the maintenance and support of that software on terms acceptable to the City and an Escrow Agreement in accordance with section 4.5; or

(ii) has been approved by the City in writing, which approval may be given or refused by the City in its absolute and unfettered discretion;

and such licence agreement, if not entered into with the City directly, has been assigned or is freely assignable to the City;

(b) for Third Party Embedded Software, either (i) such Third Party Embedded Software is embedded in Equipment and is not provided by the Owner thereof pursuant to a licence agreement, but may be used by the City or any subsequent owner of the machine or equipment as part of and for the intended purposes of such machine or equipment upon the purchase thereof, or (ii) such Third Party Embedded Software is subject to a licence agreement that complies with subsection 4.4(a).

If Project Co, Project Co Personnel, Subcontractor or Subcontractor Personnel incorporates, embeds or includes any Third Party Intellectual Property in the System or any Deliverable other than in compliance with this section 4.4, then in addition to any other rights and remedies the

City may have against Project Co, Project Co will at its sole expense take all necessary steps to comply with this section 4.4 or, if Project Co is unable to do so, to remove such Third Party Intellectual Property and replace it with Project Co Intellectual Property that provides the same functionality and performance as such Third Party Intellectual Property and which will operate within the System without any degradation thereof or adverse effect thereon, and which will be subject to either: (i) the acceptance testing specified in this Project Agreement that applied to all or part of the Deliverable in which the Third Party Intellectual Property was previously embedded or included in the System; or (ii) if no acceptance testing was specified in this Project Agreement as applying to the Deliverable in which the Third Party Intellectual Property was previously embedded or included in the System, acceptance testing of a nature and extent as would be suitable and acceptable in similar circumstances. Upon acceptance thereof, it will be included in the Project Co Intellectual Property for the purposes of the Licence granted pursuant to section 4.2.

4.5 Escrow Agreements

(a) If requested by the City (which for the purposes of this section 4.5 includes any permitted assignee under section 59.2 of the Project Agreement), at any time during the Project Term, Project Co will, or will require the applicable Subcontractor or third party licensor to, enter into an Escrow Agreement for any Software, Embedded Software, Equipment or Vehicle (an "**Escrowed Deliverable**") on terms that comply with this section 4.5, or amend its existing Escrow Agreement for such Software, Embedded Software, Equipment or Vehicle to comply with this section 4.5, and add the City as a beneficiary under the Escrow Agreement.

(b) The Escrow Provider will deposit with the Escrow Agent the Escrow Materials for the Escrowed Deliverable and all Modifications thereto provided by the Escrow Provider to the City as part of the Project Co Services, Software Maintenance and Support (if purchased by the City) or any other services performed by the Escrow Provider for the City, and in the case of Software the Escrow Provider will update the Escrow Materials to conform to the then-current version of the Software in use by the City after a relevant Modification has been made.

(c) The City will have the right, on reasonable notice to the Escrow Provider and the Escrow Agent, to verify that the Escrow Materials conform to the Escrowed Deliverable supplied to and in use by the City to which the Escrow Materials relate; in addition, the City may purchase such additional verification services as may be offered by the Escrow Agent and the Escrow Provider will cooperate with the City and the Escrow Agent in the performance of those verification services.

(d) The City will have the right to obtain from the Escrow Agent a copy of the Escrow Materials upon any of the following events:

(i) the Escrow Provider is bankrupt;

(ii) a trustee, receiver, manager, receiver-manager, custodian or Person having similar authority is appointed for the Escrow Provider or its business and assets and is not released or removed within 30 days after the appointment;

(iii) the Escrow Provider seeks protection from its creditors or undertakes any reorganization for the purpose of obtaining relief from its creditors;

(iv) the Escrow Provider ceases to carry on business;

(v) an Escrow Provider Event of Default has occurred; or

(vi) in the case of Software, if the City is purchasing Software Maintenance and Support for the Software in respect of which the Escrow Materials have been deposited, if the Escrow Provider has given the City notice that it will no longer provide Software Maintenance and Support or if the Escrow Provider defaults in the performance of Software Maintenance and Support and does not remedy that default within thirty (30) days after receipt of notice from the City demanding that the Escrow Provider do so; or

(vii) in the case of an Escrowed Deliverable other than Software, the Escrow Provider ceases to manufacture and supply the replacements for the Escrowed Deliverable or replacement parts for the Escrowed Deliverable that are within the scope of the Escrow Materials for that Escrowed Deliverable.

(e) Upon the release of the Escrow Materials to the City, the Escrow Provider grants to the City a Licence to:

(i) Use the Escrow Materials to enable the City to Use the Escrowed Deliverable to which the Escrow Materials relate for the Permitted Purposes, and where the Escrowed Deliverable is or contains Licensed Intellectual Property in accordance with the Licence applicable thereto;

(ii) make Modifications to the Escrow Materials, subject to the City's indemnity obligations under Sections 56.2(a)(i) and 56.2(a)(iii) of the Project Agreement and subsections 3.7(b) and 4.5(i);

(iii) in the case of Escrow Materials for Software and Embedded Software, recompile versions of the Software or Embedded Software from the Escrow Materials, which recompiled versions shall be deemed to form part of the Software or Embedded Software and be subject to the terms hereof;

(iv) in the case of Escrow Materials for Equipment and Vehicles, Use the Escrow Materials to design and manufacture, or to have designed, manufactured and supplied, replacement Equipment or Vehicles or parts therefor;

(v) make only those copies of the Escrow Materials that the City reasonably requires for the purposes set out in subsections 4.5(e)(i), (ii) and (iii); and

(vi) reveal the Escrow Materials, or any part thereof, only to agents, employees or independent contractors of the City as reasonably required for the purposes set out in subsections 4.5(e)(i), (ii) and (iii), provided that such agents, employees and independent contractors are bound by obligations of confidentiality in respect of any Escrow Materials disclosed to them, the breach of which shall constitute a breach by the City of its obligations of confidentiality in respect of the Escrow Materials.

(f) The Licence granted pursuant to subsection 4.5(e) will:

(i) where the Escrow Provider is Project Co or a Subcontractor, form part of the Licence granted pursuant to section 4.2; or

(ii) where the Escrow Provider is a third party, form part of the licence granted by such third party to the City;

and in either case remain in effect for so long as such licence remains in effect.

(g) The Escrow Provider will not terminate or fail to renew the Escrow Agreement without entering into a new Escrow Agreement with a replacement escrow agent on terms and conditions substantially the same as the Escrow Agreement and this section 4.5.

(h) The City will pay all fees charged by the Escrow Agent in association with the addition and maintenance of the City as a beneficiary under the Escrow Agreement.

(i) If the City receives the Escrow Materials, then as between the City and Project Co and notwithstanding any other provision of the Project Agreement, the City will own all Modifications to the Escrow Materials made by or for the City and all Intellectual Property Rights in such Modifications and will indemnify Project Co in respect of any claims made against Project Co as a result of the Modifications unless (i) such Modification was made during the Project Term pursuant to an agreed Variation Confirmation between the Parties or (ii) Project Co or one or more of its Subcontractors otherwise made all or part of the Modifications to the Escrow Materials.

4.6 Non-Assertion: Project Co agrees not to assert, and to require its Subcontractors not to assert, any Intellectual Property Right against the City or any Licensee that would have the effect of diminishing the rights granted to the City or any Licensee hereunder. Without limiting the generality of the foregoing, Project Co will not sue, and will require its Subcontractors not to sue, the City or any Licensee on the basis that any Equivalent Activity or the Ownership or Use of the System, any Deliverable or any part of the Work within the scope of the Permitted Purposes infringes any Intellectual Property Right of Project Co or any Subcontractor.

4.7 Deliveries: Project Co will deliver to the City all Licensed Intellectual Property at the times specified in the Project Agreement, or where no time is specified, on or before the Final Completion Date or the Termination Date, whichever is first to occur. The media on which Software is delivered and tangible copies or embodiments of any Licensed

Intellectual Property other than Software and will be the property of the City, notwithstanding Project Co's, a Subcontractor's or a third party's Ownership of the Licensed Intellectual Property and the Intellectual Property Rights therein. If any Licensed Intellectual Property requires software in order to Use that Licensed Intellectual Property, Project Co will ensure that such software will be commercially available to the City at a reasonable license fee, or if such software is not commercially available, Project Co will at its cost provide such software and a licence therefor to the City on terms and conditions that do not result in any impairment of the City's Use of the Licensed Intellectual Property in accordance with the Licence therefor.

4.8 Pass Through Obligations: Project Co is responsible to include in all contracts with Project Co Personnel and in all Subcontracts with Subcontractors such terms and conditions as may be necessary for Project Co to grant, or obtain for the City, the Ownership, Licences, rights and benefits provided for in this Schedule 41 and, where required in accordance with this Schedule 41 to deposit or have deposited Escrow Materials for Escrowed Deliverables supplied by such Subcontractors in accordance with section 4.5.

4.9 Conflicting Software Licences: All software referenced in this Schedule 41 will be licensed in accordance with this Schedule 41, and any form of software licence agreement used or provided by a licensor in association with the any such software will be of no force or effect and will not be binding on the City or any other Licensee, even if by its terms such software licence agreement is stated to be accepted by the installation or use of the software, and regardless of any acceptance of such software licence agreement that is required in order to install or use the software.

4.10 Trademarks and Names: Neither Party shall use any Trade-Marks owned by the other Party without obtaining a trade-mark licence on terms and conditions mutually satisfactory to the City and Project Co, each acting reasonably, or use the names or any identifying logos or otherwise of the other Party in any advertising or permit them so to be used except with the prior written consent of the other Party.

SCHEDULE 42

[Intentionally Deleted]

SCHEDULE 43

PROCUREMENT SUPPORT SERVICES

1. DEFINITIONS

1.1 Definitions

(a) In this Schedule, unless the context indicates a contrary intention, capitalized terms used herein which are defined in this Schedule and/or the MOU (and not otherwise defined in this Schedule) shall have meanings given to them in this Schedule and/or the MOU. The MOU shall survive this Schedule. The following terms shall have the following meanings:

(i) **"City Objectives"** means in connection with the delivery of the Stage 2 LRT Project:

(A) to derive optimum value for the public sector dollars contributed to the Stage 2 LRT Project in line with the risk profile associated with the Stage 2 LRT Project Variations;

(B) to realise a single point of accountability for service availability and lifecycle maintenance for the Expanded System;

(C) to benefit from the efficiencies of this Agreement and associated infrastructure by negotiating one or more Variations to that contract for those project elements that demonstrate value for money, including by reference to the original competitive pricing for the Stage 1 Project;

(D) that the result of any negotiations in respect of the Stage 2 LRT Project must maintain the carefully negotiated risk transfer and commercial arrangements from this Agreement (as certain elements may be enhanced and modified in the context of the recent light rail projects in the Province of Ontario) provided that the parties will be left with no proportionately greater risk in the aggregate (additional risk in some areas will be priced and/or offset by lower risk in other areas); and the result of any such negotiations shall be in accordance with the Agreed Parameters; and

(E) that the result of the negotiation and the overall plan to implement the Stage 2 LRT Project shall be satisfactory to and approved by the City's federal and provincial funding partners.

(ii) "**Clearance Notice**" has the meaning given to it in Section 2.3(e).

(iii) "**Consultants**" means those professional firms and consultants providing professional architectural, engineering, planning, consulting, Light Rail Vehicle procurement, maintenance, repair and specialty procurement PS Services which are retained by Project Co in respect of the delivery of the PS Services.

(iv) "**DB Co**" means a third party who is the preferred DB Co Proponent that reaches financial close in connection with the DB Co Works RFP.

(v) "**DB Co Proponent**" means a Person invited to respond to the DB Co Works RFP.

(vi) "**DB Co Works**" has the meaning given to such term in Appendix 3, Part C, Section 1.1 to the MOU.

(vii) "**DB Co Works Agreement**" means the design build finance project agreement to be entered into between the City and DB Co, including the schedules thereto.

(viii) "**DB Co Works Agreement Documents**" means the DB Co Works Agreement and any agreements to be entered into by or at the behest of DB Co in connection of the DB Co Works, but not including the Stage 2 Interface Agreement.

(ix) "**DB Co Works RFP**" means the request for proposals to be issued by the City to selected Persons in connection with the carrying out of the DB Co Works.

(x) "**Divergence**" occurs where any PSS Submittal(s) or compliance with any PSS Submittal(s), including any part thereof and including any time sensitive or date specific handover requirements and any conditions relating to handover, would be inconsistent with any of the Agreed Parameters (including the Stage 2 Assumptions) or would cause any of the Agreed Parameters (including the Stage 2 Assumptions), including in terms of Project Co's pricing or assumption of risk contemplated thereunder, not to be complied with; and "**Divergent**" shall have a corresponding meaning.

(xi) "**Expanded System**" means the System (as it is defined in this Agreement as of March 16, 2017) as expanded by the Stage 2 System.

(xii) "**Expanded System Revenue Service Availability**" means substantial completion of the Stage 2 System and the overall systems integration has been completed such that the Expanded System operates as a single coherent system.

(xiii) "**Expanded System Revenue Service Availability Date**" means the date upon which Expanded System Revenue Service Availability has been achieved. The

anticipated target date for Expanded System Revenue Service Availability is December 31, 2023.

(xiv) "**GAP Interface Terms**" has the meaning given to it in Section 2.5(l)(ii).

(xv) "**Interface Rejection Notice**" has the meaning given to it in Section 2.5(f), as such notice may be revised pursuant to Section 2.5(f) following the Internal Interface Comment Resolution Meeting.

(xvi) "**Interface Reserved Position Issue**" has the meaning given to it in Section 2.5(g).

(xvii) "**Internal Comment Resolution Meeting**" has the meaning given to it in Section 2.3(d).

(xviii) "**Internal Interface Comment Resolution Meeting**" has the meaning given to it in Section 2.5(e).

(xix) "**M&R Assumption Comments**" means any comment by Project Co that a PSS Submittal prior to the execution of the DB Co Works Agreement, in whole or in part, is Divergent.

(xx) "**M&R Review Suggestions**" means, in connection with the PSS Submittals, comments in respect of design and/or construction changes which would result in reduced construction cost and/or more efficient maintenance over the asset life (it being acknowledged and agreed that Project Co may propose changes to either its scope or to DB Co's design or construction means and/or methodology as long as the overall impact over the life of this Agreement (as the same may be amended to reflect any Stage 2 LRT Project Variations) would be cost-effective for the City).

(xxi) "**MOU**" means the memorandum of understanding dated March 16, 2017 between Project Co and the City governing the Parties' approach to the integration of the Stage 2 LRT Project into this Agreement.

(xxii) "**Notice of Complaint**" has the meaning given to it in Section 4.2(a)(i).

(xxiii) "**Notice of PSS Termination**" means a notice of termination of the PS Services as defined in Section 4.2(a)(iii).

(xxiv) "**Preliminary Interface Rejection Dispute Meeting**" has the meaning give to it in Section 2.5(f).

(xxv) "**Preliminary Internal Comment Resolution Meeting**" has the meaning given to it in Section 2.2(b).

(xxvi) "**Preliminary Rejection Dispute Meeting**" has the meaning given to it in Section 2.2(d).

(xxvii) "**Preliminary Rejection Notice**" has the meaning given to it in Section 2.2(c), as such notice may be revised pursuant to Section 2.2(d).

(xxviii) [INTENTIONALLY DELETED]

(xxix) "**Project Co Assumption Verification**" has the meaning given to it in Section 2.3(k).

(xxx) "**Project Manager**" means the individual identified as such in Appendix C.

(xxxi) "**Proponent Interface Comments**" has the meaning given to it in Section 2.5(i).

(xxxii) "**Proponent Interface Comment Resolution Meeting**" has the meaning given to it in Section 2.5(i).

(xxxiii) "**Proposals**" means the proposals to be submitted by the DB Co Proponents in response to the DB Co Works RFP.

(xxxiv) "**PS Services**" means those procurement support services to be provided by Project Co as set out in this Schedule.

(xxxv) "**PS Services Commencement Date**" means the date on which Project Co starts to perform the PS Services.

(xxxvi) "**PS Term**" has the meaning given to it in Section 4.1(a).

(xxxvii) "**PSS Event of Default**" any material failure of Project Co to perform the PS Services in accordance with this Schedule which is not rectified within 30 days of notification by the City.

(xxxviii) "**PSS Submittal**" means a draft of the Stage 2 DB Co PSOS or any DB Co Works Agreement Documents produced by the City and any subsequent updates of any such documents, in connection with the procurement for the DB Co Works, excluding the Reference Concept Design.

(xxxix) "**Reference Concept Design**" means the Non Reliant, preliminary design produced by the City which is viewed by the City as being substantially compliant with the Stage 2 DB Co PSOS requirements.

(xl) "**Rejection Notice**" has the meaning given to it in Section 2.3(e).

(xli) "**Reserved Position Issue**" has the meaning given to it in Section 2.3(f).

(xlii) "**Review Comments**" means any M&R Assumption Comment or M&R Review Suggestion.

(xliii) "**RFP Documents**" means any documents issued by the City to DB Co Proponents during the course of the RFP Process in connection with the DB Co Works RFP, including the DB Co Works Agreement Documents, the form of Stage 2 Interface Agreement and the Stage 2 DB Co PSOS.

(xliv) "**RFP Process**" means the procurement process carried out pursuant to the DB Co Works RFP.

(xlv) "**Stage 2 Assumptions**" means the following assumptions in respect of the DB Co Works and Project Co's assumption of risk in respect of the Expanded System as contemplated by the MOU:

(A) following achievement of the Expanded System Revenue Service Availability Date, Project Co shall assume full responsibility for maintaining availability of the Expanded System in accordance with the Stage 2 Maintenance PSOS (including the obligation to the deliver the Stage 2 Maintenance Services for the fixed price outlined in Appendix 3 Part E - Financial Parameters of the MOU);

(B) unless otherwise agreed, as a general matter the Output Specifications (in respect of the System as it is defined in this Agreement as at March 16, 2017) will provide an appropriate starting point and standard for maintaining availability of the Expanded System in accordance with Stage 2 Maintenance PSOS, together with any relevant items set out in the maintenance and rehabilitation pricing assumptions provided as part of the Price Form set out as Attachment 1 to Part E of Appendix 3 of the MOU;

(except to the extent the City otherwise retains responsibility for any matter under either this Agreement or the Stage 2 LRT Project Variations (for example, such as the role of the City as operator in the commissioning process)),

(C) the terms of the DB Co Works Agreement and the Stage 2 Interface Agreement shall follow the assumptions set out in Appendix 3, Part C, Section 1.2 of the MOU and Appendix 3, Part F, Section 1.5 of the MOU, respectively; and

(D) the overall goal of the Stage 2 LRT Project procurement process is to achieve the City Objectives (including value for money for the City), provided that priority shall be given to ensuring that the assumptions in respect of the DB Co Works Agreement and the Stage 2 Interface Agreement are complied with, subject to any deviations to this approach

which the Parties may agree (for example, higher risk profile for DB Co in return for reduced maintenance cost risk margin).

(xlvi) "**Stage 2 DB Co PSOS**" means the output specifications to be developed by the City for the DB Co Works.

(xlvii) "**Stage 2 East Extension**" means the east extension of the Confederation Line from Blair station to Trim as generally illustrated by the darker blue lines to the east of the Confederation Line in Figure 1: Summary of Stage 2 Project Components of the MOU including all related DB Co Works.

(xlviii) "**Stage 2 Interface Agreement**" means the agreement to be entered into among Project Co, DB Co and the City in respect of certain interface issues between the stakeholders of the Expanded System, as envisaged by Section 1.5 of Part F of Appendix 3 of the MOU.

(xlix) "**Stage 2 Interface Agreement Protocol Review**" has the meaning given to it in Section 2.5(a).

(l) "**Stage 2 LRT Project**" means the Stage 2 East Extension and the Stage 2 West Extension and includes both the Stage 2 Project Co Expanded Scope and the DB Co Works.

(li) "**Stage 2 LRT Project Variations**" means one or more Variations to be initiated by the City in accordance with the terms of Schedule 22 to the Project Agreement (subject to the terms of the MOU) to implement the Stage 2 Project Co Expanded Scope, which were referred to under the MOU as the "Stage 1 PA Variations" and which include this Schedule.

(lii) "**Stage 2 Maintenance PSOS**" means the output specifications to be developed for the Stage 2 Project Co Expanded Scope, which was referred to under the MOU as the "Stage 2 RTG PSOS".

(liii) "**Stage 2 Maintenance Services**" means the services described in Section 1.5 of Appendix 2 of the MOU.

(liv) "**Stage 2 Project Co Expanded Scope**" means the additional works and services described in Appendix 2 of the MOU intended to be delivered by Project Co as part of the Stage 2 LRT Project, which was referred to under the MOU as the "RTG Expanded Scope" and which includes the PS Services.

(lv) "**Stage 2 West Extension**" means the west extension of the Confederation Line from Tunney's Pasture to Moodie Drive as generally illustrated by the darker blue

lines to the west of the Confederation Line in Figure 1: Summary of Stage 2 Project Components of the MOU including all related DB Co Works.

(lvi) "**Strategic Issues**" has the meaning given in Section 2.2(b).

(lvii) "**Unavoidable Delay**" means any condition or cause beyond the reasonable control of Project Co that prevents or delays Project Co in fulfilling its obligations under this Schedule, provided that Project Co has acted in a reasonable manner consistent with its obligations hereunder with respect to such condition or cause.

2. PROCUREMENT SUPPORT SERVICES

2.1 Duties

(a) Project Co shall provide the PS Services all in accordance with and in the manner more particularly set out in this Schedule.

(b) Project Co shall provide the resources and staff necessary for the delivery of the PS Services. As at the date hereof, the Project Manager for the PS Services is James Messel. Project Co shall treat such Project Manager as if such person were a Key Individual performing PS Services and the provisions of Section 10.4(c) of this Agreement shall apply to such Project Manager, mutatis mutandis, during the period that Project Co is providing the PS Services.

(c) Other than as authorized by the City or as permitted or required under this Schedule, none of Project Co nor its Affiliates nor any of their respective advisors, employees or representatives engaged in the PS Services shall contact or attempt to contact, either directly or indirectly, at any time during the RFP Process, any of the DB Co Proponents or, to the extent Project Co is aware of them, team members of any DB Co Proponent, on any matter related to the RFP Process, the RFP Documents or the Proposals. Project Co shall be added as a party who cannot be contacted pursuant to the DB Co Works RFP. Project Co shall not be in breach of this provision if an employee of Project Co, any of its Affiliates or any of their respective advisors or representatives ceases to be so employed and subsequently becomes employed by any DB Co Proponent or any team member of a DB Co Proponent. Notwithstanding the foregoing, with respect to employees engaged in the provision of the PS Services who are both (i) employees of Project Co or of any of its Affiliates or of any of their respective advisors or representatives and (ii) bound by written restrictive covenants with their respective employers prohibiting them from being employed by a DB Co Proponent or a team member of a DB Co Proponent, Project Co shall use commercially reasonable efforts to enforce such restrictive covenants (if any exist) with respect to its own employees and shall use commercially reasonable efforts to require such Affiliates or any such advisors or representatives to use commercially reasonable efforts to enforce such restrictive

covenants (if any exist) with respect to their respective employees engaged in the performance of the PS Services.

(d) Other than as specified herein, neither Project Co nor any of its Affiliates, acting in its capacity as the provider of PS Services, shall enter, directly or indirectly, into any ancillary agreement, side letter or similar additional agreement with any DB Co Proponent with respect to the PS Services pursuant to which Project Co or any of its Affiliates grants rights to or otherwise benefits such DB Co Proponent in a manner more favorable in any respect than the rights and benefits established in favour of any DB Co Proponent pursuant to this Schedule.

(e) For the avoidance of doubt and without limitation, the PS Services shall not:

(i) form part of the Approved Purposes, the Civic Works, the Design and Construction Works, the Highway Work, the Maintenance, the Maintenance Services, Work or Works; or

(ii) form part of the definition of, or be required for, 2017 Readiness, Substantial Completion, Final Completion or Revenue Service Availability.

2.2 Preliminary Review Procedure

(a) As soon as practicable, and in any event, no later than April 19, 2017, the City shall deliver to Project Co a draft of the Stage 2 DB Co PSOS and the Reference Concept Design. Project Co shall review the Stage 2 DB Co PSOS and provide M&R Assumption Comments and M&R Review Suggestions on the same. All such Review Comments shall be submitted to the City on a mutually acceptable comment review form by the later of (i) 7 Business Days following the delivery of such Stage 2 DB Co PSOS to Project Co via SharePoint and (ii) May 1, 2017, or such later date agreed to by the City (acting reasonably).

(b) Not less than two (2) Business Days prior to the deadline for submission of the Review Comments by Project Co regarding the Stage 2 DB Co PSOS, Project Co will provide a written list of material issues that require further discussion and which cannot practically be implemented as proposed drafting changes ("**Strategic Issues**"), which Strategic Issues shall, for clarity, be in the nature of M&R Assumption Comments. Within three (3) Business Days following the City's receipt of the Review Comments (or such later date agreed to by the Parties), a meeting (a "**Preliminary Internal Comment Resolution Meeting**") will be held between Project Co and the City to review and dispose of all Strategic Issues. Without limiting the City's obligations in this Section 2.2, the City shall give reasonable consideration to any Strategic Issues and any other input or comments from Project Co in the nature of M&R Assumption Comments on Stage 2 DB Co PSOS.

(c) Within five (5) Business Days of the conclusion of the Preliminary Internal Comment Resolution Meeting, the City shall inform Project Co in writing: (i) of any Review Comments that have been rejected by the City (a "**Preliminary Rejection Notice**"), with written reasons therefor; or (ii) that all Review Comments were accepted. For the avoidance of doubt, the inclusion of any M&R Assumption Comments in the Preliminary Rejection Notice shall not in any way prejudice Project Co's right to make or confirm such M&R Assumption Comments as Reserved Position Issues pursuant to the process contemplated in Section 2.3(f). For the avoidance of doubt, the City shall, at the time it provides Project Co with the Preliminary Rejection Notice, indicate in writing to Project Co which of the Review Comments have been accepted and which of the Review Comments have been rejected bythe City.

(d) Three (3) Business Days after Project Co's receipt of the Preliminary Rejection Notice, the Parties shall meet to discuss the Review Comments that have been rejected by the City (the "**Preliminary Rejection Dispute Meeting**") and the Parties (each acting reasonably) shall seek to reach agreement on the disposition of such rejected Review Comments. Within one (1) Business Day following the Preliminary Rejection Dispute Meeting, the City shall deliver a revised Preliminary Rejection Notice to Project Co, which shall indicate which Review Comments have been rejected by the City, with written reasons therefor. For the avoidance of doubt, the City shall, at the time it provides Project Co with such revised Preliminary Rejection Notice, indicate in writing to Project Co which of the Review Comments have been accepted and which of the Review Comments have been rejected bythe City.

(e) Following the Preliminary Internal Comment Resolution Meeting and the Preliminary Rejection Dispute Meeting, a record of each comment and agreed disposition among Project Co and the City shall be developed and maintained by the City and shall be made available to Project Co upon request. The City shall update the Stage 2 DB Co PSOS following the Preliminary Internal Comment Resolution Meeting and the Preliminary Rejection Dispute Meeting such that all agreed upon comments are incorporated into the Stage 2 DB Co PSOS.

(f) Project Co and the City shall follow a substantially similar process as outlined in Sections 2.2(a), 2.2(b), 2.2(c), 2.2(d) and 2.2(e) above (including, for greater certainty, in respect of the timelines for review and comment provided therein), with the necessary changes, in connection with the development of the DB Co Works Agreement Documents and the City shall give reasonable consideration to any input or comments from Project Co on the DB Co Works Agreement Documents. The City shall deliver to Project Co drafts of the DB Co Works Agreement Documents as soon as practicable, and in any event, no later than April 27, 2017, for preliminary review pursuant to this Section 2.2.

2.3 Final Review Procedure

(a) Prior to their initial release to the DB Co Proponents, each of the Stage 2 DB Co PSOS and DB Co Works Agreement Documents produced by the City shall be developed and provided by the City to Project Co for review and comment in accordance with the final review procedure described in this Section 2.3.

(b) As soon as practicable, and in any event, no later than May 18, 2017, the City shall deliver to Project Co, prior to issuance to the DB Co Proponents, the draft Stage 2 DB Co PSOS, which shall, in the opinion of the City, be in a form suitable for release to the DB Co Proponents, subject to Project Co's right to review and comment on the same pursuant to this Section 2.3. As soon as practicable, and in any event, no later than May 25, 2017, the City shall deliver to Project Co, prior to issuance to the DB Co Proponents, the draft DB Co Works Agreement Documents, which shall, in the opinion of the City, be in a form suitable for release to the DB Co Proponents, subject to Project Co's right to review and comment on the same pursuant to this Section 2.3.

(c) Project Co shall review the draft Stage 2 DB Co PSOS and the DB Co Works Agreement Documents and provide M&R Assumption Comments and/or M&R Review Suggestions with respect to the same. All of Project Co's Review Comments on such documents shall be submitted to the City on a mutually acceptable comment review form by the later of (i) eight (8) Business Days following the delivery of such PSS Submittals to Project Co via SharePoint and (ii) May 31, 2017 (in the case of the Stage 2 DB Co PSOS) or June 8, 2017 (in the case of the DB Co Works Agreement Documents), or such later date agreed to by the City (acting reasonably).

(d) Not less than two (2) Business Days prior to the submission of the Review Comments by Project Co on the Stage 2 DB Co PSOS, and not less than two (2) Business Days prior to the submission of the Review Comments by Project Co on the DB Co Works Agreement Documents, Project Co will provide a written list of Strategic Issues regarding the Stage 2 DB Co PSOS or the DB Co Works Agreement Documents, whichever is applicable. On the Business Day following the City's receipt of the Review Comments on the Stage 2 DB Co PSOS and on the Business Day following the City's receipt of the Review Comments on the DB Co Works Agreement Documents, (or such later date agreed to by the Parties), a meeting (an "**Internal Comment Resolution Meeting**") will be held between Project Co and the City to review and dispose of all Strategic Issues. Without limiting the City's obligations under this Section 2.3, the City shall give reasonable consideration to any Strategic Issues and any other input or comments from Project Co in the nature of M&R Assumption Comments on any PSS Submittals.

(e) Within five (5) Business Days of the conclusion of the Internal Comment Resolution Meeting regarding the Stage 2 DB Co PSOS and within three (3) Business Days of the conclusion of the Internal Comment Resolution Meeting regarding the DB Co Works Agreement Documents, the City shall inform Project Co in writing: (i) of any Review

Comments (with respect to the Stage 2 DB Co PSOS or the DB Co Works Agreement Documents, as applicable) that have been rejected by the City (a "**Rejection Notice**"), with written reasons therefor; or (ii) that all Review Comments (with respect to the Stage 2 DB Co PSOS or the DB Co Works Agreement Documents, as applicable) were accepted by the City (a "**Clearance Notice**"). For the avoidance of doubt, the City shall, at the time it provides Project Co with the Rejection Notice, indicate in writing to Project Co which of the Review Comments have been accepted and which of the Review Comments have been rejected by the City (in each case, with respect to the Stage 2 DB Co PSOS or the DB Co Works Agreement Documents, as applicable).

(f) Within three (3) Business Days after Project Co's receipt of the Rejection Notice from the City regarding the Stage 2 DB Co PSOS, and within two (2) Business Days after Project Co's receipt of the Rejection Notice from the City regarding the DB Co Works Agreement Documents, Project Co shall notify the City whether or not Project Co wishes to make or confirm any M&R Assumption Comments (which, for greater certainty, may include any M&R Assumption Comments rejected in any Preliminary Rejection Notice or any Rejection Notice and/or any Strategic Issues raised (whether under Section 2.2 or this Section 2.3) with respect to the Stage 2 DB Co PSOS or the DB Co Works Agreement Documents, as applicable, (each such comment, a "**Reserved Position Issue**") (and any failure by Project Co to make or confirm any such previously raised comment within such response period shall constitute a determination by Project Co not to dispute the M&R Assumption Comment which was identified in the applicable Preliminary Rejection Notice or the applicable Rejection Notice but not made or confirmed by Project Co pursuant to this paragraph).

(g) Notwithstanding Project Co's right to raise Reserved Position Issues, the City shall be entitled to proceed with the procurement for the DB Co Works and the City's obligations under the document in question, provided however that nothing in this Section 2.3(g) is intended to prejudice the Parties' respective rights and obligations with respect to such Reserved Position Issues under the other provisions of this Schedule.

(h) The City shall give Project Co five (5) Business Days' prior notice before issuing the final version of the DB Co Works RFP to the DB Co Proponents. Prior to the issuance of such final version of the DB Co Works RFP, either Party may refer for resolution pursuant to the Dispute Resolution Procedure (specifically by an Expert under Section 5 of Schedule 27 – Dispute Resolution Procedure to this Agreement) any Dispute relating to any Reserved Position Issues raised by Project Co to determine whether the relevant PSS Submittal(s) or any subsequent amendment or development of the relevant documents prior to the execution of the DB Co Works Agreement, in whole or in part, is Divergent and:

(A) subject to Sections 2.3(j)(ii)(A) to (D), 2.4, 2.5 and 2.6, to the extent that it is determined under such Dispute Resolution Procedure that, with respect

to the relevant Reserved Position Issue, the relevant PSS Submittal(s) or any subsequent amendment or development of the relevant documents prior to the execution of the DB Co Works Agreement, in whole or in part, was/were not Divergent, Project Co shall have no further right to raise such Reserved Position Issue and, for greater certainty, if it is determined under such Dispute Resolution Procedure that, with respect to the relevant Reserved Position Issues, none of the relevant PSS Submittal(s) or any subsequent amendment or development of the relevant documents prior to the determination under the Dispute Resolution Procedure were, in whole or in part, Divergent, subject to Sections 2.3(j)(ii)(A) to (D), 2.4, 2.5 and 2.6, Project Co shall have no further right to dispute the relevant PSS Submittal; and

(B) to the extent that it is determined under such Dispute Resolution Procedure or the Parties agree in writing that, with respect to the relevant Reserved Position Issue, the relevant PSS Submittal(s) or any subsequent amendment or development of the relevant documents prior to the determination under the Dispute Resolution Procedure were, in whole or in part, Divergent, the City, at its option, shall carry out one of the following options as soon as reasonably practicable:

(1) rectify the Divergence (such that there is no longer any Divergence) by amending the relevant PSS Submittal to the reasonable satisfaction of both Parties;

(2) negotiate in good faith with Project Co suitable adjustments to any one or more of the Stage 2 LRT Project Variations to bring such Stage 2 LRT Project Variation(s) within the Agreed Parameters and within a cost effective approach for the City and an acceptable risk tolerance for Project Co (taking into account any consequential amendments to the wider Stage 2 LRT Project procurement);

(3) negotiate adjustments in pricing under the General Parameters as set out in Section 1.1 of Appendix 3 to the MOU; or

(4) initiate a Variation under the Project Agreement that, where, expressly so specified in the MOU, Project Co's right to object to such a Variation under Section 1.5 of Schedule 22 will continue to be restricted as contemplated by subsection 1 of the MOU (No objection if within Agreed Parameters) and provided further that, if the City elects to withdraw the relevant Variation Enquiry or otherwise not proceed with such Variation, the City shall thereupon carry out one of the options set out in paragraphs (1) to (3) above,

and where paragraphs (2) or (3) of this paragraph (B) applies, within twenty (20) Business Days of such determination under the Dispute Resolution Procedure or such agreement between the Parties, Project Co shall provide the City with written details of the financial consequences, with respect to the relevant Reserved Position Issue, of the relevant PSS Submittal(s) or any subsequent amendment or development of the relevant documents, in whole or in part, being Divergent.

(i) Following the Internal Comment Resolution Meeting, a record of each comment and agreed disposition among Project Co and the City shall be developed and maintained by the City and shall be updated by the City promptly following any Dispute. The City shall update the PSS Submittals following the Internal Comment Resolution Meeting and again following the resolution of each Dispute such that all agreed upon comments, or, as applicable, all comments as determined under the Dispute Resolution Procedure, are incorporated into the relevant PSS Submittals. The City shall afford Project Co a reasonable opportunity to review the updated PSS Submittals prior to issuance of the same to the DB Co Proponents. The allotted time to incorporate comments shall extend for a maximum of three (3) Business Days. The City shall not be required to consider additional comments or input, if any, from Project Co on the PSS Submittals referred to above in this paragraph submitted by Project Co during this three (3) Business Day period, unless such comments or input result from a further change made by the City which, in Project Co's opinion (acting reasonably), result in any Divergence or Project Co (acting reasonably) takes issue with the way in which any agreed upon comment has been incorporated into the relevant PSS Submittals. The City shall ensure that Project Co is provided with the final version of the Stage 2 DB Co PSOS and the Reference Concept Design at least seven (7) calendar days prior to the City's release of the same to the DB Co Proponents. The City shall ensure that Project Co is provided with the final version of the DB Co Works Agreement Documents at least four (4) Business Days prior to the City's release of the same to the DB Co Proponents.

(j) If, within three (3) Business Days after the delivery by the City to Project Co of the relevant Rejection Notice or the relevant Clearance Notice, Project Co has not provided any comments on the relevant PSS Submittal as provided for herein or has provided comments on the relevant PSS Submittal but has not asserted that the City has failed to give reasonable consideration to such comments, without prejudice to any Reserved Position Issue which may be raised by Project Co or which has not yet been resolved through the Dispute Resolution Procedure, Project Co shall thereafter not be entitled to (and hereby waives any rights to):

(i) subject to paragraph (ii) below, object to the relevant PSS Submittal;

(ii) provide any additional comments on any subsequent development of the specific PSS Submittal in question or other matters contained within any such PSS

Submittal, provided, however, that Project Co (acting reasonably) may raise comments related to:

(A) any Reserved Position Issue which has not yet been resolved through the Dispute Resolution Procedure;

(B) any bona fide new issues or modifications of previous issues that arise as a result of the subsequent development of the document or matter in question the particulars and consequences of which were not known to Project Co prior to the applicable deadline under Section 2.2(a) for Project Co's submission of Review Comments (and for the avoidance of doubt and without limiting the generality of the foregoing, a new edit in section X or in document A that changes the nature or effect of a pre-existing provision in section Y or in document B that would have been acceptable had the new section X edit or document A edit not been introduced, shall be considered a new issue for both sections X and Y or, as applicable, for both documents A and B, but only to the extent of the consequences of that edit);

(C) without limiting (B), above, or (D), below, any new issues or modifications of previous issues that arise as a result of any interpretation of any PSS Submittal by any DB Co Proponent, or any consequences of such interpretation, that was/were not known to Project Co prior to the applicable deadline under Section 2.2(a) for Project Co's submission of Review Comments; or

(D) without limiting (B) or (C), above, any new issues or modifications of previous issues that arise as a result of any DB Co Proponent filling in any gaps in any PSS Submittal, or the consequences of such action, which gaps or actions were not known to Project Co prior to the applicable deadline under Section 2.2(a) for Project Co's submission of Review Comments,

and in the case of any new issues or modifications of previous issues referred to in any of (B), (C) or (D), above, the provisions of Section 2.3 shall apply mutatis mutandis as though such issues were Review Comments; or

(iii) subject to paragraph (ii) above, claim against the City that the fixed price outlined in Appendix 3 Part E - Financial Parameters of the MOU provided in respect of Scope 5: Stage 2 Maintenance Services under the MOU (or, if applicable, the pricing under the terms of the relevant Stage 2 LRT Project Variation) should be increased or adjusted in connection with the relevant PSS Submittal.

(k) Upon completion of the process set out in this Section 2.3 for the Stage 2 DB Co PSOS (including in respect of any new issues or modifications of previous issues as referred to in any of Section 2.3(j)(ii)(B), (C) or (D)), the Stage 2 DB Co PSOS shall be finalized and submitted by the City to the DB Co Proponents, and Project Co shall confirm that, subject to any Reserved Position Issues (and their subsequent resolution) and to Sections 2.4, 2.5 and 2.6, the Stage 2 DB Co PSOS is not, as at the date of such confirmation, Divergent (the "**Project Co Assumption Verification**").

2.4 Procurement Period Review

(a) Project Co and any relevant Project Co Parties shall have the right to participate in the design presentation meetings relating to the DB Co Works with the DB Co Proponents. The City shall provide Project Co with notice of the design presentation meetings, such notice to be provided sufficiently in advance (acting reasonably) so as to permit Project Co to prepare for the attendance at such meetings. Project Co and, if applicable, the Project Co Parties will only actively participate in such meetings at the request of the City and otherwise shall only be observers in such meetings. Following attendance at a design presentation meeting, Project Co will provide comments and timely feedback as to the discussions and presentations that were the subject of the meeting, but only to the extent required to confirm compliance with the Project Co Assumption Verification or otherwise raise any M&R Assumption Comments, in each case in respect of any changes that might be proposed to the underlying documents, provided that Project Co may also comment on issues in the nature of those described in any of paragraphs (B), (C) or (D) of Section 2.3(j)(ii).

(b) Project Co shall have the right to participate in commercially confidential meetings held in connection with the DB Co Works RFP, and the City acknowledges and agrees that Project Co may, acting reasonably, extend such right to the Project Co Parties. The City shall provide Project Co with notice of the commercially confidential meetings, such notice to be provided sufficiently in advance (acting reasonably) so as to permit Project Co to prepare for the attendance at such meetings. Project Co and, if applicable, the Project Co Parties will only actively participate in such meetings at the request of the City and otherwise shall only be observers in such meetings. Following attendance at a commercially confidential meeting, Project Co will provide comments and timely feedback as to the discussions and presentations that were the subject of the meeting, but only to the extent required to confirm compliance with the Project Co Assumption Verification or otherwise raise any M&R Assumption Comments, in each case in respect of any changes that might be proposed to the underlying documents, provided that Project Co may also comment on issues in the nature of those described in any of paragraphs (B), (C) or (D) of Section 2.3(j)(ii).

(c) To the extent the City intends to make any changes to the Stage 2 DB Co PSOS, the Reference Concept Design or any of the DB Co Works Agreement Documents at any

time during the RFP Process, the provisions of Section 2.3 shall apply to such changes mutatis mutandis.

(d) During preferred proponent negotiations held in connection with the DB Co Works RFP, the City shall provide Project Co with the final version of the Stage 2 DB Co PSOS and the DB Co Works Agreement Documents prior to the same being formally confirmed by the parties thereto as the final execution versions and prior to the same being executed by the parties thereto. Project Co will be afforded not less than fifteen (15) Business Days to complete a final compliance check to confirm the Project Co Assumption Verification or raise any M&R Assumption Comments, in each case in respect of any changes appearing in or proposed for the Stage 2 DB Co PSOS or any of the DB Co Works Agreement Documents, or to raise comments on any issues in the nature of those described in any of paragraphs (B), (C) or (D) of Section 2.3(j)(ii), and Project Co may provide the City with a list of non-compliances and/or gaps. The relevant provisions of Section 2.3, including Section 2.3(h), shall apply to any such comments raised by Project Co mutatis mutandis.

2.5 Stage 2 Interface Agreement

(a) The Parties shall develop the form of Stage 2 Interface Agreement in accordance with this Section 2.5 (the "**Stage 2 Interface Agreement Protocol Review**"), which form shall be issued to DB Co Proponents as part of the DB Co Works RFP as provided in Section 2.5(h). The Parties acknowledge and agree that the purpose of this Stage 2 Interface Agreement Protocol Review is to ensure that the form of Stage 2 Interface Agreement issued to DB Co Proponents as part of the DB Co Works RFP is consistent with the terms of the MOU.

(b) The Parties acknowledge and agree that the disposition of any comments pursuant to this Stage 2 Interface Agreement Protocol Review shall be consistent with Section 1.5 of Part F of Appendix 3 to the MOU.

(c) The City shall prepare an initial draft of the form of Stage 2 Interface Agreement based on the terms provided in Section 1.5 of Part F of Appendix 3 to the MOU and shall provide such draft to Project Co for review and comment in accordance with the Stage 2 Interface Agreement Protocol Review as soon as practicable, and in any event, no later than April 27, 2017. The allotted time for this review by Project Co shall be a period of ten (10) Business Days after delivery of the form of Stage 2 Interface Agreement to Project Co via SharePoint unless otherwise agreed by the Parties, acting reasonably. The City shall not release any version of the Stage 2 Interface Agreement to the DB Co Proponents until after Project Co has had the opportunity to review and comment on the same in accordance with the provisions of this Section 2.5 and such comments have been addressed in accordance with the provisions of this Section 2.5.

(d) Project Co shall review the draft form of Stage 2 Interface Agreement and provide comments and feedback to the City on a mutually acceptable comment review form by the later of (i) the date falling ten (11) Business Days after delivery of the form of Stage 2 Interface Agreement to Project Co via SharePoint and (ii) May 12, 2017. Project Co acknowledges and agrees that any substantive comments provided pursuant to this Section 2.5(d) shall be consistent with the terms provided in Section 1.5 of Part F of Appendix 3 of the MOU.

(e) Within two (2) Business Days following the City's receipt of such comments from Project Co (or such later date agreed to by the Parties), a meeting (an "**Internal Interface Comment Resolution Meeting**") will be held between Project Co and the City to review and dispose of all such comments, and the Parties will use commercially reasonable efforts to mutually agree on the disposition thereof, consistent with the general principle provided in Section 2.5(b), above.

(f) Within four (4) Business Days of the conclusion of the Internal Interface Comment Resolution Meeting, the City shall inform Project Co in writing: (i) of any comments that were rejected (an "**Interface Rejection Notice**"), with written reasons therefor; or (ii) that all comments were accepted. For the avoidance of doubt, the City shall, at the time it provides Project Co with such Interface Rejection Notice, indicate in writing to Project Co which of Project Co's comments on the Stage 2 Interface Agreement have been accepted and which of the Review Comments have been rejected by the City. One (1) Business Day after Project Co's receipt of the Interface Rejection Notice (or such later date agreed to by the Parties), the Parties shall meet to discuss Project Co's comments on the Stage 2 Interface Agreement that have been rejected by the City (the "**Preliminary Interface Rejection Dispute Meeting**") and the Parties (each acting reasonably) shall seek to reach agreement on the disposition of such rejected comments. Within one (1) Business Day following the Preliminary Interface Rejection Dispute Meeting, the City shall deliver a revised Interface Rejection Notice to Project Co, which shall indicate which of Project Co's comments on the Stage 2 Interface Agreement have been rejected by the City, with written reasons therefor. For the avoidance of doubt, the City shall, at the time it provides Project Co with such revised Interface Rejection Notice, indicate in writing to Project Co which of Project Co's comments on the Stage 2 Interface Agreement have been accepted and which of the Review Comments have been rejected by the City.

(g) Within three (3) Business Days after Project Co's receipt of the Interface Rejection Notice from the City, Project Co shall notify the City whether or not Project Co wishes to make or confirm any comments on the Stage 2 Interface Agreement previously raised by Project Co (each such comment an "**Interface Reserved Position Issue**") (and any failure by Project Co to make or confirm any such previously raised comment within such response period shall constitute a determination by Project Co not to dispute the

previously raised comment which was identified in the Interface Rejection Notice but not made or confirmed by Project Co pursuant to this paragraph.

(h) Upon completion of the process set out above, the revised draft form of Stage 2 Interface Agreement shall be issued by the City to the DB Co Proponents.

(i) The City shall provide Project Co any comments received from the DB Co Proponents on the form of Stage 2 Interface Agreement pursuant to the DB Co Works RFP ("**Proponent Interface Comments**") via SharePoint. Within seven (7) Business Days (or such later date agreed to by the Parties) following the Project Co's receipt of the Proponent Interface Comments, a meeting (a "**Proponent Interface Comment Resolution Meeting**") will be held between Project Co and the City to review and dispose of all such comments, and the Parties will use commercially reasonable efforts to mutually agree on the disposition thereof, consistent with the general principle provided in Section 2.5(b), above.

(j) Within three (3) Business Days after the Proponent Interface Comment Resolution Meeting, the City shall further revise the form of Stage 2 Interface Agreement by incorporating (to the Parties' mutual satisfaction, each acting reasonably) all agreed upon Proponent Interface Comments, and send the same to Project Co for review and approval.

(k) The process described in Sections 2.5(i) and 2.5(j) above shall be repeated for so long as DB Co Proponents continue to provide Proponent Interface Comments pursuant to the DB Co Works RFP.

(l) The City shall give Project Co five (5) Business Days' prior notice before issuing the final version of the form of Stage 2 Interface Agreement to the DB Co Proponents. Prior to the issuance of such final version of the form of Stage 2 Interface Agreement, either Party may refer for resolution pursuant to the Dispute Resolution Procedure (specifically by an Expert under Section 5 of Schedule 27 – Dispute Resolution Procedure to this Agreement), any Dispute relating to any Interface Reserved Position Issues raised by Project Co to determine whether the failure to reflect such Interface Reserved Position Issue would result in any of items (a) through (r) of Section 1.5 of Part F of Appendix 3 to the MOU being omitted from the form of Stage 2 Interface Agreement and:

(i) to the extent that it is determined under such Dispute Resolution Procedure that failing to reflect such Interface Reserved Position Issue would not result in any of items (a) through (r) of Section 1.5 of Part F of Appendix 3 of the MOU being omitted from the form of Stage 2 Interface Agreement, Project Co shall have no further right to raise such Interface Reserved Position Issue during the RFP Process (and, for greater certainty, such determination shall be without prejudice to the rights of the Parties to further negotiate the development of the Stage 2

Interface Agreement at preferred proponent stage, including the right of Project Co to raise such Reserve Position Issue); and

(ii) to the extent that it is determined under such Dispute Resolution Procedure that failing to reflect such Interface Reserved Position Issue would result in any of items (a) through (r) of Section 1.5 of Part F of Appendix 3 of the MOU being omitted from the form of Stage 2 Interface Agreement (such omitted terms, the "**GAP Interface Terms**"), the City, at its option, shall select one of the following options as soon as reasonably practicable:

(A) rectify the Interface Agreement such that any GAP Interface Term is eliminated to the reasonable satisfaction of both Parties; or

(B) the City and Project Co shall determine an appropriate adjustment to the Fixed Price (as defined in the MOU) using the terms and conditions of Schedule 22 to the Project Agreement to determine the additional risk premium and cost required by Project Co to address any GAP Interface Terms, provided that Project Co's rights of objection referred to under Section 1.5 of Schedule 22 to the Project Agreement will continue to be restricted in the manner contemplated by subsection 1 (No objection if within Agreed Parameters) of the MOU; and provided further that should the additional risk created by the exclusion of any GAP Interface Terms not be capable of being resolved by an appropriate adjustment to the Fixed Price as set out above, the City shall assume, or otherwise provide adequate relief from, the risks associated with the exclusion of such GAP Interface Term(s) from the Stage 2 Interface Agreement.

(m) Following the Internal Interface Comment Resolution Meeting, a record of each comment and agreed disposition among Project Co and the City shall be developed and maintained by the City. The City shall update the draft form of Stage 2 Interface Agreement following the Internal Interface Comment Resolution Meeting. The City shall further update such record after the resolution of each Dispute relating to the Stage 2 Interface Agreement. The City shall ensure that all agreed upon comments and, as applicable, comments as determined under the Dispute Resolution Procedure, are incorporated into the Stage 2 Interface Agreement. The City shall afford Project Co a reasonable opportunity to review the updated form of Stage 2 Interface Agreement prior to issuance of the same to the DB Co Proponents.

(n) Project Co shall be entitled to participate in any discussions relating to, and consent to, any changes in the Stage 2 Interface Agreement at the preferred proponent stage.

(o) For the avoidance of doubt, nothing in this Schedule shall be construed as limiting Project Co's rights under the provisions of the MOU pertaining to Scope 4: Interface and Design Management for the Expanded System or to Scope 5: Stage 2 Maintenance

Services or under any Stage 2 Variation LRT Project Variation relating to any of the foregoing.

2.6 Review Comments Generally

(a) Review Comments may include comments on any of the following:

(i) impacts on annual maintenance/life cycle costs as outlined in Price Form (Appendix 3, Part E, Attachment 1) to the MOU;

(ii) impacts on scope and/or pricing included in Stage 2 LRT Project Variations;

(iii) a change or divergence from the Stage 2 Assumptions and/or the assumptions set out in in Appendix 3, Part C, Section 1.2 to the MOU;

(iv) maintenance of systems infrastructure and efficient maintenance over the life of the asset;

(v) DB Co to Project Co hand over requirements;

(vi) testing/inspection/commissioning related to construction of the DB Co Works by DB Co; and

(vii) provision of as-built drawings and related documentation by DB Co to Project Co.

2.7 Consultants

(a) Project Co shall provide to the City and maintain a list of Consultants and sub-Consultants engaged in the provision of the PS Services, organized by discipline, so that they may be added to the do not contact and ineligible persons list in the DB Co Works RFP.

2.8 Standard of Care and Unavoidable Delay

(a) Project Co shall perform the PS Services with the reasonable skill and care as would normally be exercised by licensed or registered professionals having knowledge and experience in providing services of a similar nature, scope and complexity to the PS Services.

(b) The PS Services will be provided in a manner that is consistent with the Stage 2 Assumptions and Project Co's assumption of risk contemplated thereunder. Project Co shall also have due regard to the City Objectives in the performance of the PS Services and assist the City to achieve the City Objectives, in so far as they do not conflict with Project Co's legitimate expectations outlined in the Stage 2 Assumptions. In carrying out the PS Services, Project Co will be expected to consider the combined best interests of

both Parties, and shall promptly inform the City of any potential conflicts of interests that arise.

(c) The City shall act in good faith in cooperating with Project Co in the performance of the PS Services in accordance with this Schedule 43, including when considering any Review Comment raised by Project Co as part of the PS Services.

(d) If Project Co is prevented from, or delayed in, the performance of its duties by an event of Unavoidable Delay, the date for performance shall be delayed by a period of time equal to the period of Unavoidable Delay. Project Co will notify the City as soon as practicable after becoming aware of an event of Unavoidable Delay and will, from time to time, notify the City of the expected duration of the period of Unavoidable Delay.

(e) If, during the course of any review by Project Co contemplated hereunder, Project Co requests further information or clarification from the City in connection with such review, the City shall use all reasonable efforts to provide such information and/or clarification to Project Co within a reasonable period of time following receipt of such request from Project Co.

(f) Any timeline for comment, confirmation and/or review by Project Co contemplated in this Schedule may be extended as set out herein, or if not set out herein, may be extended as permitted by the City (acting reasonably).

(g) Any meetings referred to in this Schedule may be held by telephone or videoconference.

(h) Project Co: (i) confirms that it is generally familiar with the general requirements, design and performance criteria of the City in connection with the PS Services and the City Objectives; and (ii) subject to Section 2.8(b), covenants that it will apply this familiarity in the delivery of the PS Services with respect to the Stage 2 LRT Project. For certainty, the Parties acknowledge and agree that the PS Services do not include any scope of, or otherwise pertain to, system integration.

2.9 Insurance

(a) Project Co shall, at its own expense, effect and maintain insurance to protect itself and its employees from claims, losses or damages arising out of the performance of PS Services rendered by Project Co and its employees, agents and subcontractors under this Schedule and caused by any error, omission or negligent act for which it is legally liable. Project Co shall maintain this insurance in force throughout the PS Term. Project Co shall also effect and maintain insurance to protect itself from claims under workers' compensation acts; from claims for damages because of bodily injury, including personal injury, sickness, disease, or death of any employees or of any other person; from claims for damages because of injury to or destruction of property including loss of use resulting therefrom.

(b) Certificates of insurance shall be delivered to the City prior to commencement of PS Services. The certificates shall contain a provision that the coverage afforded under the policies shall not be cancelled or reduced in limits by endorsement until at least thirty (30) days' prior written notice has been given to the City.

3. [INTENTIONALLY DELETED]

4. TERM

4.1 Duration

(a) This PS Services to be provided under this Schedule shall commence on the PS Services Commencement Date and shall continue in full force and effect until the earlier of the date on which the DB Co Works Agreement has been executed and delivered and such other date, if any, on which termination of the PS Services takes effect in accordance with the terms of this Schedule (the "**PS Term**").

4.2 Termination by the City

(a) The City may terminate the PS Services for cause if at any time there occurs a PSS Event of Default which is continuing. Such termination is to be conducted on the following basis:

(i) the City shall give written notice ("**Notice of Complaint**") to Project Co specifying in reasonable detail the PSS Event of Default;

(ii) if the PSS Event of Default in question is one that is capable of being cured, then within fifteen (15) days of receipt of such Notice of Complaint, Project Co shall commence to cure such default and proceed diligently thereafter to cure such default until such default is cured;

(iii) if the PSS Event of Default in question is one that is capable of being cured and, if within the fifteen (15) day period referred to in Section 4.2(a)(ii), Project Co fails to commence to cure such default or if at any time after the expiry of such fifteen (15) day period Project Co fails to proceed diligently to cure such default, the City may terminate the PS Services by written notice ("**Notice of PSS Termination**") to Project Co stating that the PS Services are terminated and the reasons therefor. Such termination shall be effective as of and from the last day of the month in which the Notice of PSS Termination is given to Project Co;

(iv) if the PSS Event of Default in question is one that is not capable of being cured, then within fifteen (15) days of receipt of such Notice of Complaint, Project Co shall deliver in writing to the City a reasonable plan to prevent the reoccurrence of such PSS Event of Default, which plan is satisfactory to the City (acting reasonably) and Project Co shall proceed diligently thereafter to implement such plan; and

(v) if the PSS Event of Default in question is one that is not capable of being cured, and, if within the fifteen (15) day period referred to in Section 4.2(a)(iv), Project Co fails to deliver the plan referred to in that Section or if at any time after the expiry of such fifteen (15) day period Project Co fails to proceed diligently to implement such plan to the satisfaction of the City (acting reasonably), the City may terminate the PS Services by giving Project Co a Notice of PSS Termination (and shall include the reasons for the termination). Such termination shall be effective as of and from the last day of the month in which the Notice of PSS Termination is given to Project Co.

(b) Upon written notice to Project Co, the City may terminate the PS Services for its convenience, without obligation or liability of any nature except as set out in Section 4.4.

(c) The City agrees that nothing in or arising out of this Schedule and no performance or delay or failure in the performance of this Schedule (including any delay or failure relating to the performance of the PS Services) shall give rise to or be capable of giving rise to a Project Co Event of Default. To the extent that any claim by the City under this Schedule would cause Project Co to be unable to meet its obligations under the Lending Agreements, payment of such claim shall be deferred until such time Project Co is able to meet make such payment without breaching its obligations under the Lending Agreements.

4.3 Termination by Project Co

(a) If the City defaults [INTENTIONALLY DELETED] or in any material respect of any other obligation under this Schedule and such default shall continue for more than thirty (30) days after notice thereof is given to the City, Project Co may suspend performance of PS Services, but only until [INTENTIONALLY DELETED] or the default is otherwise cured. If such default continues for sixty (60) days from the date such notice of default has been given to the City, Project Co may terminate the PS Services by notice to the City with immediate effect. The election to terminate shall not be construed to be an election of remedies and a waiver of other potential remedies available to it at law and/or in equity.

4.4 Consequences of Termination

(a) The PS Services are being provided alongside the continued operation of the MOU with a view to finalizing all of the Stage 2 LRT Project Variations. If the City validly terminates the PS Services on the grounds of a PSS Event of Default, the City shall be entitled to consider this as a material breach of the MOU for the purposes of Section 3 of the MOU and take the actions described thereunder (such as recovery of additional costs incurred to replace the PS Services).

(b) In addition, if the PS Services hereunder are terminated for a PSS Event of Default and Project Co remains the intended provider of the Stage 2 Maintenance Services, the City will act in good faith in respect of the development of documents under the DB Co Works RFP with a view to ensuring that the DB Co Works and the DB Co Works Agreement Documents shall reflect the Stage 2 Assumptions, but, subject to the foregoing and to the Parties' respective rights and obligations under Section 1.5 of Part F of Appendix 3 to the MOU, Project Co shall not be entitled to claim that any decision made by the City in such circumstances has impacted Project Co's pricing assumptions in the Price Form.

(c) If the PS Services are terminated early for any reason other than PSS Event of Default, and Project Co remains the intended provider of the Stage 2 Maintenance Services, then the waivers in Sections 2.3 and 4.4(b) shall not apply, and the City acknowledges that if the DB Co Works or any of the DB Co Works Agreement Documents are Divergent, this

shall entitle Project Co to an adjustment (which, for clarity, may be an adjustment in respect of Project Co's scope of work, assumption of risk and/or pricing) under the terms of the MOU and any relevant Stage 2 LRT Project Variation which incorporates the relevant Stage 2 Assumptions.

(d) [INTENTIONALLY DELETED]

(e) If the PS Services are terminated early, Project Co shall promptly deliver to the City copies of all records and documents (with the exception of Sensitive Information) maintained under the terms of this Schedule, which are in the possession or control of Project Co, relating directly or indirectly to the PS Services, in accordance with the terms of Section 4.4 of Schedule 26.

5. GENERAL

5.1 Dispute Resolution Procedure

(a) For the purposes of this Schedule 43, Section 5.1 of Schedule 27 – Dispute Resolution Procedure shall be amended as follows:

(i) the word "or" at the end of Section 5.1(c) shall be deleted;

(ii) the comma at the end of Section 5.1(d) shall be deleted and replaced with a semi-colon;

(iii) following Section 5.1(d), a new Section 5.1(e) shall be added as follows:

"(e) whether a PSS Submittal or any subsequent amendment or development of the relevant documents prior to the execution of the DB Co Works Agreement, in whole or in part, was or was not Divergent; or"

(iv) following the new Section 5.1(e), a new Section 5.1(f) shall be added as follows:

"(f) whether failing to reflect an Interface Reserved Position Issue would result in any of items (a) through (r) of Section 1.5 of Part F of Appendix 3 to the MOU being omitted from the form of Stage 2 Interface Agreement,"

(a) For the avoidance of doubt, "includes" and "including", whether or not used with the words "without limitation" or "but not limited to", shall not be deemed limited by the specific enumeration of items but shall, in all cases, be deemed to be without limitation and construed and interpreted to mean "includes without limitation" and "including without limitation".

5.2 [INTENTIONALLY DELETED]

SCHEDULE 44

STAGE 2 ADDITIONAL VEHICLES

PART 1
DEFINITIONS

1.1 Definitions

The following definitions shall have the following meanings in this Schedule 44:

(a) "**Additional Vehicles Termination Date**" has the meaning given to it in Section 3.1(b)(i) of this Schedule 44.

(b) "**Belfast MSF Expansion**" has the meaning given to it in the MOU.

(c) "**Belfast MSF Expansion Variation**" means one or more Variations to be entered into between Project Co and the City relating to the Belfast MSF Expansion and pursuant to the MOU.

(d) "**Break Point**" means July 31, 2017.

(e) "**CC LD Account**" has the meaning given to it in Section 2.7(e)(i) of this Schedule 44.

(f) "**Default Interest Rate**" means

(g) "**Delivery**" means delivery by Project Co of the Stage 2 Additional Vehicles purchased by the City in the condition required by Sections 2.1, 2.2, 2.6 and 2.9 of this Schedule 44 to the Designated Site and "**Deliver**" and similar terms shall be construed accordingly.

(h) "**Delivery Date**" means the date required for Delivery of each Stage 2 Additional Vehicle as set out in Appendix 1 to this Schedule 44.

(i) "**Designated Site**" means the Belfast Road maintenance and storage facility.

(j) "**Excluded Matters**" means (i) any obligation or liability of Project Co arising out of the provisions of the Project Agreement and (ii) any matter related to the provisions of the Project Agreement, in either case other than those specifically relating to the Delivery of the Stage 2 Additional Vehicles as set out in this Schedule 44.

(k) "**Expanded System**" means the System as expanded by the Stage 2 System.

(l) "**Expanded System Diagram**" means the diagram set out at Appendix 2 to this Schedule 44.

(m) "**Expanded System Revenue Service Availability**" occurs when substantial completion of the Stage 2 System and Systems Integration have been completed such that the Expanded System operates as a single coherent system.

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(n) "**Final Milestone**" means in respect of each Stage 2 Additional Vehicle, the milestone referenced in Section 2.4(a)(ix) of this Schedule 44.

(o) "**Longstop Delivery Date**" means March 15, 2020.

(p) "**MOU**" means the agreement set out in the Memorandum of Understanding dated March 16, 2017 and made between the City and Project Co.

(q) "**Prime Rate**" means on any day, the annual rate of interest announced by the Royal Bank of Canada (or its successor), or any Canadian chartered bank agreed by the City and Project Co, from time to time as its reference rate then in effect for determining interest rates on Canadian dollar commercial loans made by it in Canada.

(r) "**Punch List**" means, in respect of each Stage 2 Additional Vehicle, a list of minor deficiencies (such that they do not affect the safety or operation of such Stage 2 Additional Vehicle) and which will not substantially affect the use of such Stage 2 Additional Vehicle for its intended purpose (either until or while the work is completed).

(s) "**Punch List Items**" means the items on the Punch List.

(t) "**Rolling Stock Activities**" means any activities undertaken by any person under, relating to, or in connection with the implementation of, this Schedule 44 and any and all early works packages contemplated by the MOU in connection with the Belfast MSF Expansion.

(u) "**Rolling Stock Component**" means an amount equal to comprising part of the aggregate Vehicle Unit Price for all the Stage 2 additional Vehicles.

(v) "**RTG Delay Costs**" means any losses, damages or costs reasonably and properly incurred or suffered by the Construction Contractor as a result of any delay by the Vehicle Supplier in the performance of the Stage 2 Vehicle Supply Variation up to a maximum amount of per vehicle per day of delay.

(w) "**S2AV Capital Spares**" means the spare parts and components for the Stage 2 Additional Vehicles identified in Appendix 3 to this Schedule 44.

(x) "**S2AV Payment Account**" means an account into which Project Co shall direct by written notice to the City and the Construction Contractor that all Stage 2 Additional Vehicles Milestone Payments and other payments under Section 2.4 of this Schedule 44 shall be made.

(y) "**Stage 1 Vehicles**" means the Vehicles required to be delivered under this Project Agreement in order to achieve Substantial Completion of the Vehicle Component, excluding, for greater certainty, any Stage 2 Additional Vehicles.

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(z) "**Stage 2 Additional Vehicles**" means 38 Alstom Citadis Spirit 48m light rail transit vehicles purchased by the City pursuant to this Schedule 44 (including the Thales vehicle on-board train control and on-board communications equipment).

(aa) "**Stage 2 Additional Vehicles Milestone Payments**" has the meaning given to it in Section 2.4(a).

(bb) "**Stage 2 East Extension**" means the east extension of the Confederation Line from Blair station to Trim as generally illustrated by the thinner red lines to the east of the Confederation Line in the Expanded System Diagram.

(cc) "**Stage 2 LRT Project**" means the Stage 2 East Extension and the Stage 2 West Extension.

(dd) "**Stage 2 System**" means the light rail rapid transit system for the Stage 2 LRT Project.

(ee) "**Stage 2 Vehicle Supply Variation**" means the variation for the supply of the Stage 2 Additional Vehicles dated June 21, 2017 to the contract dated February 12, 2013 between the Construction Contractor and the Vehicle Supplier for the supply by the Vehicle Supplier of the Stage 1 Vehicles.

(ff) "**Stage 2 West Extension**" means the west extension of the Confederation Line from Tunney's Pasture to Moodie Drive as generally illustrated by the thinner red lines to the west of the Confederation Line in the Expanded System Diagram.

(gg) "**Systems Integration**" means ensuring that all components of the Expanded System function together as a coherent system.

(hh) "**Vehicle Long Stop Date**" means January 1, 2023.

(ii) "**Vehicle Supplier**" means Alstom Transport Canada Inc.

(jj) "**Vehicle Unit Price**" means, subject as provided in Section 2.4(d), per Stage 2 Additional Vehicle.

(kk) "**Weekday**" means Monday, Tuesday, Wednesday, Thursday or Friday that is not a statutory holiday in the Province of Ontario.

Unless otherwise defined in this Schedule 44, terms defined in Schedule 1 to this Project Agreement shall have the same meaning in this Schedule 44.

1.2 Appendices

The following documents, all of which are hereby incorporated by reference into and form part of this Schedule:

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Appendix No.		Description
Appendix 1	–	Delivery Dates
Appendix 2	–	Expanded System Diagram
Appendix 3	–	S2AV Capital Spares
Appendix 14	–	Commissioning of Stage 2 Vehicles

PART 2
PURCHASE OF STAGE 2 ADDITIONAL VEHICLES

2.1 City's Purchase

(a) The City hereby purchases from Project Co the Stage 2 Additional Vehicles and the S2AV Capital Spares and requires that each Stage 2 Additional Vehicle be Delivered by Project Co to the Designated Site on the Delivery Date for such Vehicle set out in Appendix 1 or on such earlier date as may be agreed by the City and Project Co.

(b) The Parties acknowledge that the City intends to use the Stage 2 Additional Vehicles on the System and the Expanded System, provided that it is expressly acknowledged by the Parties that Project Co shall have no responsibility or liability under this Schedule 44 in respect of any aspect of Systems Integration. The Stage 2 Additional Vehicles shall be capable of being used to achieve Expanded System Revenue Service Availability and capable of being utilized on the System and the Expanded System, assuming that the Expanded System will be designed and constructed to the same requirements as the System.

(c) The purchase of each Stage 2 Additional Vehicle shall be completed upon the Delivery Date for such Vehicle. Together with the documentation required under Section 29.5 of the Project Agreement, as applied herein, Project Co will deliver to the City a Punch List together with the Delivery of each Vehicle. The Delivery of any Stage 2 Additional Vehicle shall be effective even if there are Punch List Items. Such Punch List Items shall be corrected as expeditiously as possible by the Project Co at the Designated Site. Such Punch List Items shall be itemized and listed along with a rectification date agreed between the parties, and must be remedied by the agreed upon rectification date.

(d) Except to the extent otherwise provided in this Schedule 44 and subject always to Section 2.8 of this Schedule 44, the provisions of the Project Agreement relating to Vehicles, including (but not limited to) Section 29.5 of the Project Agreement shall apply, *mutatis mutandis*, to the Stage 2 Additional Vehicles, provided that, for the purposes of this Schedule 44, the provisions of the Project Agreement entitling Project Co to extensions of time for any Delay Event shall apply to each of the Delivery Dates hereunder, provided Project Co shall have complied with its obligations in respect of any Delay Event under Section 40 of the Project Agreement (including, as such obligations shall relate to the details of the consequences (whether direct or indirect, financial or non-financial) which such Delay Event may have upon any of the Delivery Dates). The

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City shall allow Project Co an extension of time equal to the delay caused by any relevant Delay Event and shall fix a revised Delivery Date as soon as reasonably practicable and, in any event, within ten (10) Business Days of the latter of (A) the date of receipt by the City Representative of Project Co's notice given in accordance with Section 40.2(a) of the Project Agreement and the date of receipt of any further particulars (if such are required under Section 40.2(c) of the Project Agreement), whichever is later and (B) the date of receipt by the City Representative of any supplemental information supplied by Project Co in accordance with Section 40.2(b) of the Project Agreement and the date of receipt of any further particulars (if such are required under Section 40.2(c) of the Project Agreement), whichever is later.

(e) If, as at the Delivery Date for any Stage 2 Additional Vehicle:

(i) the relevant Stage 2 Additional Vehicle is encumbered by any encumbrances contrary to Section 29.5 of the Project Agreement; or

(ii) Project Co has failed to perform any covenant on its part in respect of such Stage 2 Additional Vehicle,

(a "**Default Event**") then, without prejudice to the City's entitlement to the payment of liquidated damages under and in accordance with Section 2.7(a) and (b) of this Schedule 44, the City may serve notice on Project Co (the "**Vehicle Notice**") requiring Project Co to remove the encumbrance or rectify or otherwise deal with any other relevant Default Event and giving Project Co a reasonable period in light of the nature of the encumbrance, default or failure (the "**Vehicle Cure Period**"), to do so. If by the end of the Vehicle Cure Period, Project Co has not removed the encumbrance or rectified the other relevant Default Event(s) to the satisfaction of the City, acting reasonably, the City may in its Discretion on prior written notice to Project Co (the "**Default Notice**"), arrange for the encumbrance to be discharged or otherwise perform, rectify or remedy the other relevant Default Event(s) and if the relevant Default Event(s) reasonably requires the payment or expenditure of money, the City may make such payment or expenditure and deduct or set-off all sums so expended (together with interest thereon at the Default Interest Rate until the date of such deduction and/or set-off) from any subsequent Stage 2 Additional Vehicles Milestone Payment but not, for greater certainty, against any other amount payable by the City under this Project Agreement. The Parties agree that Delivery of any Stage 2 Additional Vehicle shall not, unless otherwise agreed by Project Co and the City, take place until any outstanding Default Event has been remedied to the satisfaction of the City, acting reasonably.

2.2 Output Specifications of Stage 2 Additional Vehicles

(a) Subject to Section 2.2(b), the Stage 2 Additional Vehicles purchased by the City pursuant to Section 2.1(a) shall be substantially identical to the design of those light rail vehicles purchased under the Project Agreement, subject only to changes necessitated by changes in the supplier of components or in the nature of components supplied by manufacturers and, in any event, manufactured in accordance with the Output Specifications provided for in Schedule 15-2 – Output Specifications - Design and Construction Specifications, as

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the same have been amended pursuant to all variations, instructions, adjustments and deviations, to the extent agreed or approved by RTG on or prior to the date of execution of the Variation Confirmation related to this Schedule 44. To the extent that there is any Dispute outstanding relating to the Output Specifications provided for in Schedule 15-2 or the interpretation thereof, the Parties agree that the outcome of such Dispute will apply equally to the Stage 2 Additional Vehicles as to the Stage 1 Vehicles.

(b) Notwithstanding Section 2.2(a), the City may further amend the Output Specifications provided for in Schedule 15 – Output Specifications in respect of the Stage 2 Additional Vehicles after the date specified in Section 2.2(a). Such further amendments shall constitute a Variation and shall be subject to the Variation process set out in the Project Agreement and Schedule 22 - Variation Procedure.

2.3 Price of Additional Vehicles and S2AV Capital Spares

Subject as provided in Sections 2.2(b) and 2.4(d) to (h), the price of each of the Stage 2 Additional Vehicles purchased by the City pursuant to Section 2.1(a) shall be the Vehicle Unit Price. Subject as provided in Sections 2.2(b) and 2.4(d) to (h), the price of the S2AV Capital Spares shall be .

2.4 Payment of Price of Additional Vehicles and S2AV Capital Spares

[REDACTED]

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2.5 Insurance Premium Adjustment

The City shall on the date of execution of this Schedule 44 pay to Project Co a single payment of $ (inclusive of relevant taxes) to compensate Project Co for the increase in its insurance costs relating to the requirement to insure the Stage 2 Additional Vehicles.

2.6 Commissioning of Additional Vehicles

The Stage 2 Additional Vehicles purchased pursuant to this Schedule shall be tested and commissioned by Project Co in accordance with Appendix 14 - Commissioning of Stage 2 Vehicles.

2.7 Project Co's Failure to Deliver

(a) If by June 15, 2019, Project Co shall have failed to complete serial testing on 17 Stage 2 Additional Vehicles, the City shall, subject as provided in Section 2.7(d) to (f), be entitled on account of liquidated damages to an amount equal to for each of the first 17 Stage 2 Additional Vehicles in respect of which serial testing is delayed for each day of delay from June 15, 2019 until serial testing of such Stage 2 Additional Vehicle has been achieved.

(b) If by the Longstop Delivery Date, the Final Milestone has not been achieved in respect of all Stage 2 Additional Vehicles, the City shall, subject as provided in Section 2.7(d) to (f), be entitled on account of liquidated damages to an amount equal to:

(i) for each of the first 17 Stage 2 Additional Vehicles in respect of which the Final Milestone is delayed for each day of delay from the Longstop Delivery Date until such Final Milestone has been achieved; and

(ii) for each of the next 21 Stage 2 Additional Vehicles in respect of which the Final Milestone is delayed for each day of delay from the Longstop Delivery Date until such Final Milestone has been achieved.

(c) Except as provided in Sections 2.1(e) and 3.1 of this Schedule, the amounts of liquidated damages referred to in Sections 2.7(a) and (b) of this Schedule shall constitute the City's sole and exclusive remedy in respect of a failure of Project Co to Deliver the Stage 2 Additional Vehicles in accordance with the provisions of this Project Agreement.

(d) The maximum amount of Project Co's liability under Section 2.7(a) and (b) of this Schedule 44 shall be the lesser of:

(i) the maximum liability of the Vehicle Supplier in respect of liquidated damages payable by it to the Construction Contractor under the terms of the Stage 2 Vehicle Supply Variation; and

(ii) subject to Section 2.7(e) and (f) the amount standing to the credit of the CC LD Account as at the Longstop Delivery Date.

(e) Project Co shall ensure that with effect from May 1, 2019:

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(i) the Construction Contractor shall pay any liquidated damages which it receives from the Vehicle Supplier under the Stage 2 Vehicle Supply Variation into an account (the "**CC LD Account**") in the name of the Construction Contractor;

(ii) any amounts standing to the credit of the CC LD Account shall thereafter be applied only to compensate the Construction Contractor in respect of accrued RTG Delay Costs or to pay to Project Co amounts to enable Project Co to meet its obligations to the City under Section 2.7(a) and (b) of this Schedule 44; and

(iii) the City shall be entitled to a security interest in the CC LD Account as security for the payment of amounts due and payable to the City under Section 2.7(a) and (b) of this Schedule 44.

(f) If, as at the Longstop Delivery Date, there is an ongoing unresolved dispute as to any amount of liquidated damages payable to the Construction Contractor by the Vehicle Supplier under the terms of the Stage 2 Vehicle Supply Variation, then any payment of liquidated damages by Project Co under Section 2.7(a) and (b) shall be deferred until the resolution of such dispute.

(g) If Project Co shall fail to Deliver the Stage 2 Additional Vehicles by the Vehicle Long Stop Date, the City shall have the right to:

(i) cancel the purchase of the undelivered Stage 2 Additional Vehicles (the "**Cancelled Vehicles**") by written notice to Project Co, provided that any Stage 2 Additional Vehicles completed or work partially completed in connection with any Stage 2 Additional Vehicles shall be delivered, within a reasonable period after such termination, at the City's cost to a location specified by the City, acting reasonably; or

(ii) without derogation from the City's right under Section 2.7(a) and (b), but subject as provided in Section 2.7(d), complete the purchase of the Cancelled Vehicles by written notice to Project Co.

2.8 Ring Fencing Provisions and Limitation on Liability

(a) The City agrees that nothing in or arising out of this Schedule 44 and no performance or delay or failure in the performance of any obligation under or in connection with this Schedule 44 (including any delay or failure relating to the Stage 2 Additional Vehicles or the Delivery thereof) shall give rise to or be capable of giving rise to a Project Co Event of Default.

(b) In addition, to the extent that any Claim by the City under this Schedule 44 would cause Project Co to be unable to meet its obligations under the Lending Agreements or would otherwise have a Material Adverse Effect under and as defined in the Lending Agreements, satisfaction of such Claim shall be deferred until (i) after the Substantial Completion Payment Date; and (ii) such time as Project Co is able to satisfy such Claim without breaching any of its obligations under the Lending Agreements or otherwise creating or giving rise to any Material Adverse Effect under and as defined in the Lending Agreements.

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(c) The City further agrees that no performance or delay or failure in the performance by Project Co of any of the Excluded Matters shall give rise or be capable of giving rise to any default or failure on the part of Project Co under this Schedule 44.

(d) Notwithstanding any other provisions of this Project Agreement or any other Project Document, the City shall not be entitled to exercise any right under this Project Agreement, any other Project Document, or otherwise howsoever arising, to deduct or set-off any amount due or owing to it under this Schedule 44 against any payment that it is required to make under any other provision of this Project Agreement or any other Project Document or to deduct or set-off any amount payable by it under this Schedule 44 against any amount due or owing to it under any other provision of this Project Agreement or any other Project Document.

(e) The maximum aggregate liability of Project Co under this Schedule 44, including for default, breach, negligence, any liquidated damages, indemnity obligations or otherwise in connection with Project Co's obligations under this Schedule 44, shall be limited to the amount recovered from the Construction Contractor under the variation to the Construction Contract reflecting the amendments set out in this Schedule 44 (the "**CC Dropdown**"). Project Co shall ensure that the maximum aggregate liability of the Construction Contractor under the CC Dropdown shall not be less than an amount equal to the greater of (i) % of the total remuneration payable to the Construction Contractor under the CC Dropdown, being times the Vehicle Unit Price plus on account of the S2AV Capital Spares and (ii) the aggregate amounts recovered by the Construction Contractor against (x) the Vehicle Supplier under the Stage 2 Vehicle Supply Variation and (y) the supplier of the vehicle on-board communications equipment under its supply contract with the Construction Contractor.

2.9 Canadian Content

(a) Prior to or concurrently with the Delivery of each Stage 2 Additional Vehicle, Project Co shall deliver to the City or shall procure the delivery to the City of the Canadian Content Certificate, which shall, in a manner consistent with the Canadian Contact Certificate(s) delivered in respect of the Stage 1 Vehicles:

(i) demonstrate that such Stage 2 Additional Vehicle meets the Canadian Content Requirements;

(ii) include any necessary or desirable back-up information reasonably necessary to support the contents thereof and to address the requirements of the Canadian Content Policy;

(iii) be true and correct in all material respects; and

(iv) be in form and content satisfactory to the City, acting reasonably.

PART 3
TERMINATION OF PROJECT AGREEMENT

3.1 Termination of Project Agreement

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(a) In the event that the Project Agreement shall be terminated pursuant to and in accordance with the provisions thereof, the provisions of this Section 3.1 shall apply.

(b) If the Project Agreement shall be terminated as a result of a City Event of Default or the exercise of the City's right to terminate for convenience pursuant to Section 47.3 of the Project Agreement:

(i) Project Co shall have the right either to continue to carry out its obligation to Deliver the Stage 2 Additional Vehicles pursuant to the terms and conditions of this Schedule or to terminate the terms and conditions of this Schedule by giving the City a written notice within thirty (30) days following the termination of the Project Agreement effective immediately (the "**Additional Vehicles Termination Date**");

(ii) in the event that Project Co shall elect to carry out its obligation to Deliver the Stage 2 Additional Vehicles pursuant to the terms and conditions of this Schedule

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in accordance with subparagraph (i) above, the provisions of this Schedule shall survive and apply together with those parts of this Project Agreement necessary to enable the Parties to comply therewith; and

(iii) in the event that Project Co shall elect to terminate the terms and conditions of this Schedule in accordance with subparagraph (i) above, the City shall not be entitled to any refund of the payments that the City shall have made in respect of the Stage 2 Additional Vehicles prior to or on the Additional Vehicles Termination Date; provided that any Stage 2 Additional Vehicles completed or work partially completed in connection with any Stage 2 Additional Vehicles shall be delivered at the City's cost to a location specified by the City, acting reasonably.

(c) If the Project Agreement shall be terminated as a result of the exercise of the City's right to terminate pursuant to Section 45 of the Project Agreement:

(i) the City shall have the right either to continue to carry out the terms and conditions of this Schedule or to terminate the terms and conditions of this Schedule by giving Project Co a written notice within thirty (30) days following the termination of the Project Agreement effective immediately;

(ii) in the event that the City shall elect to carry out the terms and conditions of this Schedule in accordance with subparagraph (i) above, the provisions of this Schedule shall survive and apply, together with those parts of this Project Agreement necessary to enable the Parties to comply therewith, provided that the Parties shall have agreed any and all amendments to the Project Agreement necessary to provide for the facilities necessary for the manufacture, storage and maintenance of the Vehicles to be Delivered hereunder; and

(iii) in the event that the City shall elect to terminate the terms and conditions of this Schedule in accordance with subparagraph (i) above, the provisions of Section 48 of this Project Agreement shall apply.

(d) If the Project Agreement shall be terminated as a result of Section 47.1 or 47.2 of the Project Agreement:

(i) either party shall have the right to terminate the terms and conditions of this Schedule 44 by giving the other party a written notice within thirty (30) days following the termination of the Project Agreement effective immediately;

(ii) in the event that neither Party shall elect to terminate the terms and conditions of this Schedule 44 in accordance with subparagraph (i) above, the provisions of this Schedule 44 shall survive and apply, together with those parts of this Project Agreement necessary to enable the Parties to comply therewith, provided that the Parties shall have agreed any and all amendments to the Project Agreement necessary to provide for the facilities necessary for the manufacture, storage and maintenance of the Vehicles to be Delivered hereunder; and

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(iii) in the event that either Party shall elect to terminate the terms and conditions of this Schedule in accordance with subparagraph (i) above, the City shall not be entitled to any refund of the payments that the City shall have made in respect of the Stage 2 Additional Vehicles prior to or on the Additional Vehicles Termination Date; provided that any Stage 2 Additional Vehicles completed or work partially completed in connection with any Stage 2 Additional Vehicles shall be delivered, within a reasonable period after termination, at the City's cost to a location specified by the City, acting reasonably.

(e) In the event that Project Co or the City, as the case may be, fails to deliver a written notice within thirty (30) days following the termination of the Project Agreement as provided for in Section 3.1(b), Section 3.1(c) or Section 3.1(d), it shall be deemed that the City has elected to terminate the terms and conditions of this Schedule 44.

(f) For greater certainty, the City acknowledges and agrees that, if the Project Agreement is terminated for any reason, including as a result of a Project Co Event of Default, nothing in or arising out of this Schedule 44 will have any impact whatsoever on the compensation payable to Project Co pursuant to Schedule 23 (Compensation on Termination).

3.2 Impact of Termination on M&R Activities

On any termination of the terms and conditions of this Schedule 44:

(a) the City shall negotiate in good faith with Project Co such amendments to the Project Agreement as shall place Project Co and the Maintenance Contractor in no better and no worse position in respect of the provision of the Maintenance Services or in relation to the Payment Mechanism as each of them would have been in had the Rolling Stock Activities not been carried out; and

(b) the City shall compensate Project Co for any incremental cost, liability or expense that either of Project Co and the Maintenance Contractor shall demonstrate to the reasonable satisfaction of the City that it has suffered or incurred in having complied with or in continuing to comply with its obligations under the Project Agreement as a result of the Rolling Stock Activities.

PART 4
BREAK POINT

4.1 Break Point

(a) The Parties acknowledge that they are currently negotiating the terms of the Belfast MSF Expansion Variation. The Parties further acknowledge that Project Co's ability to perform its obligations under this Schedule 44 may be adversely impacted if the Belfast MSF Expansion Variation is not executed in sufficient time to enable the Belfast MSF Expansion to be substantially complete by December 31, 2018 (the "**Deadline Date**").

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(b) The Parties agree that, if the Belfast MSF Expansion Variation shall not have been executed on or before the Break Point, then the Parties shall meet within 10 Business Days of the Break Point to negotiate in good faith with a view to agreeing the following:

(i) the funding by the City of such additional early works packages as will enable work to continue on the Belfast MSF Expansion; and

(ii) any Variations that may be necessary to the MOU, this Schedule 44 or to the other provisions of this Project Agreement, or any provisions that may be necessary in any Variation contemplated under the MOU that is still being negotiated, due to the delay in achieving agreement on the Belfast MSF Expansion Variation or as a result of the Belfast MSF Expansion not going ahead as anticipated in the MOU.

4.2 Break Point Option

If, by the date that is 60 days after the Break Point or such later date as the Parties may agree, being not later than the date falling 90 days after the Break Point, the Belfast MSF Expansion Variation has not been executed and agreement has not been reached by the Parties on the matters referred to in Section 4.1(b)(i) and (ii) of this Schedule, then the City shall, at its discretion, either (a) take a novation of the Stage 2 Vehicle Supply Variation from the Construction Contractor at no cost to the Construction Contractor and this Schedule 44 shall terminate and the provisions of Section 3.1(b)(iii) shall apply; or (b) continue with the operation and performance of this Schedule 44, provided that, regardless of which option the City shall elect, the City shall negotiate in good faith with Project Co such amendments to the Project Agreement as shall place Project Co and the Maintenance Contractor in no better and no worse position in respect of the provision of the Maintenance Services or in relation to the Payment Mechanism as each of them would have been in had the Rolling Stock Activities not been carried out and any disagreement as to the terms of such amendments shall be determined by the Dispute Resolution Procedure and provided further that, with effect from the Break Point, any Rolling Stock Activities that in any way impede, restrict or otherwise interfere with the carrying out by Project Co of its obligations under the Project Agreement and/or any Variation thereto, including this Schedule 44, shall be treated for all purposes under the Project Agreement and any such Variation as an Excusing Cause and a Compensation Event.

PART 5
FURTHER VEHICLES

5.1 Further Vehicles

(a) Project Co acknowledges and agrees that the City may require additional light rail transit vehicles following the date hereof, including all electromechanical and other equipment therein, designed and manufactured in accordance with Section 2.2 hereof (the "**Option Vehicles**"). For clarity, this includes any additional light rail transit vehicles beyond the initial fleet of Vehicles to be provided by Project Co at the Revenue Service Availability Date and the Stage 2 Additional Vehicles provided under this Schedule 44. The City anticipates that it may require delivery of approximately 28 Option Vehicles between 2026 and 2036. Project Co and the City acknowledge and agree that the City shall have

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the opportunity to provide one or more written notices to Project Co to negotiate a price per Option Vehicle (each a "**Vehicle Option Notice**"). In the event a Vehicle Option Notice is delivered, Project Co shall have 75 days from the delivery of a Vehicle Option Notice to deliver a proposed price per Option Vehicle to the City (the "**Vehicle Option Proposal**"). The proposed price per Option Vehicle shall be determined in good faith by Project Co and negotiated in good faith between the City and Project Co based on (A) a detailed "line item" price build-up provided by Project Co to the City as to differences between the Vehicle Unit Price and the proposed price per Option Vehicle and (B) and market comparables and metrics as regards the pricing for similar light rail transit vehicles being manufactured and delivered at that time. The Vehicle Option Proposal shall include sufficient information and detail with respect to items (A) and (B) above. To the extent the City and Project Co are able to mutually agree on a final price per Option Vehicle within 105 days of the delivery of a Vehicle Option Notice (or such longer period as the City and Project Co may mutually agree), such Option Vehicles shall be purchased and delivered on substantially similar terms, under prevailing conditions at the time of Vehicle Option Proposal, as those set forth in this Schedule 44.

5.2 Amendments to Lifecycle Payments

(a) Where the City shall purchase any Option Vehicles pursuant to Section 5.1(a), the City and Project Co shall agree on appropriate amendments to the schedule of Lifecycle Payments set out in Schedule 20 - Payment Mechanism, taking into account lifecycle costs for the Option Vehicles that occur within the Maintenance Term.

(b) The amendments of the Lifecycle Payments schedule as provided for in Section 5.2(a) shall be presumptively based on a lifecycle cost curve identical in real dollar terms to the lifecycle cost curve for the Vehicles contained in Project Co's financial model at Financial Close, as amended from time to time. Any variations must be demonstrated by Project Co with specific references to unique features of the Option Vehicles which require a different lifecycle maintenance approach.

(c) For greater certainty, the amendment of the Lifecycle Payments as provided for hereunder shall take into account that:

(i) any amendment in the Output Specifications requested by the City shall result in an adjustment in the Lifecycle Payments; and

(ii) the City shall be responsible for lifecycle costs for the Option Vehicles that occur beyond the Maintenance Term.

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APPENDIX 1

DELIVERY DATES

Stage 2 Additional Vehicles (38 Alstom Citadis Spirit 48m light rail transit vehicles)		
Month	Quantity of LRV Deliveries	
	By Month	Cumulative
June 2018	1	1
July 2018	1	2
August 2018	1	3
September 2018	1	4
October 2018	1	5
November 2018	1	6
December 2018	1	7
January 2019	2	9
February 2019	3	12
March 2019	2	14
April 2019	3	17
May 2019	3	20
June 2019	2	22
July 2019	3	25
August 2019	2	27
September 2019	3	30
October 2019	2	32
November 2019	2	34
December 2019	2	36
January 2020	2	38

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APPENDIX 2

EXPANDED SYSTEM DIAGRAM

APPENDIX 3

S2AV CAPITAL SPARES

Main System	DESCRIPTION	Capital Spares Qty	Existing Contract	Additonal
BOGIE	Power Bogie (without motor)	4	3	1
BOGIE	Axle beam	10		10
BOGIE	Trailer bogie	3	2	1
BOGIE	Primary suspension spring	5		5
BOGIE	Vertical damper	5		5
BOGIE	Lateral damper	3		3
BOGIE	Equipped traction converter	4	3	1
TCMS	Traction motor	6		6
TCMS	Line filter inductor	3		3
TRACTION	RHEOSTATIC BRAKE RESISTOR	3		3
COUPLER	Coupler	3	3	0
GANGWAY	Gangway	3		3
DOORS	Passenger access doors	5		5
DOORS	Door mechanism	5		5
DOORS	Door control unit	5		5
HVAC	HVAC saloon	7	4	3
HVAC	HVAC saloon compressor	4		4
HVAC	HVAC saloon controller	4		4
HVAC	Cabin booster	4	2	2
BRAKE	Hydraulic Power Unit Motor	5		5
BRAKE	Disc brake unit complete	5		5
BRAKE	Track brake unit	5		5
BRAKE	Electronic Brake Control Unit	2		2
CURRENT COLLECTION	Pantograph	2	1	1
CURRENT COLLECTION	Surge arrester	1		1
CVS	APS	2		2
BATTERY	Battery box	3	1	2
DRIVER INTERFACE	Master controller	4	2	2
DRIVER INTERFACE	Driver seat	1		1
SAFETY SYSTEMS	Event Recorder	2		2
AIR GENERATION UNIT	Air production unit	2		2
CVS	HSCB module	2	1	1
CVS	POWER MODULE ONIX	3		3
PAPIS	UNIT CONTROL AGATE	1		1
PAPIS	Frontal display	2		2
PAPIS	9" TFT display for wheelchair area	2		2
PAPIS	Internal LED display	4		4
PAPIS	LCD display	6		6
PAPIS	PIS Server stand alone module	2		2
TCMS	RIOM T314	5		5
TCMS	RIOM T304	1		1
TCMS	Redundant Gateway MVB-WTB	1		1
PAPIS	Retrovision IP camera	4		4
TCMS	MPU 3U9	2		2

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APPENDIX 14

COMMISSIONING OF STAGE 2 VEHICLES

1.1 Applicable Standards

(a) Project Co shall plan, schedule, coordinate and execute the commissioning of the Stage 2 Vehicles with the support of the Vehicle Supplier.

(b) Project Co shall provide all relevant documentation in respect of any changes or variations in design of any of the Stage 2 Additional Vehicles in comparison to the design of the Stage 2 Additional Vehicles in accordance with the requirements of Schedule 10 - Review Procedure.

1.2 Vehicle Commissioning Activities

(a) The following commissioning tests are intended to verify all vehicle functions are operating correctly on the City's right of way (Stage 1):

(i) Static functional testing of a 2 car Train shall be conducted to ensure that all functionality, both within the Stage 2 Vehicle and across the trainlines, is operating normally.

(ii) Tests of the brake rates shall be performed on all Stage 2 Vehicles per the requirements of the Project Agreement. Brake rates shall be verified using virtual chart recordings and the Velocity/Time (V/T) method:

(A) Emergency Brake rates;

(B) Dynamic brake rates;

(C) and friction rates;

(D) The parking brakes shall be engaged on each end of each Stage 2 Vehicle stopped on the maximum grade on the stage 1 system. The parking brakes shall prevent car movement.

(iii) Each Stage 2 Vehicle shall be tested to ensure that the acceleration rates of Project Agreement are met.

(iv) Project Co and the City shall mutually agree on a final form of testing and commissioning plan to ensure the Stage 2 Vehicles are capable of running on the Stage 1 system (and the Expanded System if built to Stage 1 specifications), on the basis that the testing and commissioning plan shall be no more onerous than the testing and commissioning plan for the Stage 1 Vehicles.

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SCHEDULE 45

BELFAST MSF EXPANSION DBF SCHEDULE

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1. DEFINITIONS AND INTERPRETATION

1.1 Definitions and Interpretation

(a) This Belfast MSF Expansion DBF Schedule (this "**Schedule**") shall be interpreted in accordance with Appendix 1 – Definitions and Interpretation. Capitalized terms used in this Schedule which are not defined in Appendix 1 shall have the meanings ascribed to them in the Project Agreement.

(b) This Schedule is comprised of the provisions of Articles 1 to 52 inclusive and the following documents, all of which are incorporated by reference into and form part of this Schedule.

Appendix		Description
Appendix 1	-	Definitions and Interpretation
Appendix 2	-	Completion Documents
Appendix 4	-	Lenders' Direct Agreement
Appendix 4B	-	Borrower Lenders' Direct Agreement
Appendix 5	-	Contractor's Direct Agreement
Appendix 6	-	Amendment to the Independent Certifier Agreement
Appendix 9	-	Belfast MSF Expansion Key Individuals
Appendix 10	-	Review Procedure
Appendix 11	-	Quality Management
Appendix 14	-	Commissioning
Appendix 15-2 Part 6	-	Belfast MSF Expansion Output Specifications
Appendix 16	-	See Schedule 16 – Title Encumbrances to the Project Agreement
Appendix 17	-	Environmental Obligations
Appendix 18	-	See Schedule 18 – Communications and Public Consultation Protocol to the Project Agreement

Appendix		Description
Appendix 21	-	Construction Payments
Appendix 22	-	See Schedule 22 – Variation Procedure to the Project Agreement
Appendix 23	-	Compensation on Termination
Appendix 25	-	Insurance and Performance Security Requirements
Appendix 26	-	Record Provisions
Appendix 27	-	See Schedule 27 – Dispute Resolution Procedure to the Project Agreement
Appendix 28	-	Refinancing
Appendix 30	-	Amended and Restated Insurance Trust Agreement
Appendix 31	-	Project Co Information
Appendix 33	-	Works Reports
Appendix 41	-	See Schedule 41 - Intellectual Property to the Project Agreement

(c) The documents comprising this Schedule are complementary and what is called for by any one of them shall be interpreted as if called for by all, except in the event of ambiguities, conflicts or inconsistencies, in which case Section 1.3 [1.2] shall apply.

(d) Intentionally Deleted.

(e) Unless it is specifically provided that a consent, approval or satisfaction is in the Discretion of the City, no consent, approval or satisfaction of the City or the City Representative shall be unreasonably withheld or delayed.

(f) Unless it is specifically provided that a consent, approval or satisfaction is in the discretion of Project Co, no consent, approval or satisfaction of Project Co or the Project Co Representative shall be unreasonably withheld or delayed.

(g) Whenever this Schedule refers to a provision or a Schedule to the Project Agreement being applied *mutatis mutandis*, this shall mean that the applicable provisions of the Project Agreement shall be read and construed with all appropriate changes, including where a defined term in the Project Agreement is used in this Schedule with the words "Belfast MSF Expansion" in front of it, using the defined term from this Schedule.

(h) Article and section references in this Schedule indicated by square brackets are references to substantially equivalent articles and sections, as the case may be, as set out in the

Project Agreement, and are inserted herein for convenience and identification purposes only. Such references shall not affect the interpretation or construction of this Schedule.

1.2 Early Works

(a) The Parties acknowledge that Project Co started work on the Belfast MSF Expansion Project in advance of the execution of the Belfast MSF Expansion Variation Confirmation and agree that all work completed by Project Co under Early Works Packages 1, 2, 3, 4 and 5, as directed in Variation Directives ●, shall be treated as part of the Belfast MSF Expansion Works and shall be deemed to have been completed under this Schedule and the terms of the Variation Directives themselves.

(b) The Parties agrees that Project Co has received payment of $ from the City in respect of work carried out under Early Works Packages 1, 2 and 3 and will receive payment of $ in respect of work carried out under Early Works Packages 4, and 5 and that the amounts payable by the City under this Schedule have taken such amounts into account and shall not be reduced as a result of such payments; provided however such amounts shall not count toward the achievement of Initial Capital Investment. For clarity, the amounts to be paid under Early Works Packages 4 and 5 will be paid pursuant to the terms of such Early Works Packages and not pursuant to the terms of this Schedule(including Appendix 21).

1.3 Conflict of Terms of this Schedule

(a) In the event of ambiguities, conflicts or inconsistencies between or among any of the provisions of this Schedule, the provisions shall govern in the following order of precedence with each taking precedence over those listed subsequently:

(i) the provisions of amendments in writing to this Schedule (if any) signed by the Parties and Variation Confirmations shall govern and take precedence only over the specific provisions of this Schedule expressly amended thereby;

(ii) any provision establishing a higher standard of safety, reliability, durability, performance or service shall take precedence over a provision establishing a lower standard of safety, reliability, durability, performance or service;

(iii) the body of this Schedule;

(iv) Appendix 1 – Definitions and Interpretation;

(v) Schedule 27 - Dispute Resolution Procedure to the Project Agreement;

(vi) Appendix 21 - Construction Payments;

(vii) Appendix 15-2 Part 6 - Belfast MSF Expansion Output Specifications;

(viii) Appendix 17 - Environmental Obligations;

(ix) Appendix 25 - Insurance and Performance Security Requirements;

(x) Schedule 22- Variation Procedure to the Project Agreement;

(xi) Appendix 10 - Review Procedure;

(xii) Appendix 14 - Commissioning;

(xiii) Appendix 11 - Quality Management;

(xiv) Appendix 28 - Refinancing;

(xv) Appendix 23 - Compensation on Termination;

(xvi) Appendix 26 - Record Provisions; and

(xvii) the other Appendices and Schedules to the Project Agreement in the order in which they are listed in Section 1.1(b).

(b) Subject to Section 1.3(a) [1.2(a)], if the ambiguity, conflict or inconsistency between or among any of the provisions of this Schedule is between a provision of general application and a provision that applies only to a specific part of the Belfast MSF Expansion Project Scope, the provision that applies to the specific part of the Belfast MSF Expansion Project Scope shall govern for that specific part of the Belfast MSF Expansion Project Scope.

(c) If any ambiguity, conflict or inconsistency between or among any of the provisions of this Schedule is not readily resolved by the foregoing provisions of this Section 1.3 [1.2], then Project Co or the City, upon discovery of same, shall immediately give notice to the City Representative. The City Representative shall, within 10 Business Days after such notice, make a determination of which provision governs and give notice of such determination, in writing, to Project Co.

(d) The City and Project Co shall comply with the determination of the City Representative pursuant to this Section 1.3 [1.2]unless the City or Project Co disputes the decision of the City Representative in which event such Dispute may be referred for resolution in accordance with Schedule 27 - Dispute Resolution Procedure to the Project Agreement.

1.4 Conflict of Documents

(a) In the event of ambiguities, conflicts or inconsistencies between or among this Schedule and the Belfast MSF Expansion Lenders' Direct Agreement, the Belfast MSF Expansion Lenders' Direct Agreement shall prevail. Notwithstanding the foregoing, if there is any right or remedy in favour of the City set out in the Belfast MSF Expansion Lenders' Direct Agreement or any part thereof which is not set out or provided for in this Schedule, such additional right or remedy shall not constitute an ambiguity, conflict or inconsistency.

1.5 Finco

(a) The City acknowledges that Project Co has subcontracted substantially all of its rights and obligations under this Schedule to Finco. The City agrees that Finco may act on behalf of Project Co and in Project Co's name under this Schedule.

2. BELFAST MSF EXPANSION COMMERCIAL CLOSE AND BELFAST MSF EXPANSION FINANCIAL CLOSE [ARTICLE 2]

2.1 Effective Date [Section 2.1]

(a) The provisions of this Schedule will come into effect on Belfast MSF Expansion Commercial Close.

2.2 Belfast MSF Expansion Financial Close [Section 2.3]

(a) On or before the Belfast MSF Expansion Financial Close Date:

(i) Project Co shall deliver to the City the documents referred to in Section 1 of Appendix 2 – Completion Documents; and

(ii) The City shall deliver to Project Co the documents referred to in Section 2 of Appendix 2 – Completion Documents.

(b) Intentionally deleted.

(c) Intentionally deleted.

(d) Intentionally deleted.

2.3 Conditions to Belfast MSF Expansion Financial Close [Section 2.5]

(a) Conditions for the Benefit of the City

The obligation of the City to complete the Belfast MSF Expansion Financial Close shall be subject to fulfilment of the following conditions on or before the Belfast MSF Expansion Financial Close Date:

(i) Obligations of Project Co

On Belfast MSF Expansion Financial Close, all of the covenants and obligations of this Schedule to be complied with or performed by Project Co on or before the Belfast MSF Expansion Financial Close Date shall have been complied with or performed in all material respects.

(ii) Representations and Warranties of Project Co

On Belfast MSF Expansion Financial Close, the representations or warranties of Project Co set out in Section 4.1 [5.1] shall be true and accurate in all material

respects and Project Co shall have delivered to the City a certificate of Project Co signed by a senior officer of Project Co without personal liability, having knowledge of the matters certified therein with respect thereto (the "**Project Co Belfast MSF Expansion Certificate**").

(iii) Project Co Belfast MSF Expansion Event of Default

On Belfast MSF Expansion Financial Close, there shall be no Project Co Belfast MSF Expansion Event of Default, nor shall there be any breach of this Schedule by Project Co or any other matter which has occurred which, if not cured, shall result in a Project Co Belfast MSF Expansion Event of Default.

(iv) Completion Documents

On Belfast MSF Expansion Financial Close, the City shall be satisfied with the forms of the Belfast MSF Expansion Completion Documents to be delivered by Project Co referred to in Section 1 of Appendix 2 – Completion Documents.

The conditions set forth in this Section 2.3(a) [2.5(a)] are for the sole benefit of the City and may be waived in whole or in part by the City by notice to Project Co.

(b) Mutual Conditions

The obligation of the City and Project Co to complete the Belfast MSF Expansion Financial Close shall be subject to fulfilment of the following conditions:

(i) confirmation by the City that no amendment is required to the Environment Assessment or EA Approvals as a result of the Belfast MSF Expansion Works; and

(ii) no injunction or restraining order or other decision or order of a court or Relevant Authority of competent jurisdiction being in effect on Belfast MSF Expansion Financial Close which prohibits, restrains, limits or imposes conditions having a material adverse effect on the obligations or liabilities of either of the Parties, or the transactions contemplated by this Schedule.

If any of the foregoing conditions are not performed or fulfilled on or before 5:00 p.m. on September 19, 2017, either the City or Project Co may terminate this Schedule, in which event this Schedule shall be terminated and the Parties shall have no further obligations or liabilities to each other under this Schedule.

3. SCOPE OF BELFAST MSF EXPANSION DBF SCHEDULE [ARTICLE 3]

3.1 Project Co Undertaking [Section 3.1]

(a) Project Co shall undertake the Belfast MSF Expansion Project and perform the activities within the Belfast MSF Expansion Project Scope in accordance with and subject to the provisions of this Schedule.

4. REPRESENTATIONS AND WARRANTIES [ARTICLE 5]

4.1 Project Co Representations and Warranties [Section 5.1]

(a) Project Co represents and warrants to the City that as of Belfast MSF Expansion Commercial Close:

(i) Project Co has carefully reviewed the whole of this Schedule, and all other documents made available to Project Co by or on behalf of the City, and, to Project Co's knowledge, nothing contained in this Schedule or such documents inhibits or prevents Project Co from completing the Belfast MSF Expansion Works in a good and safe manner so as to achieve and satisfy the requirements of this Schedule; and

(ii) the Belfast MSF Expansion Scheduled Substantial Completion Date is a realistic date for Belfast MSF Expansion Substantial Completion and is achievable by Project Co performing the Belfast MSF Expansion Works in accordance with this Schedule.

5. BACKGROUND INFORMATION [ARTICLE 6]

5.1 No Claims [Section 6.3]

(a) Project Co acknowledges and confirms that:

(i) the Background Information may contain information that relates to the Belfast MSF Expansion and it has conducted its own analysis and review of the Background Information and has, before the execution and delivery of the Belfast MSF Expansion Variation Confirmation, satisfied itself as to the accuracy, completeness and fitness for purpose of any such Background Information upon which it places reliance for the purpose of the Belfast MSF Expansion; and

(ii) except as expressly provided in Section 5.2(a), 14.1, 14.2, 14.3, 14.4 and 14.5 [6.4(a), 16.1, 16.2, 16.3, 16.4 and 16.5], it shall not be entitled to and shall not, and shall ensure that no Belfast MSF Expansion Project Co Party shall, make any claim against the City or any City Party (whether in contract, tort or otherwise), including, without limitation, any claim in damages, for extensions of time or for additional payments under this Schedule on the grounds:

(A) of any misunderstanding or misapprehension in respect of the Background Information relating to the Belfast MSF Expansion; or

(B) that the Background Information relating to the Belfast MSF Expansion was incorrect or insufficient,

nor shall Project Co be relieved from any of its obligations under this Schedule on any such grounds.

5.2 Technical Reports [Section 6.4]

(a) The City agrees that, if at Belfast MSF Expansion Commercial Close, except as disclosed in any Background Information or as otherwise disclosed by the City or any Belfast MSF Expansion City Party, or known by Project Co or any Belfast MSF Expansion Project Co Party, any of the information in the Technical Reports is, to the Knowledge of the City, incorrect or there is relevant information in the possession or control of the City that would make any of the information in the Technical Reports incorrect, then, to the extent that such incorrect information materially adversely interferes with Project Co's ability to perform the activities within the Belfast MSF Expansion Project Scope or materially adversely affects Project Co's cost of performing activities within the Belfast MSF Expansion Project Scope, such incorrect information shall, subject to and in accordance with Schedule 22 - Variation Procedure to the Project Agreement, result in a Variation.

6. BELFAST MSF EXPANSION PROJECT DOCUMENTS [ARTICLE 7]

6.1 Belfast MSF Expansion Project Documents [Section 7.1]

(a) Project Co shall perform its obligations under, and observe all of the provisions of, each of the Belfast MSF Expansion Project Documents to which it is a party, and shall ensure that each Belfast MSF Expansion Project Co Party shall perform its obligations under, and observe all of the provisions of, each of the Belfast MSF Expansion Project Documents to which such Belfast MSF Expansion Project Co Party is a party, so as to ensure that other parties to such Belfast MSF Expansion Project Documents shall not be entitled to terminate same. In the event that Project Co receives a notice of default under any of the Belfast MSF Expansion Project Documents, it shall promptly, and, in any event, no later than 2 Business Days after receipt thereof, deliver a copy of such notice of default to the City.

6.2 Belfast MSF Expansion Ancillary Documents [Section 7.2]

(a) Project Co shall not:

(i) terminate or agree to the termination of all or part of any Belfast MSF Expansion Ancillary Document, except pursuant to Section 49 or otherwise to prevent or cure a Project Co Belfast MSF Expansion Event of Default (provided that commercially reasonable alternative measures would not prevent or cure such Project Co Belfast MSF Expansion Event of Default);

(ii) make or agree to any amendment, restatement or other modification of any Belfast MSF Expansion Ancillary Document that materially adversely affects Project Co's ability to perform its obligations under this Schedule or that has the effect of increasing any liability of the City, whether actual or potential;

(iii) breach its obligations (or waive or allow to lapse any rights it may have) or permit others to breach their obligations (or waive or allow to lapse any rights they may have) under any Belfast MSF Expansion Ancillary Document, that materially adversely affect Project Co's ability to perform its obligations under this Schedule or that have the effect of increasing any liability of the City, whether actual or potential; or

(iv) enter into, or permit the entry by any other person into, any agreement replacing all or part of any Belfast MSF Expansion Ancillary Document, except in the circumstances referenced in Section 6.2(a)(i),

without the prior written consent of the City, provided that, where consent is requested pursuant to Section 6.2(a)(i) or 6.2(a)(iv), such consent shall not be withheld, and shall be provided within a reasonable time, where the relevant matter referred to in Section 6.2(a)(i) or 6.2(a)(iv) will not materially adversely affect Project Co's ability to perform its obligations under this Schedule or have the effect of increasing any liability of the City, whether actual or potential. In the event of termination or agreement to the termination of all or part of any Belfast MSF Expansion Ancillary Document as described in Section 6.2(a)(i) or any agreement replacing all or part of any Belfast MSF Expansion Ancillary Document as described in Section 6.2(a)(iv), Project Co shall, to the extent applicable, comply with all provisions herein applicable to changes in Project Co Parties, including Section 49 [PA - 59.3].

(b) Upon the written request of City, Project Co will deliver or cause to be delivered to City a copy of any notices delivered or received by Project Co under any of the Belfast MSF Expansion Ancillary Documents.

6.3 Intentionally Deleted

6.4 Intentionally Deleted

7. CITY RESPONSIBILITIES [ARTICLE 8]

7.1 General [Section 8.1]

(a) The City shall, at its own cost and risk:

(i) perform all of its obligations under, and observe all provisions of, this Schedule in compliance with Applicable Law;

(ii) cooperate with Project Co in the fulfillment of the purposes and intent of this Schedule, provided, however, that the City shall not be under any obligation to perform any of Project Co's obligations under this Schedule;

(iii) Intentionally deleted;

(iv) make such payments to Project Co as are specifically provided for in this Schedule;

(v) cooperate with Project Co in using reasonable efforts to manage the impact of road traffic upon the Belfast MSF Expansion Construction; however, the City shall have no liability to Project Co in connection therewith;

(vi) perform those additional obligations specifically provided for in this Schedule; and

(vii) use commercially reasonable efforts, with the assistance of Project Co, to amend if required the OLRT Regulations, to the extent such regulations interface with the Belfast MSF Expansion or relate to the Belfast MSF Expansion Project. For certainty, the City shall be solely responsible for the formal adoption of any amendment to the OLRT Regulations (by way of by law or otherwise).

(b) Nothing in this Schedule shall in any way fetter the right, authority and Discretion of the City or any of the Belfast MSF Expansion City Parties in fulfilling its statutory or other functions under Applicable Law. Project Co agrees that it shall comply, and shall cause all relevant Belfast MSF Expansion Project Co Parties to comply, subject to Section 31.1(b) [39.1(b)], with all written directions issued by or on behalf of the City from time to time as a party to this Schedule and as a Governmental Authority with regulatory jurisdiction over the Belfast MSF Expansion Project and the System.

(c) The City shall, and shall cause all Belfast MSF Expansion City Parties to, take reasonable steps to minimize undue interference with the provision of the Belfast MSF Expansion Project Scope by Project Co or any Belfast MSF Expansion Project Co Party.

(d) The City may, without legal obligation to do so and at the expense of Project Co, take such commercially reasonable steps as Project Co may request to facilitate temporary access for Project Co to lands not forming part of the Belfast MSF Expansion Lands to the extent Project Co may reasonably require to perform the activities within the Belfast MSF Expansion Project Scope, provided that Project Co has demonstrated, to the reasonable satisfaction of the City, that it has not been able to gain such access through the use of its own commercially reasonable efforts.

(e) Intentionally deleted.

(f) Intentionally deleted.

7.2 City Belfast MSF Expansion Permits, Licences and Approvals

(a) The City shall, at its own cost and risk:

(i) obtain on or before Belfast MSF Expansion Financial Close, except as otherwise provided in Exhibit 1 – Permits, Licences and Approvals of Appendix 1 –

Definitions and Interpretation, maintain, and, as applicable, renew all City Belfast MSF Expansion Permits, Licences and Approvals;

(ii) comply with all Belfast MSF Expansion Permits, Licences and Approvals in accordance with their terms; and

(iii) execute all documents which, under Applicable Law, only the City as a land owner is entitled to execute and which are required to obtain or maintain any City Belfast MSF Expansion Permits, Licences and Approvals.

(b) The City shall, at its own cost, provide or cause to be provided such information, documentation, and administrative assistance as Project Co may request and as the City may reasonably be able to provide, and shall execute such applications as are required to be in its name, to enable Project Co to obtain, maintain or renew any Project Co Belfast MSF Expansion Permits, Licences and Approvals or to demonstrate compliance with any Belfast MSF Expansion Permits, Licences and Approvals, provided that the City shall not be responsible for obtaining or for any delay in obtaining or for the failure of Project Co to obtain any Project Co Belfast MSF Expansion Permit, Licence or Approval, unless such delay or failure is caused by any act or omission of the City. For greater certainty, the City shall not be obligated to:

(i) exercise any other of its legal rights in order to avoid or eliminate the requirement to obtain any such Belfast MSF Expansion Permits, Licences and Approvals;

(ii) automatically grant such Project Co Belfast MSF Expansion Permits, Licences and Approvals for which it is the authorizing entity and will apply its usual procedures and criteria in considering applications from Project Co for such Project Co Belfast MSF Expansion Permits, Licences and Approvals; and

(c) Notwithstanding the provisions of Section 8.3(a)(i) [PA 9.4(a)(i)], the City shall be responsible for all designations, assumptions, road closures, transfers and any other applicable requirements relating to the Belfast MSF Expansion and the System which interfaces with the Belfast MSF Expansion which can only be effected by the City pursuant to the *Municipal Act, 2001* (Ontario), subject to receipt by the City of any required consent(s) from the Crown in right of Canada and subject to Project Co having, at its own cost, providing or causing to be provided such information, documentation, and technical or administrative assistance, as the City may request and as Project Co may reasonably be able to provide to enable the City to effect such requirements.

7.3 Limitation on the City's Obligations

(a) The City shall have no obligations of any nature or kind whatsoever to Project Co except those obligations expressly enumerated as the City obligations specifically referred to in Section 7 or otherwise specifically provided in this Schedule.

8. PROJECT CO BELFAST MSF EXPANSION RESPONSIBILITIES [ARTICLE 9]

8.1 General [Section 9.2]

(a) Project Co shall, at its own cost and risk:

(i) perform all activities within the Belfast MSF Expansion Works:

(A) in compliance with Applicable Law;

(B) in compliance with all Belfast MSF Expansion Permits, Licences and Approvals and so as to preserve the existence and continued effectiveness of any such Belfast MSF Expansion Permits, Licences and Approvals;

(C) so as to satisfy the Belfast MSF Expansion Output Specifications;

(D) in accordance with Good Industry Practice (Works);

(E) in a timely and professional manner;

(F) with due regard to the health and safety of persons and property;

(G) subject to the other provisions of this Schedule, in a manner which will not impair the ability of the City or Belfast MSF Expansion City Party to comply with Applicable Law;

(H) subject to the other provisions of this Schedule, in a manner which will not impair the performance of the Governmental Activities;

(I) in accordance with all other terms of this Schedule;

(ii) cooperate with the City in the fulfillment of the purposes and intent of this Schedule, provided however that Project Co shall not be under any obligation to perform any of the City's obligations under this Schedule; and

(iii) design, construct, test, commission and complete the Belfast MSF Expansion, including the rectification of Belfast MSF Expansion Minor Deficiencies and other activities required to enable or facilitate the Maintenance Services and the commencement of the Stage 2 Maintenance Services while maintaining the functional integrity of the MSF during such construction activities to ensure that the Maintenance Services for the light rail vehicles required to be provided under the Project Agreement are not compromised or delayed. Without limitation, the Belfast MSF Expansion Works will be undertaken and completed so as to:

(A) allow by December 15, 2018, the Expanded MSF to store and maintain up to 66 vehicles as the nominal operational capacity; and

(B) allow from December 15, 2018, until December 2023, the Expanded MSF to store and maintain on a temporary basis up to 78 vehicles.

After December 2023, the City will be responsible for providing appropriate vehicle storage for vehicles in excess of the nominal operational capacity of 66 vehicles of the Expanded MSF and for providing additional vehicle light maintenance facilities.

8.2 Belfast MSF Expansion Project Co Parties [Section 9.3]

(a) Project Co shall not be relieved of any liability or obligation under this Schedule by the appointment of any Belfast MSF Expansion Project Co Party, and Project Co shall cause each Belfast MSF Expansion Project Co Party, to the extent such Project Co Party performs or is specified hereunder to perform the activities within the Belfast MSF Expansion Project Scope, to comply with the obligations of Project Co hereunder in the same manner and to the same extent as Project Co.

8.3 Project Co Belfast MSF Expansion Permits, Licences and Approvals [Section 9.4]

(a) Project Co shall, at its own cost and risk:

(i) obtain, maintain, and, as applicable, renew all Project Co Belfast MSF Expansion Permits, Licences and Approvals which may be required for the performance of the activities within the Belfast MSF Expansion Project Scope including those Belfast MSF Expansion Permits, Licences and Approvals in respect of which Project Co has responsibility as provided for in Appendix 1 – Permits, Licences and Approvals of Schedule 1 – Definitions and Interpretation to the Project Agreement;

(ii) assume the obligations of the City under the City Belfast MSF Expansion Permits, Licences and Approvals as set out in Appendix 1 – Permits, Licences and Approvals of Schedule 1 – Definitions and Interpretation to the Project Agreement insofar as they relate to the Belfast MSF Expansion;

(iii) comply with all Belfast MSF Expansion Permits, Licences and Approvals in accordance with their terms;

(b) Where Project Co Belfast MSF Expansion Permits, Licences and Approvals have requirements that may impose any conditions, liabilities or obligations on the City or any Belfast MSF Expansion City Party, Project Co shall not obtain, amend or renew (other than upon the same terms and conditions) such Project Co Belfast MSF Expansion Permits, Licences and Approvals without the prior written consent of the City, provided that the City shall not be responsible for obtaining or for the failure of Project Co to obtain any Project Co Belfast MSF Expansion Permit, Licence or Approval. The City shall comply, or shall require compliance, with any conditions, liabilities or obligations as are imposed on the City or any Belfast MSF Expansion City Party by the requirements

of any Project Co Belfast MSF Expansion Permit, Licence or Approval obtained with the City's consent under this Section 8.3(b).

(c) Project Co shall, at its own cost, provide or cause to be provided such information, documentation, and administrative assistance as the City may request and as Project Co may reasonably be able to provide, and shall execute such applications as are required to be in its name, to enable the City to obtain, maintain or renew any City Belfast MSF Expansion Permits, Licences and Approvals or to demonstrate compliance with any Belfast MSF Expansion Permits, Licences and Approvals, provided that Project Co shall not be responsible for obtaining or for any delay in obtaining or for the failure of the City to obtain any City Belfast MSF Expansion Permit, Licence or Approval, unless such delay or failure is caused by any act or omission of Project Co, any Belfast MSF Expansion Project Co Party or any other person for whom Project Co is responsible at law.

(d) The City shall use commercially reasonable efforts (subject to any Applicable Law or policy restrictions) to provide Project Co with or cause to be provided to Project Co such information and documentation as Project Co may reasonably require in relation to Belfast MSF Expansion Permits, Licences and Approvals.

8.4 Safety and Security [Section 9.5]

(a) Project Co shall:

(i) comply with the Belfast MSF Expansion Safety Management Plan;

(ii) keep the Belfast MSF Expansion Site in a safe and orderly state, as appropriate in accordance with Good Industry Practice (Works), to avoid danger to persons on the Belfast MSF Expansion Site and in the immediate vicinity of the Belfast MSF Expansion Site provided that to the extent Project Co for any reason vacates all or part of the Belfast MSF Expansion Site on a temporary basis, the abandoned area shall be maintained by Project Co in a state that is safe for public use;

(iii) take such measures as are reasonable in accordance with Good Industry Practice (Works) to maintain and secure the Belfast MSF Expansion Lands and the Belfast MSF Expansion Site to prevent access thereto prior to Belfast MSF Expansion Substantial Completion;

(iv) intentionally deleted;

(v) with respect to the Belfast MSF Expansion Works, perform, or cause a Belfast MSF Expansion Project Co Party to perform, all of the obligations of the "**constructor**", and indemnify the City and each other Belfast MSF Expansion City Party against any and all of the liabilities of the "**constructor**", under the *OHSA* and the FCLC, as applicable, and all regulations thereto; and

(vi) provide the City with a certificate of good standing from WSIB or any successor thereto once every 90 days from Final Completion until Belfast MSF Expansion Final Completion.

8.5 Trespass [Section 9.6]

(a) Except as otherwise provided in this Schedule, prior to the Belfast MSF Expansion Substantial Completion Date, the City shall not be responsible for the presence on or around the Belfast MSF Expansion Site, or any interference affecting the Belfast MSF Expansion Site or the Belfast MSF Expansion Works of any persons not entitled to be on or around the Belfast MSF Expansion Site ("**Belfast MSF Expansion Trespassers**"). For greater certainty, the presence of, or interference by, any Belfast MSF Expansion Trespassers on or around the Belfast MSF Expansion Site shall not be a breach of the obligation of the City to grant licence rights of the use and access to Project Co on and over the Belfast MSF Expansion Lands, nor a breach of any other obligation, representation or warranty under this Schedule.

(b) Prior to the Belfast MSF Expansion Substantial Completion Date, the management of any Belfast MSF Expansion Trespassers shall be the responsibility of Project Co (to the extent same is not otherwise the responsibility of the Police Service). If at any time prior to the Belfast MSF Expansion Substantial Completion Date, any part of the Belfast MSF Expansion Site is occupied, or access to the Belfast MSF Expansion Site is prevented or interfered with, by Belfast MSF Expansion Trespassers, Project Co shall use all appropriate measures reasonable in the circumstances to manage such Belfast MSF Expansion Trespassers including the pursuit of the remedies referred to in Section 8.5(c)(i) [9.6(c)(i)] and promptly notify the City Representative of such occurrence and of the action which Project Co proposes to take in respect thereof. Project Co may exercise any legal remedy available to it to remove Belfast MSF Expansion Trespassers from the Belfast MSF Expansion Site, provided that if Project Co does so elect to exercise any such legal remedy, Project Co shall give the City Representative notice prior to commencing any legal proceeding for that purpose and shall continually update the City Representative as to the status of any such proceeding in reasonable detail and at reasonable intervals, and provided further that:

(i) Project Co shall not give directly or indirectly to any Belfast MSF Expansion Trespasser any inducement, monetary or otherwise, with a view to avoiding, limiting or influencing the manner of trespassing activities by that Belfast MSF Expansion Trespasser or by other Belfast MSF Expansion Trespassers; and

(ii) Project Co shall not by virtue of this Section 8.5(b) [9.6(b)] be prevented from entering into *bona fide* settlements of claims brought against it by Belfast MSF Expansion Trespassers which provide for reasonable payments in satisfaction of such claims or agreeing to any reasonable cost orders in any proceedings.

(c) Prior to the Belfast MSF Expansion Substantial Completion Date, Project Co may request the assistance of the City (at the cost of Project Co) to remove Belfast MSF Expansion Trespassers where Project Co demonstrates to the City's reasonable satisfaction that:

(i) it is pursuing legal remedies available to it to remove the Belfast MSF Expansion Trespassers (provided that for this purpose Project Co may but shall not be obligated to prosecute injunctive or other judicial remedies beyond the court of first instance); and

(ii) the continued presence of the Belfast MSF Expansion Trespassers is having a material adverse effect on the conduct of the Belfast MSF Expansion Works or Maintenance Services under the Project Agreement that Project Co is unable to mitigate.

Following such request, the City shall notify Project Co whether the City can lawfully provide any assistance in relation to the removal of the Belfast MSF Expansion Trespassers that is not independently available to Project Co and, to the extent that such assistance can be lawfully provided, the City shall provide such assistance (at the cost of Project Co) to the extent it is, in the Discretion of the City, reasonable and appropriate in the circumstances to do so.

(d) For greater certainty, the presence of, or interference by, any Belfast MSF Expansion Trespassers on or around the Belfast MSF Expansion Site shall not be a breach of the obligation of the City to grant licence rights of use and access to Project Co on and over the Belfast MSF Expansion Lands, nor a breach of any other obligation, representation or warranty under this Schedule.

8.6 Additional Works/Third Party Works [Section 9.7]

(a) The City reserves the right to carry out Additional Belfast MSF Expansion Works and to issue permissions, consents, approvals, certificates, licences, agreements and authorizations, permits in respect of Belfast MSF Expansion Third Party Works. The City may assign the methods and manner of construction (where applicable) of the Additional Belfast MSF Expansion Works, the coordination and scheduling of the Additional Belfast MSF Expansion Works and the Belfast MSF Expansion Third Party Works and the safety training in respect of the Additional Belfast MSF Expansion Works and the Belfast MSF Expansion Third Party Works to Project Co.

(b) In connection with the Additional Belfast MSF Expansion Works, the City shall:

(i) cause Additional Belfast MSF Expansion Contractors to comply with the instructions of Project Co relating to matters of health and safety on the Belfast MSF Expansion Site, methods and manner of construction (where applicable), and coordination and scheduling of the Additional Belfast MSF Expansion Works with the Belfast MSF Expansion Works during the performance of the Belfast MSF Expansion Works;

(ii) enter into separate contracts with Additional Belfast MSF Expansion Contractors under conditions of contract which are compatible with the conditions of this Schedule and provide for compliance by Additional Belfast MSF Expansion Contractors with Section 8.6(d) [9.7(d)] and all directions of Project Co in respect

of any matter regarding health and safety on the Belfast MSF Expansion Site, methods and manner of construction (where applicable), and coordination and scheduling of the Additional Belfast MSF Expansion Works in those cases where the City has requested Project Co to proceed in accordance with Section 8.6(d) [9.7(d)] during the performance of the Belfast MSF Expansion Works;

(iii) ensure that insurance coverage is provided as would be required by a prudent owner similarly situated and coordinate such insurance with the insurance coverage of Project Co and in any event, such insurance shall provide for liability insurance of not less than $5,000,000; and

(iv) take all necessary steps to avoid labour disputes or other disputes on the Belfast MSF Expansion Project arising from the Additional Belfast MSF Expansion Works.

(c) In connection with the Belfast MSF Expansion Third Party Works, the City shall:

(i) cause Belfast MSF Expansion Third Party Contractors to comply with the instructions of Project Co relating to matters of health and safety on the Belfast MSF Expansion Site and coordination and scheduling of the Belfast MSF Expansion Third Party Works with the Belfast MSF Expansion Works during the performance of the Belfast MSF Expansion Works;

(ii) issue encroachment permits to Belfast MSF Expansion Third Party Contractors containing conditions which are compatible with the conditions of this Schedule and provide for compliance by Belfast MSF Expansion Third Party Contractors with Section 8.6(d) [9.7(d)] and all directions of Project Co in respect of any matter regarding health and safety on the Belfast MSF Expansion Site and coordination and scheduling of the Belfast MSF Expansion Third Party Works in those cases where the City has requested Project Co to proceed in accordance with Section 8.6(d) [9.7(d)] during the performance of the Belfast MSF Expansion Works and during the performance of the Maintenance Services, only to the extent that such Belfast MSF Expansion Third Party Works materially adversely affect Project Co's ability to provide the Maintenance Services; and

(iii) require (A) that insurance coverage is provided as would be required by a prudent owner similarly situated and (B) that such insurance is coordinated with the insurance coverage of Project Co as it affects the Belfast MSF Expansion Works and in any event, such insurance shall provide for liability insurance of not less than $5,000,000.

(d) In connection with the Additional Belfast MSF Expansion Works and the Belfast MSF Expansion Third Party Works, Project Co shall, during the performance of the Belfast MSF Expansion Works, and at the request of the City, during the performance of the Maintenance Services in connection with the MSF prior to Belfast MSF Expansion Substantial Completion, as the City considers appropriate taking into account the nature of the Additional Belfast MSF Expansion Works or the Belfast MSF Expansion Third

Party Works, as applicable, and the potential for impact on the Maintenance Services in connection with the MSF prior to Belfast MSF Expansion Substantial Completion:

(i) where the City has assigned to Project Co the matters referred to in Section 8.6(a) [9.7(a)] and subject to the performance by the City of its obligations under Sections 8.6(b)(i) and (ii) [9.7(b)(i) and (ii)] or Sections 8.6(c)(i) and (ii) [9.7(c)(i) and (ii)], as applicable:

(A) provide for the methods and manner of construction (where applicable) of the Additional Belfast MSF Expansion Works and the coordination and scheduling of the Additional Belfast MSF Expansion Works and the Belfast MSF Expansion Third Party Works with the Belfast MSF Expansion Works to be performed under this Schedule; and

(B) for the Additional Belfast MSF Expansion Contractors and in respect to such Additional Belfast MSF Expansion Works and for the Belfast MSF Expansion Third Party Contractors and in respect to such Belfast MSF Expansion Third Party Works, assume overall responsibility for compliance with all aspects of Applicable Law relating to health and safety at the Belfast MSF Expansion Site, including all the responsibilities of the 'constructor' under the OHSA;

(ii) afford Additional Belfast MSF Expansion Contractors and Belfast MSF Expansion Third Party Contractors reasonable opportunity to introduce and store their products and use their construction machinery and equipment to execute the Additional Belfast MSF Expansion Works and the Belfast MSF Expansion Third Party Works, as applicable;

(iii) participate with the City, Additional Belfast MSF Expansion Contractors and Belfast MSF Expansion Third Party Contractors, as applicable, in reviewing their construction schedules when directed to do so by the City; and

(iv) where part of the Works or the Belfast MSF Expansion Works is affected by or depends upon, for its proper execution, the Additional Belfast MSF Expansion Works or the Belfast MSF Expansion Third Party Works, promptly report to the City in writing and prior to proceeding with that part of the Works or the Belfast MSF Expansion Works any readily apparent deficiencies in the Additional Belfast MSF Expansion Works or the Belfast MSF Expansion Third Party Works. Failure by Project Co to so report shall invalidate any claims against the City by reason of such readily apparent deficiencies.

(e) In the case of Additional Belfast MSF Expansion Works and Belfast MSF Expansion Third Party Works carried out prior to Belfast MSF Expansion Final Completion of the Belfast MSF Expansion Works, if:

(i) any Additional Belfast MSF Expansion Contractors or Belfast MSF Expansion Third Party Contractors cause any damage to the Works or the Belfast MSF Expansion Works;

(ii) Project Co incurs any additional costs or there is any delay in the Works Schedule or the Belfast MSF Expansion Works Schedule as a result of any Additional Belfast MSF Expansion Contractors or Belfast MSF Expansion Third Party Contractors not complying with the coordination, scheduling and safety instructions of Project Co; or

(iii) subject to the performance by Project Co of its obligations under Section 8.6(d) [9.7(d)], if Project Co incurs any additional costs or there is any delay in the Works Schedule or the Belfast MSF Expansion Works Schedule as a result of any such Additional Belfast MSF Expansion Works (other than Additional Belfast MSF Expansion Work that is required to meet the Belfast MSF Expansion Output Specifications and provided such Additional Belfast MSF Expansion Work is performed by such Additional Belfast MSF Expansion Contractors in accordance with Good Industry Practice (Works) and in accordance with the terms of their respective contracts or engagements with the City) or any Belfast MSF Expansion Third Party Works,

then:

(iv) any such delay in the Belfast MSF Expansion Works Schedule or additional costs in respect of the Belfast MSF Expansion Works shall be treated as a Belfast MSF Expansion Delay Event and a Belfast MSF Expansion Compensation Event; and

(v) any such delay in the Works Schedule or additional costs in respect of the Works shall be treated as a Delay Event and a Compensation Event.

(f) Claims, disputes, and other matters in question between Project Co and Additional Belfast MSF Expansion Contractors or Belfast MSF Expansion Third Party Contractors shall be dealt with in substantially the same manner as contemplated in Schedule 27 – Dispute Resolution Procedure to the Project Agreement, provided the Additional Belfast MSF Expansion Contractors and Belfast MSF Expansion Third Party Contractors have reciprocal obligations and the City has made commercially reasonable efforts to ensure that such provisions are included in the contracts with the Additional Belfast MSF Expansion Contractors and the encroachment permits with the Belfast MSF Expansion Third Party Contractors, as applicable. Project Co shall be deemed to have consented to arbitration of any dispute with any Other Belfast MSF Expansion Contractor whose contract with the City or encroachment permit, as applicable, contains a similar agreement to arbitrate.

(g) In connection with the Additional Belfast MSF Expansion Works, Project Co may request a Variation as follows:

(i) Project Co shall have a period of 10 Business Days following notice from the City of the City's intention to carry out such Additional Belfast MSF Expansion Works including a reasonable description of such Additional Belfast MSF Expansion Works to request a Variation if such Additional Belfast MSF Expansion Works are (A) reasonably expected to make a warranty made in favour of Project Co from a Belfast MSF Expansion Project Co Party or equipment supplier and given in accordance with Good Industry Practice (Works) void or (B) reasonably expected to have a material negative consequence on Project Co's ability to perform any of the activities within the Project Scope or the Belfast MSF Expansion Project Scope;

(ii) if Project Co has made a request for a Variation in accordance with Section 8.6(g)(i) [9.7(g)(i)], the City shall, within 10 Business Days of such request, either issue a Variation Enquiry or give notice to Project Co that it does not agree that a Variation is required;

(iii) either Party may refer the question of whether a Variation is required as the result of a warranty risk or risk in the performance of the activities within the Project Scope or the Belfast MSF Expansion Project Scope for resolution in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement; and

(iv) where the City has, under Section 8.6(g)(ii) [9.7(g)(ii)], given notice to Project Co that it does not agree that a Variation is required, the City shall, within 10 Business Days of a subsequent agreement or of a determination that a Variation is required, issue a Variation Enquiry and the relevant provisions of Schedule 22 – Variation Procedure to the Project Agreement shall apply except that:

(A) the City shall not be entitled to withdraw any such Variation Enquiry unless the City determines not to proceed with the Additional Belfast MSF Expansion Works or to proceed only in a manner that the Additional Belfast MSF Expansion Works will not result in a warranty becoming void (as contemplated in Section 8.6(g)(i) [9.7(g)(i)]) or will not result in any material negative consequence on Project Co's ability to perform any activities within the Project Scope or the Belfast MSF Expansion Project Scope and Project Co has agreed with such conclusion, or the Parties otherwise agree; and

(B) the Parties shall, without prejudice to their respective general obligations to comply with the terms of this Schedule, use commercially reasonable efforts to mitigate the adverse effects with respect to any void or voidable warranty and take commercially reasonable steps to minimize any increase in costs arising from any void warranty.

(h) Placing, installing, applying or connecting the Additional Belfast MSF Expansion Works performed by Additional Belfast MSF Expansion Contractors and the Belfast MSF Expansion Third Party Works performed by Belfast MSF Expansion Third Party

Contractors on and to the Works or the Belfast MSF Expansion Works performed by Project Co will not relieve Project Co from its obligations under the Project Agreement with respect to the Works or under this Schedule with respect to the Belfast MSF Expansion Works, except to the extent expressly described in any Variation Confirmation.

9. REPRESENTATIVES [ARTICLE 10]

9.1 Representatives

(a) The City Representative and Project Co Representative appointed under the Project Agreement shall have such roles under this Schedule.

9.2 Belfast MSF Expansion Key Individuals [Section 10.4]

(a) The individuals who are critical to the performance of the Belfast MSF Expansion Works are identified in Appendix 9 – Belfast MSF Expansion Key Individuals. Project Co shall use commercially reasonable efforts to ensure that such persons remain involved in the Belfast MSF Expansion Works in the capacity set out in Appendix 9 – Belfast MSF Expansion Key Individuals and, in particular, will not, for the duration of the Belfast MSF Expansion Works, require or request any such person to be involved in any other project on behalf of Project Co or any Belfast MSF Expansion Project Co Party if, in the reasonable opinion of the City such involvement would have a material adverse effect on the Belfast MSF Expansion Works. For greater certainty, involvement by any of the individuals identified in Appendix 9 in any other aspect of the Project shall not be considered to be involvement by that person in another project on behalf of Project Co or any Belfast MSF Expansion Project Co Party.

(b) The provisions of section 10.4(c) and (d) of the Project Agreement shall apply *mutatis mutandis* to this Schedule.

10. BELFAST MSF EXPANSION WORKS COMMITTEE [ARTICLE 11]

10.1 Establishment [Section 11.1]

(a) The Parties shall, within 30 days following the Belfast MSF Expansion Financial Close Date, establish a committee (the "**Belfast MSF Expansion Works Committee**") consisting of:

(i) the City Representative;

(ii) Intentionally deleted;

(iii) 3 representatives appointed by the City from time to time;

(iv) the following 4 representatives appointed by Project Co:

(A) the Project Co Representative;

(B) 3 representatives of the Belfast MSF Expansion Construction Contractor; and

(v) 1 additional representative appointed by the City.

(b) The Independent Certifier and a representative of the Maintenance Contractor shall be entitled, but not required, to attend meetings as non-voting members of the Belfast MSF Expansion Works Committee. Members of the Belfast MSF Expansion Works Committee may invite, on prior notice to all members, such advisors and consultants as they require from time to time to attend meetings and provide briefings to the Belfast MSF Expansion Works Committee.

(c) 1 of the representatives of the City shall be the chairperson of the Belfast MSF Expansion Works Committee.

10.2 Function and Role [Section 11.2]

(a) The Belfast MSF Expansion Works Committee shall assist the Parties by promoting cooperative and effective communication with respect to matters related to the Belfast MSF Expansion Works.

(b) The Belfast MSF Expansion Works Committee shall be responsible for receiving and reviewing all matters related to the Belfast MSF Expansion Works, including:

(i) any design, construction and commissioning issues;

(ii) the Belfast MSF Expansion Works Schedule;

(iii) any issues arising from reports or documents provided by Project Co or the Independent Certifier;

(iv) any quality assurance and safety and security issues, including any design, configuration control, interfacing, training, testing, operational impact and other matters creating or giving rise to a safety or security issue or otherwise requiring attention and oversight;

(v) the Belfast MSF Expansion Works Reports;

(vi) any special matters referred to the Belfast MSF Expansion Works Committee by the City or Project Co;

(vii) any community and media relations issues in accordance with Schedule 18 - Communications and Public Consultation Protocol to the Project Agreement to the extent such issues relate to the Belfast MSF Expansion;

(viii) considering and making recommendations to the City to proceed or not to proceed with a Variation related to the Belfast MSF Expansion Works pursuant to Schedule 22 – Variation Procedure to the Project Agreement to address safety or

security issues relating to, arising from, or having implications to the planning, implementation or performance of the Belfast MSF Expansion Project Scope or any part;

(ix) interface with the Works and the Maintenance Services; and

(x) any other issues or matters pertaining to the Belfast MSF Expansion Works.

(c) Subject to Section 10.2(d), [11.2(d)] any unanimous decision of the Belfast MSF Expansion Works Committee shall be final and binding on the Parties. If the Belfast MSF Expansion Works Committee is unable to reach a unanimous decision, either Party may refer the matter for resolution in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement.

(d) The Belfast MSF Expansion Works Committee shall not have authority to make decisions with respect to or approve:

(i) any amendment to or waiver of any provision of the Project Agreement, including this Schedule;

(ii) any change to a Construction Period Payment, the Belfast MSF Expansion Scheduled Substantial Completion Date or the Belfast MSF Expansion Scheduled Final Completion Date;

(iii) any Variation;

(iv) any change that may materially adversely affect Project Co's ability to achieve any Construction Period Payment, the Initial Capital Investment Date, Belfast MSF Expansion Substantial Completion by the Belfast MSF Expansion Scheduled Substantial Completion Date, Belfast MSF Expansion Final Completion by the Belfast MSF Expansion Scheduled Final Completion Date; and

(v) any matter with respect to which the City has a right of consent or in respect of which the City may exercise discretion pursuant to the Project Agreement including, for greater certainty, this Schedule.

10.3 Term of Belfast MSF Expansion Works Committee [Section 11.3]

(a) Unless otherwise agreed, the Belfast MSF Expansion Works Committee shall operate only until the Belfast MSF Expansion Final Completion Date.

10.4 Replacement of Committee Members [Section 11.4]

(a) The City shall be entitled to replace any of its representatives on the Belfast MSF Expansion Works Committee by written notice to Project Co. The City will use commercially reasonable efforts to deliver prior written notice of any such replacements

to Project Co. Project Co may replace any of its representatives on the Belfast MSF Expansion Works Committee with the prior written consent of the City.

10.5 Procedures and Practices [Section 11.5]

(a) The members of the Belfast MSF Expansion Works Committee may:

(i) adopt such procedures and practices for the conduct of the activities of the Belfast MSF Expansion Works Committee as they consider appropriate from time to time;

(ii) invite to any meeting of the Belfast MSF Expansion Works Committee such other persons as the members of the Belfast MSF Expansion Works Committee may agree;

(iii) exclude from any meeting of the Belfast MSF Expansion Works Committee (other than members of the Belfast MSF Expansion Works Committee) such persons as the members of the Belfast MSF Expansion Works Committee may agree; and

(iv) receive and review reports from any person or organization agreed to by the members of the Belfast MSF Expansion Works Committee.

(b) Once established, the Belfast MSF Expansion Works Committee shall meet at least once each month from the Belfast MSF Expansion Financial Close Date until the Belfast MSF Expansion Substantial Completion Date and thereafter as required, unless otherwise agreed by the members of the Belfast MSF Expansion Works Committee or the Parties.

(c) Any one of the Project Co Representative and any of the City's representatives on the Belfast MSF Expansion Works Committee may convene a special meeting of the Belfast MSF Expansion Works Committee at any time. Special meetings of the Belfast MSF Expansion Works Committee may be convened on not less than 5 Business Days' notice to all members of the Belfast MSF Expansion Works Committee identifying the agenda items to be discussed at the special meeting, provided that, in an Belfast MSF Expansion Emergency, a meeting may be called at any time on such notice as may be reasonable in the circumstances.

(d) Unless otherwise agreed by the members of the Belfast MSF Expansion Works Committee, the Belfast MSF Expansion Works Committee shall meet at the Belfast MSF Expansion Site, elsewhere in the City of Ottawa, Ontario or in any other location in Ontario. Meetings of the Belfast MSF Expansion Works Committee may be held by means of such telephonic, electronic or other communication facilities as permit all persons participating in the meeting to communicate with each other simultaneously and instantaneously. A person participating in a meeting by such means will be deemed to be present at such meeting, provided that each member of the Belfast MSF Expansion Works Committee must attend in person at least once each calendar quarter.

(e) 2 representatives of the City, the City Representative and the Project Co Representative shall constitute a quorum at any meeting of the Belfast MSF Expansion Works Committee. A quorum of members may exercise all the powers of the Belfast MSF Expansion Works Committee. The members shall not transact business at a meeting of the Belfast MSF Expansion Works Committee unless a quorum is present.

(f) Minutes of all meetings, recommendations and decisions of the Belfast MSF Expansion Works Committee, including those made by telephone or other form of communication, shall be recorded and maintained by Project Co. Project Co shall circulate copies of such minutes within 5 Business Days of the holding of the meeting or the making of the recommendation or decision. Unless the City notifies Project Co within 5 Business Days of receipt of the minutes that the City disagrees with the contents of the minutes, the City and Project Co shall be deemed to have approved such minutes. Project Co shall maintain a complete set of all minutes of the meetings of the Belfast MSF Expansion Works Committee and shall make such minutes available for inspection by the City during regular business hours.

11. QUALITY ASSURANCE

(a) Project Co shall comply with the provisions of Appendix 11 - Quality Management.

12. LICENCE

12.1 Belfast MSF Expansion Lands

(a) The provisions of Article 14 of the Project Agreement shall apply *mutatis mutandis* to the Belfast MSF Expansion Lands and the Belfast MSF Expansion Project Scope. In addition to the foregoing:

(i) Project Co and the City agree that Project Co shall be entitled to maintain construction signs at the Belfast MSF Expansion Site until Belfast MSF Expansion Substantial Completion; and

(ii) the licence granted to Finco of use and access to, on and over the Lands and the System pursuant to Section 14.1 of the Project Agreement as applied by this Section 12 shall, for the duration of the performance of the Belfast MSF Expansion Works, be an interest in the premises.

13. TITLE ENCUMBRANCES [ARTICLE 15]

13.1 Title Encumbrances [Section 15.1]

(a) The provisions of Article 15 of the Project Agreement, including Schedule 16 - Title Encumbrances to the Project Agreement, shall apply *mutatis mutandis* to the Belfast MSF Expansion Project.

(b) The parties acknowledge that Section 20(2) of the CLA applies and that all liens that relate to the Belfast MSF Expansion are in relation to a separate lot from the System and the Highway.

14. SITE CONDITION [ARTICLE 16]

14.1 Acceptance of Site Condition

(a) Subject to Sections 5.2, 14.2, 14.3, 14.4 and 14.5 [6.4, 16.2, 16.3, 16.4 and 16.5], Project Co acknowledges and agrees that it has investigated the Belfast MSF Expansion Lands, the Other Existing Infrastructure and the Site Conditions, insofar as they apply to the Belfast MSF Expansion Lands including the Background Information, prior to executing the Belfast MSF Expansion Variation Confirmation and agrees to accept the Belfast MSF Expansion Lands, the Other Existing Infrastructure and the Site Conditions of the Belfast MSF Expansion Lands on an "as is, where is" basis. Without limiting the generality of the foregoing, but subject to Sections 5.2, 14.2, 14.3, 14.4 and 14.5 [6.4, 16.2, 16.3, 16.4 and 16.5], Project Co shall not be entitled to make any claim of any nature whatsoever against the City or any Belfast MSF Expansion City Party on any grounds relating to the Belfast MSF Expansion Lands, the Other Existing Infrastructure or the Site Conditions, including the fact that incorrect or insufficient information on any matter relating to the Belfast MSF Expansion Lands, the Other Existing Infrastructure or the Site Conditions was given to it by any person, whether or not a Belfast MSF Expansion City Party, unless the relevant person has given Project Co an express written entitlement to rely on information relating to the Belfast MSF Expansion Lands, the Other Existing Infrastructure or the Site Conditions provided by such person to Project Co.

(b) Subject to Sections 5.2, 14.2, 14.3, 14.4 and 14.5 [6.4, 16.2, 16.3, 16.4 and 16.5], Project Co acknowledges and agrees that it has and shall be deemed to have:

(i) received all design data, warranties and all other applicable information (to the extent such information is available as of Belfast MSF Expansion Commercial Close);

(ii) satisfied itself prior to executing the Belfast MSF Expansion Variation Confirmation as to the structural, environmental and general condition of the Other Existing Infrastructure relating to the Belfast MSF Expansion Lands;

(iii) satisfied itself as to the presence of any Contamination on, in or under the Belfast MSF Expansion Lands or migrating to or from the Belfast MSF Expansion Lands;

(iv) satisfied itself as to the adequacy of the rights of access to, from and through the Belfast MSF Expansion Lands and any accommodation it may require for the purposes of fulfilling its obligations under this Schedule;

(v) satisfied itself as to the possibility of interference by persons of any description whatsoever with access to or use of, or rights in respect of, the Belfast MSF Expansion Lands;

(vi) satisfied itself as to the precautions, times and methods of working necessary to prevent any nuisance or interference, whether public or private, being caused to third parties and will comply and will ensure compliance by all Project Co Parties with all communication and record keeping obligations in respect thereof in accordance with Schedule 18 – Communications and Public Consultation Protocol to the Project Agreement, insofar as that Schedule applies to the Belfast MSF Expansion, and Appendix 26 – Record Provisions; and

(vii) satisfied itself as to the nature of the Site Conditions of the Belfast MSF Expansion Lands, the ground and the subsoil, the level and quantity of groundwater, the form and nature of the Belfast MSF Expansion Lands, the loadbearing and other relevant properties of the Belfast MSF Expansion Lands, the risk of injury or damage to property affecting the Belfast MSF Expansion Lands, the nature of the materials (whether natural or otherwise) to be excavated and the nature of the design, work and materials necessary for the execution and delivery of the Belfast MSF Expansion Works.

(c) Project Co further acknowledges and agrees that, other than as referred to or contained in this Schedule, no representations or warranties have been made, nor documentation delivered to Project Co or any Belfast MSF Expansion Project Co Party, which would indicate that Project Co would be unable to perform the activities within the Belfast MSF Expansion Project Scope in a lawful manner.

14.2 Contamination

(a) At all times throughout the Belfast MSF Expansion Project Term, Project Co shall be responsible for managing, remediating and/or removing, in accordance with Section 5.5(a) of Appendix 17 – Environmental Obligations, any Contamination located on, in or under, the Belfast MSF Expansion Lands, at any time during the Belfast MSF Expansion Project Term, which was described in, or was properly inferable, readily apparent or readily discoverable from, the Advanced Environmental Reports or the Geotechnical Data Reports ("**Belfast MSF Expansion Existing Contamination**").

(b) Project Co shall be responsible for removing or remediating, in accordance with Section 5.5(b) of Appendix 17 – Environmental Obligations:

(i) any Contamination on, in or under the Belfast MSF Expansion Lands which Project Co or any Belfast MSF Expansion Project Co Party causes or permits to be Released in a manner which does not comply with Applicable Law or which causes a Risk to Human Health or the Environment; or,

(ii) any Belfast MSF Expansion Existing Contamination which was harmless or stored, contained or otherwise dealt with in accordance with Applicable Law which Project Co or any Belfast MSF Expansion Project Co Party causes or permits to be Released in a manner which does not comply with Applicable Law or which causes a Risk to Human Health or the Environment.

(c) In addition, and without limiting any other obligation of Project Co under this Schedule, Project Co shall be responsible for all Direct Losses associated with the Releases of Contamination or Belfast MSF Expansion Existing Contamination described in Sections 14.2(b)(i) and 14.2(b)(ii) [16.2(b)(i) and 16.2(b)(ii)] above.

(d) Contamination in, on or under the Belfast MSF Expansion Lands which is not the responsibility of Project Co pursuant to Section 14.2(a) [16.2(a)] or Section 14.2(b) [16.2(b)] shall be the responsibility of the City.

(e) Upon the discovery of any Contamination in, on or under the Belfast MSF Expansion Lands, Project Co shall immediately inform the City Representative and shall comply, and ensure compliance by all Belfast MSF Expansion Project Co Parties, with all Applicable Law and Appendix 17 – Environmental Obligations, as applicable, in respect thereof:

(i) at the City's cost pursuant to Section 14.2(h) [16.2(g)], in respect of Contamination for which the City is responsible pursuant to Section 14.2(d) [16.2(c)]; and,

(ii) at its own cost in respect of Contamination for which it is responsible pursuant to Section 14.2(a) or 14.2(b) [16.2(a) or 16.2(b)].

(f) Except to the extent required to prevent or mitigate a Belfast MSF Expansion Emergency or to comply with Applicable Law, Project Co shall not undertake any significant work pursuant to Section 14.2(e) [16.2(d)] in respect of Contamination for which the City is responsible pursuant to Section 14.2(d) [16.2(c)] until the City Representative has been given a reasonable opportunity to review the nature and extent of the Contamination and has instructed Project Co to proceed with such work.

(g) In the event that the City wishes Project Co to perform actions in respect of any Contamination which are in addition to any required pursuant to Section 14.2(e) [16.2(d)], then the City shall issue an instruction to Project Co specifying what action the City requires Project Co to take and Project Co shall promptly and diligently comply with all such instructions at the City's cost pursuant to Section 14.2(h) [16.2(g)].

(h) If Sections 14.2(e), 14.2(f) or 14.2(g) [16.2(d), 16.2(e) or 16.2(f)] require Project Co to perform any alteration, addition, demolition, extension or variation in the Belfast MSF Expansion Project Scope as a result of Contamination for which the City is responsible pursuant to Section 14.2(d) [16.2(c)] or as a result of any instructions given by the City pursuant to Section 14.2(g) [16.2(f)] and which would not otherwise be required under this Schedule, then any such alteration, addition, demolition, extension or variation:

(i) prior to Belfast MSF Expansion Substantial Completion shall, subject to and in accordance with Section 32 [40] be treated as a Belfast MSF Expansion Delay Event and, subject to and in accordance with Section 33 [41], be treated as a Belfast MSF Expansion Compensation Event; and

(ii) following Belfast MSF Expansion Substantial Completion shall, subject to and in accordance with Schedule 22 - Variation Procedure to the Project Agreement, result in a Variation.

(i) In the event that the City and Project Co do not agree as to the nature or extent of Contamination, or in the event of a disagreement as to whether Project Co is responsible for Contamination pursuant to either Sections 14.2(a) or 14.2(b) [16.2(a) or 16.2(b)], or the actions to be performed by Project Co pursuant to Section 14.2(e) [16.2(d)] or Appendix 17 – Environmental Obligations, such disagreement shall be referred for determination to an independent and suitably qualified and experienced person, acceptable to Project Co and the City, each acting reasonably (and the costs and expenses of retaining such person shall be borne by the unsuccessful Party). Such person's decision shall be final and binding on the Parties, except to the extent that either Party alleges that such decision would result in non-compliance with Applicable Law or this Schedule, in which event either Party may refer the disagreement for resolution in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement.

14.3 Items of Geological, Historical or Archaeological Interest or Value

(a) As between the Parties, all fossils, artifacts and other objects having artistic, historic, archaeological or monetary value, including human remains and burial sites, which may be found on or at the Belfast MSF Expansion Lands are or shall be the sole and absolute property of the City.

(b) The City shall be responsible for items referred to in Section 14.3(a) [16.3(a)] except for any such items that were described in, or were properly inferable, readily apparent or readily discernable from the Background Information.

(c) Upon the discovery of any item referred to in Section 14.3(a) [16.3(a)] during the performance of the Belfast MSF Expansion Project Scope, Project Co shall:

(i) immediately inform the City Representative of such discovery;

(ii) take all steps not to disturb the item and, if necessary, cease any activities within the Belfast MSF Expansion Project Scope in so far as performing such Belfast MSF Expansion Project Scope would endanger the item or prevent or impede its excavation, take all necessary steps to preserve and ensure the preservation of the item in the same position and condition in which it was found, and comply, and ensure compliance by all Belfast MSF Expansion Project Co Parties, with Applicable Law and all requirements of Governmental Authorities with respect to such discovery, including Appendix 17 – Environmental Obligations, Part 7:

(A) at the City's cost pursuant to Section 14.3(e) [16.3(e)], in respect of any such discovery for which the City is responsible pursuant to Section 14.3(b) [16.3(b)] and

(B) at its own cost in respect of such discovery for which it is responsible pursuant to Section 14.3(b) [16.3(b)].

(d) In the event that the City wishes Project Co to perform actions in respect of any discovery of any item referred to in Section 14.3(a) [16.3(a)] which are in addition to any required pursuant to Section 14.3(c) [16.3(c)], then the City shall issue an instruction to Project Co specifying what action the City requires Project Co to take and Project Co shall promptly and diligently comply with all such instructions at the City's cost pursuant to Section 14.3(e) [16.3(e)].

(e) If Section 14.3(c) or 14.3(d) [16.3(c) or 16.3(d)] require Project Co to perform any alteration, addition, demolition, extension or variation in the activities within the Belfast MSF Expansion Project Scope as a result of any such discovery for which the City is responsible pursuant to Section 14.3(b) [16.3(b)] or as a result of any instructions given by the City pursuant to Section 14.3(d) [16.3(d)] and which would not otherwise be required under this Schedule, then any such alteration, addition, demolition, extension or variation (but only to the extent it directly results in the interruption of the performance of the Belfast MSF Expansion Project Scope during a continuous period of 5 Business Days or more with respect to each such discovery) shall subject to and in accordance with Section 32 [40], be treated as a Belfast MSF Expansion Delay Event and, subject to and in accordance with Section 33 [41], be treated as a Belfast MSF Expansion Compensation Event.

(f) In the event that the City and Project Co do not agree as to the nature or extent of the actions required to be performed by Project Co pursuant to Section 14.3(c)(ii) [16.3(c)(ii)], such disagreement shall be referred for determination to an independent and suitably qualified and experienced person, acceptable to Project Co and the City, each acting reasonably (and the costs and expenses of retaining such person shall be borne by the unsuccessful Party). Such person's decision shall be final and binding on the Parties except to the extent that either Party alleges that such decision would result in non-compliance with Applicable Law or this Schedule, in which event either Party may refer the disagreement for resolution in accordance with Schedule 27 - Dispute Resolution Procedure to the Project Agreement.

14.4 Species-at-Risk

(a) The City shall be responsible for any Species-at-Risk which may be found on, in or at the Belfast MSF Expansion Lands, except for any Species-at-Risk the occurrence of which, in the location in which it is found, was described in the Environmental Assessments.

(b) In respect of Species-at-Risk for which Project Co is responsible pursuant to Section 14.4(a) [16.4(a)], Project Co shall, at its own cost, comply, and ensure compliance by all Belfast MSF Expansion Project Co Parties, with all Applicable Law and the provisions of Appendix 17 – Environmental Obligations. Upon the discovery of any Species-at-Risk for which the City is responsible pursuant to Section 14.4(a) [16.4(a)], Project Co shall:

(i) immediately inform the City Representative of such discovery; and

(ii) comply, and ensure compliance by all Belfast MSF Expansion Project Co Parties, with all Applicable Law and the provisions of Appendix 17 – Environmental Obligations in respect thereof, including taking all necessary steps to preserve the respective habitat and relocate the Species-at-Risk at the City's cost pursuant to Section 14.4(d) [16.4(d)].

(c) In the event that the City wishes Project Co to perform actions which are in addition to any required pursuant to Section 14.4(b) [16.4(b)], then the City shall issue an instruction to Project Co specifying what action the City requires Project Co to take and Project Co shall promptly and diligently comply with all such instructions at the City's cost pursuant to Section 14.4(d) [16.4(d)].

(d) If Section 14.4(b) or 14.4(c) [16.4(b) or 16.4(c)] require Project Co to perform any alteration, addition, demolition, extension or variation in the Belfast MSF Expansion Project Scope as a result of the discovery of any Species-at-Risk for which the City is responsible pursuant to Section 14.4(a) [16.4(a)] or as a result of any instructions given by the City pursuant to Section 14.4(c) [16.4(c)] and which would not otherwise be required under this Schedule, then any such alteration, addition, demolition, extension or variation:

(i) prior to Belfast MSF Expansion Substantial Completion shall, subject to and in accordance with Section 32 [40], be treated as a Belfast MSF Expansion Delay Event and, subject to and in accordance with Section 33 [41], be treated as a Belfast MSF Expansion Compensation Event; and

(ii) following Belfast MSF Expansion Substantial Completion shall, subject to and in accordance with Schedule 22 - Variation Procedure to the Project Agreement, result in a Variation.

14.5 Latent Defects

(a) Section 16.5 of the Project Agreement shall apply *mutatis mutandis* to the Belfast MSF Expansion Project. For greater certainty, all references to Project Scope in Section 16.5 of the Project Agreement shall be deemed to be references to the Belfast MSF Expansion Project Scope and with all references to Revenue Service Availability in Section 16.5 of the Project Agreement shall be deemed to be references to Belfast MSF Expansion Substantial Completion.

15. GOVERNMENTAL AND THIRD PARTY FINANCIAL OBLIGATIONS [ARTICLE 17]

15.1 Governmental, Railway and Utility Company Fees [Section 17.1]

(a) Project Co shall be responsible for all Financial Obligations under or in respect of all Project Co Belfast MSF Expansion Permits, Licences and Approvals and the City shall be responsible for all Financial Obligations under or in respect of all City Belfast MSF

Expansion Permits, Licences and Approvals, including, any Utility Company, any Railway Company, any Governmental Authority or any third party in respect of the Belfast MSF Expansion Project Scope, including:

(i) any development charges relating to the Belfast MSF Expansion Works or the Belfast MSF Expansion Site;

(ii) any engineering administration and inspection fees required in respect of works or services required to be performed;

(iii) any security deposits required under any Belfast MSF Expansion Permits, Licences and Approvals; and

(iv) any other amounts payable under any Belfast MSF Expansion Permits, Licences and Approvals.

(b) The Parties agree that any refund, partial rebate or credit granted by any applicable Utility Company, any applicable Railway Company, any applicable Governmental Authority or any other third party relating to the Financial Obligations referred to in Section 15.1(a) [17.1(a)] shall be for the benefit of the City to the extent such Financial Obligations were paid by the City and shall be for the benefit of Project Co to the extent such Financial Obligations were paid by Project Co.

16. CHANGE IN STANDARDS [ARTICLE 18]

(a) Where this Schedule requires Project Co to comply with a technical standard in respect of the design and construction aspects of the Belfast MSF Expansion Project Scope, and that standard has changed between the date of the MOU and the date that such compliance is required, then Project Co shall give notice to the City of such change. If, after such notice, the City requires compliance with the changed standard (rather than the standard applicable as of the date of the MOU), then, to the extent such change impacts the design and construction aspects of the Belfast MSF Expansion Project Scope and would not have otherwise been taken into account by compliance with Good Industry Practice (Works), such changed standard shall, subject to and in accordance with Schedule 22 - Variation Procedure to the Project Agreement, result in a Variation. If the City does not require compliance with the changed standard, then Project Co shall continue to comply with the standard applicable as of the date of the MOU, without a Variation therefor. This Section 16 shall not apply where a change in a technical standard is also a Belfast MSF Expansion Change in Law.

(b) Project Co confirms that as at the date of Belfast MSF Expansion Commercial Close to the extent it Has Knowledge that any technical standard has changed since the date of the MOU, it is not aware of any adverse impact that such changed standard would have on the Belfast MSF Expansion Project Scope.

17. COORDINATION AND NO DISRUPTION [ARTICLE 19]

(a) Project Co shall carry out the Belfast MSF Expansion Project Scope so as to coordinate with:

(i) subject to and in accordance with Section 8.6 [9.7] (to the extent applicable), the operations of the City, any Belfast MSF Expansion City Party, any Governmental Authority or Other Belfast MSF Expansion Contractor engaged in activities on or about the Belfast MSF Expansion Lands; and

(ii) the construction, operation, maintenance and expansion and additional phases of the Project and existing transit system, namely OC Transpo operations, the Societé de transport de l'Outaouais operations and in accordance with Schedule 38 – Extension and Additional Phases to the Project Agreement; and comply with the City of Ottawa's Transportation Master Plan generally.

(b) Project Co shall use commercially reasonable efforts to minimize:

(i) any interference with the operations of the City, any Belfast MSF Expansion City Party, any Governmental Authority or any Other Belfast MSF Expansion Contractor, including the performance of the Governmental Activities and the Belfast MSF Expansion Other Works;

(ii) any interference with the construction, operation, maintenance and rehabilitation of the transit system; and

(iii) intentionally deleted.

18. DESIGN AND CONSTRUCTION OBLIGATIONS [ARTICLE 20]

18.1 Overall Responsibility [Section 20.1]

(a) Project Co shall perform and complete the Belfast MSF Expansion Works:

(i) so as to satisfy the Belfast MSF Expansion Output Specifications;

(ii) in accordance with the Belfast MSF Expansion Design Data;

(iii) in accordance with the Belfast MSF Expansion Works Schedule; and

(iv) in accordance with the other terms and conditions of this Schedule.

(b) Project Co shall utilize the MOU Technical Parameters as the basis for the Belfast MSF Expansion Design. The Parties acknowledge that as the Belfast MSF Expansion Design continues to be developed the MOU Technical Parameters will continue to be superseded.

18.2 Intentionally deleted

18.3 Development of Design [Section 20.3]

(a) Project Co shall, at its own cost, develop and complete the design of the Belfast MSF Expansion and all Belfast MSF Expansion Design Data in accordance with the requirements of this Schedule, including Appendix 10 – Review Procedure and this Section 18.3 [20.3].

(b) The further development of the design and the process by which it is progressed must fully comply with the requirements of this Schedule.

(c) In order to develop the detailed design of the Belfast MSF Expansion, Project Co shall consult with the Belfast MSF Expansion Stakeholders (which consultation requirements pursuant to the Environmental Assessments are further described in Appendix 17 – Environmental Obligations) and the City Representative and the City Belfast MSF Expansion Design Team in an interactive process. If the result of any consultation with Belfast MSF Expansion Stakeholders, is a change to the scope, configuration or size of Belfast MSF Expansion Works, which change has been approved by the City in its Discretion, then such change shall, subject to and in accordance with Schedule 22 – Variation Procedure to the Project Agreement, result in a Variation. As of the date of the Belfast MSF Variation Confirmation the Parties agree that all relevant consultation under this Section has been carried out under the Early Works Packages and further consultation will only be required if there is a Variation or a change in Project Co's design of the Belfast MSF Expansion.

(d) The Parties agree that Exhibit A to Appendix 10 – Review Procedure is an initial list of Belfast MSF Expansion Design Data and other items that will require design review, which Belfast MSF Expansion Design Data and other items shall include (to a scale required by the City Representative):

(i) design development drawings, reports, schedules and specifications progressed from Belfast MSF Expansion Commercial Close with extensive user group input, showing all architectural, engineering and landscape design information sufficient to allow for the development of working drawing documentation, submitted at 60% completion (the "**Belfast MSF Expansion Pre-final Design Development Submittals**") and at 100% completion (the "**Belfast MSF Expansion Final Design Development Submittals**") of the development of the working drawings (collectively, the "**Belfast MSF Expansion Design Development Submittals**");

(ii) working drawing documentation, being construction drawings, reports, schedules and specifications progressed from the Belfast MSF Expansion Design Development Submittals, showing all architectural, engineering and landscape design information in accordance with the requirements of this Schedule, submitted at 60% completion (the "**Belfast MSF Expansion Pre-final Construction Document Submittals**") and 100% completion (the "**Belfast MSF Expansion Final Construction Document Submittals**") of the construction

drawings (collectively, the "**Belfast MSF Expansion Construction Document Submittals**"); and

(iii) all other documentation required pursuant to Appendix 10 – Review Procedure.

(e) Project Co shall submit to the City Representative for review in accordance with Appendix 10 – Review Procedure the Belfast MSF Expansion Pre-final Design Development Submittals.

(f) The Parties agree that, with respect to the Belfast MSF Expansion Design Development Submittals and the Belfast MSF Expansion Construction Document Submittals, the period for review shall be the 10 Business Days prescribed in Section 2.2 of Appendix 10 – Review Procedure.

(g) The Belfast MSF Expansion Design Data and other items listed in Section 18.3(d) [20.3(d)] must contain, at a minimum, the following additional information:

(i) identification of the stage of design or construction to which the documentation relates;

(ii) all design or construction drawings and specifications necessary to enable the City Representative to make an informed decision as to whether Project Co is permitted to proceed pursuant to Appendix 10 – Review Procedure;

(iii) for each stage of the design or construction documentation, a schedule identifying all changes to the relevant documentation that has occurred from the previous stage of design or construction documentation; and

(iv) where changes have been submitted, an indication of how the changes meet the requirements of this Schedule.

(h) If Project Co commences or permits the commencement of the next level of design or construction of any part or parts of Belfast MSF Expansion Works prior to being entitled to proceed in accordance with Appendix 10 – Review Procedure and it is subsequently determined in accordance with Appendix 10 – Review Procedure or Schedule 27 – Dispute Resolution Procedure to the Project Agreement that the design or construction does not comply with this Schedule, then Project Co shall forthwith, at its own cost and risk, undo, remove from the Belfast MSF Expansion Site, replace and restore, as applicable, any parts of the design or construction that do not comply with this Schedule.

(i) Neither the City nor any Belfast MSF Expansion City Party will have any liability:

(i) if a document submitted by Project Co and reviewed by the City, the City Representative or the City Belfast MSF Expansion Design Team results in non-compliance with this Schedule by Project Co or a breach by Project Co of Applicable Law; or

(ii) for any loss or claim arising due to any defect in any documents, drawings, specifications or certificates submitted by Project Co.

(j) Project Co and the City will cooperate with each other in the design review process. Notwithstanding such cooperation by the City, such review shall not constitute acceptance of the Belfast MSF Expansion Works, and Project Co shall remain solely responsible for compliance in full with all requirements of this Schedule.

18.4 Belfast MSF Expansion Start-Up Meeting [Section 20.4]

(a) Within 10 Business Days after Belfast MSF Expansion Financial Close, Project Co and the Belfast MSF Expansion Design Team shall attend a start-up meeting (the "**Belfast MSF Expansion Start-Up Meeting**") with the City to set out the design development process in greater detail.

(b) The agenda for the Belfast MSF Expansion Start-Up Meeting shall include the following:

(i) Intentionally deleted;

(ii) Project Co's plan to ensure that the Belfast MSF Expansion Works are completed in accordance with the requirements set forth in this Schedule;

(iii) Project Co's process to ensure optimum design quality;

(iv) Project Co's approach to ensure that all Belfast MSF Expansion Project Co Parties perform the Belfast MSF Expansion Works, as applicable, as a fully integrated team;

(v) a proposed schedule of Belfast MSF Expansion Works Submittals which is consistent with the Belfast MSF Expansion Works Schedule and which provides for a progressive and orderly flow of Belfast MSF Expansion Works Submittals from Project Co to the City Representative to allow sufficient time for review of each Belfast MSF Expansion Works Submittal by the City Representative, and taking into account both the resources available to the City Representative to conduct such review and whether delay in the review of the subject matter of the Belfast MSF Expansion Works Submittal will have a material impact on Project Co's ability to progress future anticipated Belfast MSF Expansion Works Submittals and the Belfast MSF Expansion Works in accordance with the Belfast MSF Expansion Works Schedule;

(vi) Project Co's plan to successfully integrate feedback from consultations with Belfast MSF Expansion Stakeholders and the City Belfast MSF Expansion Design Team;

(vii) Project Co's approach to timing, construction, and adjustment; and

(viii) a communication process that includes an electronic data room and the use of a computerized document tracking system that has the capacity to report, on request, the status of all design and construction documentation.

18.5 Belfast MSF Expansion Design Review Meetings [Section 20.5]

(a) In order to obtain input in the preparation of, and prior to submitting, the Belfast MSF Expansion Design Development Submittals and the Belfast MSF Expansion Construction Document Submittals, Project Co and the Belfast MSF Expansion Design Team shall hold design review meetings (the "**Belfast MSF Expansion Design Review Meetings**") with the City and the City Belfast MSF Expansion Design Team upon the following terms:

(i) the Project Co Representative shall arrange the Belfast MSF Expansion Design Review Meetings in consultation with the City Representative;

(ii) all Belfast MSF Expansion Design Review Meetings shall be held in Ottawa, Ontario unless the City agrees otherwise in writing;

(iii) the Parties shall cooperate to develop a reasonable schedule for the Belfast MSF Expansion Design Review Meetings and shall incorporate such schedule into the Belfast MSF Expansion Works Schedule;

(iv) Project Co shall circulate to the City and the City Belfast MSF Expansion Design Team an agenda for each of the Belfast MSF Expansion Design Review Meetings no later than 5 Business Days prior to the relevant Belfast MSF Expansion Design Review Meeting;

(v) in advance of a Belfast MSF Expansion Design Review Meeting, Project Co may submit to the City Belfast MSF Expansion Design Team for comment any interim drafts of any designs or plans required under this Schedule, which submissions shall be used to inform the City on the development of Belfast MSF Expansion Works design and provide an opportunity for dialog on compliance with the requirements of this Schedule. For greater certainty, interim submissions shall be informal and shall not be reviewed in accordance with Appendix 10 – Review Procedure;

(vi) the Belfast MSF Expansion Design Review Meetings shall be held in person, except where otherwise agreed by the Parties, acting reasonably;

(vii) Project Co shall maintain minutes of the Belfast MSF Expansion Design Review Meetings, including possible design solutions and changes in design, and, within 5 Business Days after each Belfast MSF Expansion Design Review Meeting, Project Co shall provide to the City and the City Belfast MSF Expansion Design Team a copy of the minutes, together with a copy of any notes, comments, sketches, drawings, tracings, lay-outs, plans or diagrams prepared at the Belfast MSF Expansion Design Review Meeting; and

(viii) the City and Project Co agree that the subject matter of the Belfast MSF Expansion Design Review Meetings shall not be regarded as Belfast MSF Expansion Submittals to which Appendix 10 – Review Procedure applies, and that the City shall not be bound by the input provided in connection with the Belfast MSF Expansion Design Review Meetings.

(b) The Parties shall, together with the City Belfast MSF Expansion Design Team, hold Belfast MSF Expansion Design Review Meetings prior to:

(i) each of the Belfast MSF Expansion Design Development Submittals; and

(ii) each of the Belfast MSF Expansion Construction Document Submittals.

(c) The purpose of the Belfast MSF Expansion Design Review Meetings is to facilitate the incorporation of the City input, involvement and feedback into the Belfast MSF Expansion Design Data prior to submission of such Belfast MSF Expansion Design Data in accordance with Appendix 10 – Review Procedure.

18.6 Testing [Section 20.6]

(a) To the extent and in the manner provided by the Quality Documentation and other terms of this Schedule, all testing shall be carried out by a duly accredited and certified testing facility and organization. Any self-certification/testing carried out by Project Co, and any subsequent test results, shall be reviewed by the Independent Certifier. The City Representative shall be given timely advance notice (being not less than 2 Business Days) of the date of such tests, except for categories of tests (if any) in respect of which the City Representative gives written notice to Project Co that it does not require such notice. The City Representative and any other Belfast MSF Expansion City Party at the City's option shall be entitled to attend at any test. Any materials or plant which fail such tests shall be rejected.

(b) Project Co shall develop a test recording system which shall permit ready retrieval of all test readings and shall provide information relating to tests proposed, test methodology and test readings to the City Representative on request.

(c) With respect to continuous testing operations (such as concrete quality, structural concrete strengths, aggregate quality, compaction tests and bituminous material quality), Project Co shall provide to the City Representative at regular intervals (not to exceed weekly unless otherwise agreed) test summary sheets and statistical analyses indicating strength and quality trends.

18.7 Intentionally deleted

18.8 Performance of Design Obligations [Section 20.8]

(a) Intentionally deleted

(b) Project Co shall ensure that all parts of the Belfast MSF Expansion Works shall, as required by Applicable Law, be performed or reviewed by licensed or registered professional engineers and architects registered to practice in the Province of Ontario. Such architects and engineers shall certify and, if required by Applicable Law, sign and seal, all designs, drawings and technical reports confirming that they comply with all prevailing design standards and design practices for such work in the Province of Ontario, all other applicable standards, specifications and codes, and as otherwise required by Applicable Law.

18.9 General Construction Obligations [Section 20.9]

(a) Project Co is responsible for all construction means, methods and techniques used to undertake the Belfast MSF Expansion Works and must provide everything (including labour, equipment and materials and electricity and other utilities) necessary for the construction and commissioning of the Belfast MSF Expansion Works and other performance of the Belfast MSF Expansion Works.

(b) Project Co shall in a timely and professional manner and in accordance with the requirements of this Schedule:

(i) construct the Belfast MSF Expansion Works diligently, expeditiously and in a thorough and workman-like manner consistent with Appendix 11 – Quality Management;

(ii) ensure that no works other than the Belfast MSF Expansion Works under this Schedule or the Works under the Project Agreement are constructed on the Belfast MSF Expansion Lands by Project Co or any person for whom Project Co is responsible at law;

(iii) protect the Belfast MSF Expansion Works from all of the elements, casualty and damage;

(iv) in respect of plant, equipment and materials incorporated in the Belfast MSF Expansion Works, use plant, equipment and materials that:

(A) are of a kind that are consistent with the Belfast MSF Expansion Output Specifications;

(B) are new, of good quality and are used, handled, stored and installed in accordance with Applicable Law and Good Industry Practice (Works) with respect to health and safety so as not to be hazardous or dangerous; and

(C) where they differ from the Belfast MSF Expansion Output Specifications, have been substituted with the City's prior written consent in accordance with Section 18.10 [20.10].

(c) Without limiting Project Co's obligations pursuant to Section 8.4 or 8.5 [9.5 or 9.6], Project Co shall, at all times throughout the progress of the Belfast MSF Expansion Works, be responsible for maintaining and securing the Belfast MSF Expansion Site to prevent access onto the Belfast MSF Expansion Site of any persons not entitled to be there, as determined by Project Co acting reasonably and the licence granted to Project Co pursuant to Section 12.1(a) of this Schedule shall include rights for Project Co to do so.

18.10 Substitutions [Section 20.10]

(a) Whenever equipment, components, materials, supplies, tools, and other items are specified or otherwise described in this Schedule by using the name or catalogue or model number of a particular manufacturer, fabricator, vendor or distributor, or any other material name or description, the naming or identification of the item is intended to establish the type and the minimum function and quality required, and equipment, components, materials, supplies, tools, and other items of other manufacturers, fabricators, vendors or distributors shall not be substituted without the prior written consent of the City, in its Discretion.

18.11 Belfast MSF Expansion Works Submittals [Section 20.11]

(a) Any and all items, documents and anything else required or specified by this Schedule in respect of the Belfast MSF Expansion Works to be submitted to, reviewed or otherwise processed by the City prior to Belfast MSF Expansion Final Completion, including any and all subsequent revisions, amendments and changes thereto, shall be subject to review by the City pursuant to Appendix 10 – Review Procedure.

19. ACCESS AND MONITORING [ARTICLE 21]

19.1 Access for Belfast MSF Expansion City Parties [Section 21.1]

(a) Subject to Section 19.1(b) [21.1(b)], but without limiting any of the City's rights in respect of the Belfast MSF Expansion Site, Project Co:

(i) acknowledges and agrees that throughout the Belfast MSF Expansion Project Term, without any prejudice to any access rights of any such person as a member of the general public or pursuant to Applicable Law, the City, the Belfast MSF Expansion City Parties, a Police Service and their respective representatives shall have unrestricted access to the Belfast MSF Expansion Site and any workshop where materials, or equipment are being manufactured, prepared or stored at all reasonable times during normal working hours, including for the purposes of general inspection or audit, or of attending any test or study being carried out in respect of the Belfast MSF Expansion Works, or to fulfill any statutory, public or other duties or functions.

(b) In exercising their access rights under Section 19.1(a) [21.1(a)], the City, the Belfast MSF Expansion City Parties, a Police Service and their respective representatives shall:

(i) provide reasonable prior notice appropriate to the circumstances (other than for any offices or other facilities provided at the Belfast MSF Expansion Site for the use of the City and/or Belfast MSF Expansion City Parties); and

(ii) comply with all relevant safety procedures and any reasonable directions with regard to site safety that may be issued by or on behalf of the Project Co Representative from time to time.

19.2 Increased Monitoring [Section 21.2]

(a) Subject to Section 14.5, at any time during the Belfast MSF Expansion Project Term, the City is of the opinion, acting reasonably, that there are defects in the Belfast MSF Expansion Works or that Project Co has failed to comply, in any material respect, with the requirements of this Schedule (including the Belfast MSF Expansion Output Specifications), the City may, without prejudice to any other right or remedy available to it, by notice to Project Co, increase the level of monitoring of Project Co from that set out in this Schedule to such level as the City considers reasonable taking into account the nature of the relevant defect or failure until such time as Project Co shall have demonstrated, to the City's satisfaction, that it is capable of performing and will perform, in all material respects, its obligations under this Schedule. Project Co will compensate the City for any reasonable costs incurred as a result of such increased monitoring.

19.3 Right to Uncover [Section 21.3]

(a) Subject to Section 14.5, Project Co shall ensure that the City is afforded advance notice of, and that the City is afforded a full opportunity to witness, all inspection and test activity in accordance with the Belfast MSF Expansion Inspection and Test Plan. If Project Co does not provide such notice and opportunity, Project Co shall at the request of the City uncover any relevant part of the Belfast MSF Expansion Works which have been covered up or otherwise put out of view or remove any relevant part of the Belfast MSF Expansion Works that have been proceeded with in order to permit the City to witness the relevant inspection or test activity. Project Co shall bear all costs of any such uncovering or removal, regardless of whether or not any defect is discovered in the Belfast MSF Expansion Works.

(b) If an inspection shows that the relevant part or parts of the Belfast MSF Expansion Works is or are defective or that Project Co has failed to comply with the requirements of this Schedule (including the Belfast MSF Expansion Output Specifications and the Belfast MSF Expansion Design Data) relevant to such part or parts of the Belfast MSF Expansion Works, Project Co shall rectify all such defects and non-compliance diligently and at no cost to the City and Project Co shall not be entitled to any additional compensation or extension of time in relation thereto.

(c) If an inspection shows that the relevant part or parts of the Belfast MSF Expansion Works is or are not defective and that Project Co has complied with the requirements of this Schedule (including the Belfast MSF Expansion Output Specifications and the Belfast MSF Expansion Design Data) relevant to such part or parts of the Belfast MSF Expansion Works, the exercise by the City of its rights pursuant to this Section 19.3 [21.3]:

(i) prior to Belfast MSF Expansion Substantial Completion shall, be treated as a Belfast MSF Expansion Delay Event and be treated as a Belfast MSF Expansion Compensation Event; and

(ii) following Belfast MSF Expansion Substantial Completion shall, subject to and in accordance with Schedule 22 – Variation Procedure to the Project Agreement, result in a Variation.

19.4 Access by Others

(a) Subject to Section 19.4(b) and subject to and in accordance with Section 8.6 (to the extent applicable), Project Co shall ensure that throughout the Belfast MSF Expansion Project Term, without prejudice to any access rights of any such person as a member of the general public or pursuant to Applicable Law:

(i) any contractors, consultants or other persons authorized by the City Representative or the City, including the Belfast MSF Expansion Other Contractors, have access to those parts of the Belfast MSF Expansion Site as is necessary for the purpose of carrying out the Belfast MSF Expansion Other Works;

(ii) the Independent Certifier has access to the Belfast MSF Expansion Site to the extent required to perform its obligations pursuant to the Independent Certifier Agreement, as the same applies to the Belfast MSF Expansion;

(iii) the inspectors and other persons authorized to act on behalf of the City have access to the Belfast MSF Expansion Site for inspection and acceptance purposes;

(iv) all Belfast MSF Expansion Other Contractors, including the owners or operators of any Third Party Facilities and their agents, have access to the Belfast MSF Expansion Site at all reasonable times to perform Belfast MSF Expansion Third Party Works and where applicable, in accordance with or to exercise any right or power or perform any duty or obligation under any Applicable Law or the Utility Agreements, Belfast MSF Expansion Railway Orders or encroachment permits, provided that, wherever consistent with the requirements of Applicable Law and the requirements of this Schedule, Project Co may limit such access so as to not unnecessarily impede or restrict traffic flows or any activities within the Belfast MSF Expansion Project Scope or the Maintenance Services under the Project Agreement;

(v) all Governmental Authorities and Emergency Service Providers have access to the Belfast MSF Expansion Site in order to carry out any work (including surveys and inspections) in accordance with or to exercise any right or power or perform any duty or obligation under any Applicable Law and provided that, whenever consistent with the applicable requirements of such Governmental Authority, Emergency Service Providers or Applicable Law and the requirements of this Schedule (as the case may be), Project Co may limit such access so as to not unnecessarily impede or restrict traffic flows or any Belfast MSF Expansion Project Scope or the Maintenance Services under the Project Agreement; and

(vi) any Belfast MSF Expansion City Party, Belfast MSF Expansion Other Contractors, owners or operators of Third Party Facilities, Governmental Authorities, Emergency Service Providers, Utility Companies, and Railway Companies are permitted to enter upon the Belfast MSF Expansion Site for the purposes of access to and from any other lands and/or facilities adjacent to or in proximity to the Belfast MSF Expansion Site owned or operated by such person or in which such person has any interest, provided that, whenever consistent with the requirements of Applicable Law and the requirements of this Schedule, Project Co may limit such access so as to not unnecessarily impede or restrict traffic flows or any Belfast MSF Expansion Project Scope or the Maintenance Services under the Project Agreement.

(b) In exercising their access rights under Section 19.4(a), each person referred to therein (except for Belfast MSF Expansion Other Contractors, who shall instead comply with any instructions or procedures made by Project Co pursuant to Section 8.6) shall (except in the case of access rights described in Section 19.4(a) for the purpose of responding to an Belfast MSF Expansion Emergency (for the purposes of this clause (b), references in the definition of "Belfast MSF Expansion Emergency" to the City or the City Representative shall be deemed to be references to the applicable Governmental Authority or Emergency Service Provider) and except to the extent inconsistent with the applicable requirements of such Governmental Authority or Emergency Service Provider):

(i) provide reasonable prior notice appropriate to the circumstances;

(ii) comply with all relevant health and safety procedures and any reasonable directions with regard to health and safety that may be issued by or on behalf of the Project Co Representative from time to time; and

(iii) if reasonably required by Project Co, be accompanied by a representative of Project Co or a Belfast MSF Expansion Project Co Party.

20. BELFAST MSF EXPANSION WORKS SCHEDULE AND BELFAST MSF EXPANSION WORKS REPORT [ARTICLE 22]

20.1 Completion of Belfast MSF Expansion Works [Section 22.1]

(a) Project Co shall complete the Belfast MSF Expansion Works in accordance with this Schedule and achieve Belfast MSF Expansion Substantial Completion by the Belfast MSF Expansion Scheduled Substantial Completion Date and Belfast MSF Expansion Final Completion by the Belfast MSF Expansion Scheduled Final Completion Date.

20.2 The Belfast MSF Expansion Works Schedule [Section 22.2]

(a) Project Co shall prepare and submit to the City and the Independent Certifier:

(i) within 30 days after Belfast MSF Expansion Financial Close, a detailed 6-Month Belfast MSF Expansion Works Schedule;

(ii) within 120 days after Belfast MSF Expansion Financial Close, a detailed draft of the Belfast MSF Expansion Works Schedule; and

(iii) every month in accordance with Appendix 33 - Works Reports, an updated, and progressed, Belfast MSF Expansion Works Schedule, each using Oracle Primavera P6 Project Management software, that supports the completion of the Belfast MSF Expansion Works in accordance with Section 20.1 [22.1].

(b) Project Co shall develop its Belfast MSF Expansion Works Schedule in close co-ordination with the City to ensure City related input into the design, as well as City obligations under this Schedule are included in the Belfast MSF Expansion Works Schedule with sufficient detail and understanding by both Project Co and the City such that both parties have a clear expectation of their respective obligations and input and the timing required for such.

(c) The City shall provide Project Co with comments on the 6-Month Belfast MSF Expansion Works Schedule and the draft of the Belfast MSF Expansion Works Schedule in accordance with Appendix 10 – Review Procedure, provided that the period for review of the draft of the 6-Month Belfast MSF Expansion Works Schedule and the Belfast MSF Expansion Works Schedule shall be 20 Business Days rather than the 10 Business Days prescribed in Section 2.2 of Appendix 10 – Review Procedure. Project Co shall revise the 6-Month Belfast MSF Expansion Works Schedule and the draft of the Belfast MSF Expansion Works Schedule to the extent required by Appendix 10 – Review Procedure within 15 days of receipt of any comments from the City.

(d) When agreed by the Parties, the draft of the Belfast MSF Expansion Works Schedule shall become the Belfast MSF Expansion Works Schedule.

(e) The 6-Month Belfast MSF Expansion Works Schedule and the Belfast MSF Expansion Works Schedule shall be prepared in accordance with Good Industry Practice (Works) for an expansion project of similar scale, scope, type and complexity and shall be in

sufficient detail so as to enable the City and the Independent Certifier, to monitor the progress of the Belfast MSF Expansion Works, including all commissioning activities, and the likely future progress of the Belfast MSF Expansion Works. For purposes of these schedules, Good Industry Practice (Works) includes, but is not limited to, the following Project Management Institute (PMI) publications:

(i) *A Guide to the Project Management Body of Knowledge* (PMBOK® Guide);

(ii) *Construction Extension to the PMBOK® Guide 3rd Edition*;

(iii) *The Practice Standard for Scheduling*;

(iv) *The Practice Standard for Work Breakdown Structures*; and

(v) *The Practice Standard for Earned Value Management*.

(f) Without limiting the generality of Section 20.2(e) [22.2(e)], the 6-Month Belfast MSF Expansion Works Schedule shall include the requirements below, at a minimum, in respect of the 6-month period beginning at Belfast MSF Expansion Financial Close:

(i) Intentionally deleted;

(ii) information based upon a detailed Work Breakdown Structure (WBS). The WBS and associate dictionary shall be provided to the City;

(iii) Intentionally deleted;

(iv) Intentionally deleted;

(v) major milestone events;

(vi) constraints;

(vii) the dates that key decisions must be made by the City, or key meetings where the City is to be present, to support the progress of the Belfast MSF Expansion Works;

(viii) the proposed dates for all plans and all Belfast MSF Expansion Work Submittals required to be submitted under this Schedule and any Appendix hereto by Project Co pursuant to the Belfast MSF Expansion Review Procedure;

(ix) all activities related to the environmental process, proposed Belfast MSF Expansion Stakeholder consultations, if any, and Environmental Approvals, if any, including review periods by Governmental Authorities and third parties pursuant to Project Co Belfast MSF Expansion Permits, Licences and Approvals showing in sufficient detail how these dates affect the critical path of the schedule, as well as how these dates affect the commencement date of Belfast MSF Expansion Construction Clearing and Grubbing;

(x) all design related activities;

(xi) all field and construction activities, including construction staging, subcontract work and cash allowance work, both on and off the Belfast MSF Expansion Site;

(xii) all activities leading up to Belfast MSF Expansion Construction Clearing and Grubbing;

(xiii) projected Belfast MSF Expansion Construction Contract cash flows; and

(xiv) a narrative that describes, in sufficient detail, the rationale behind the items identified in this Section 20.2(f) [22.2(f)].

(g) Without limiting the generality of Section 20.2(e) [22.2(e)], the Belfast MSF Expansion Works Schedule shall include, at a minimum, in respect of the period from 6 months following Belfast MSF Expansion Financial Close until the Belfast MSF Expansion Final Completion Date:

(i) subject to Section 20.2(g)(ii) [22.2(g)(ii)], all elements to be included in the 6-Month Belfast MSF Expansion Works Schedule pursuant to Section 20.2(f) [22.2(f)];

(ii) the proposed dates for all plans, all Belfast MSF Expansion Works, except for the proposed dates for plans under Subsection (viii) of Section 20.2(f) [22.2(f)];

(iii) Intentionally deleted;

(iv) all Project Co Belfast MSF Expansion Commissioning;

(v) Intentionally deleted;

(vi) Intentionally deleted; and

(vii) a cumulative "S" curve showing planned percent completion for each month from the commencement of the Belfast MSF Expansion Works until the Belfast MSF Expansion Scheduled Final Completion Date.

(h) Belfast MSF Expansion Works Budget and Cost Control System

(i) The project budget and cost control system implemented by Project Co shall include the following parameters:

(A) A detailed WBS based cost structure that is the overall project budget baseline;

(B) Tracking of cost issues and factors that create changes to the budget baseline;

(C) Managing the actual cost changes when and as they occur;

(D) Managing cost estimates to ensure they do not exceed budgets available;

(E) Monitoring cost performance trends to detect cost variances and track budget-cost variances;

(F) Risk management including contingencies, allowances and uncertainty funds;

(G) Scope/Cost Change Control System;

(H) Scope changes and associated cost estimates against the budget baseline; and

(I) Reporting to the City regarding all pending and approved scope changes.

(ii) Project Co shall use an Earned Value Management (EVM) methodology to track performance of the work using the following key performance factors:

(A) Schedule Performance Index (SPI);

(B) Cost Performance Index (CPI);

(C) Schedule Variance (SV);

(D) Cost Variance (CV);

(E) Planned Value (PV);

(F) Earned Value (EV);

(G) Actual Cost (AC);

(H) Estimate to Complete (ETC); and

(I) Estimate at Completion (EAC).

(iii) EVM budget, and cost performance, shall be reported monthly in accordance with Section 20.5 [22.5] Belfast MSF Expansion Works Report.

20.3 Failure to Maintain Belfast MSF Expansion Schedule [Section 22.3]

(a) Without limiting any other provision of this Schedule but subject to Section 32 [40], if at any time:

(i) the actual progress of the Belfast MSF Expansion Works has significantly fallen behind the Belfast MSF Expansion Works Schedule; or

(ii) the City is of the opinion that the actual progress of the Belfast MSF Expansion Works has significantly fallen behind the Belfast MSF Expansion Works Schedule,

Project Co shall be required:

(iii) within 5 Business Days of receipt of notice from the City, to produce and deliver to each of the City Representative and the Independent Certifier:

(A) a report identifying the reasons for the delay; and

(B) a plan showing the steps that are to be taken by Project Co to eliminate or reduce the delay to bring the progress of the Belfast MSF Expansion Works back on schedule in accordance with the Belfast MSF Expansion Works Schedule.

(b) Project Co shall notify the City Representative if, at any time, the actual progress of the Belfast MSF Expansion Works is significantly ahead of the Belfast MSF Expansion Works Schedule.

(c) Provided that Project Co has complied with this Section 20.3 [22.3] and is not in default under this Schedule, for greater certainty, the failure to achieve: (i) Belfast MSF Expansion Substantial Completion by the Belfast MSF Expansion Scheduled Substantial Completion Date; or (ii) Belfast MSF Expansion Final Completion by the Belfast MSF Expansion Scheduled Final Completion Date shall not be a Project Co Belfast MSF Expansion Event of Default or a Project Co Event of Default.

20.4 Intentionally Deleted [Section 22.4]

20.5 Belfast MSF Expansion Works Report [Section 22.5]

(a) Project Co shall continuously monitor the progress of the Belfast MSF Expansion Works in relation to the Belfast MSF Expansion Works Schedule and, within 10 Business Days following the end of each calendar month from Belfast MSF Expansion Financial Close until the Belfast MSF Expansion Final Completion Date, Project Co shall provide to the City Representative and the Independent Certifier a works report (each, a "**Belfast MSF Expansion Works Report**"), which will include:

(i) an executive summary describing the general status of the Belfast MSF Expansion Works and progress made over the relevant month;

(ii) an updated Belfast MSF Expansion Works Schedule, printed in both summary and detailed formats (PDF), and in native P6 format (XER);

(iii) a narrative description of any Disputes related to the Belfast MSF Expansion Works including any action that has taken place over the relevant month to resolve such Disputes; and

(iv) an update on those matters set out in Appendix 33 – Works Reports,

all in form and substance satisfactory to the City, acting reasonably. For greater certainty, for all updates and revisions to the Belfast MSF Expansion Works Schedule, Project Co must provide a revised critical path reflecting the updated/revised Belfast MSF Expansion Works Schedule. Prior to Final Completion, Project Co may combine all or part of the Belfast MSF Expansion Works Report with the Works Report.

(b) Project Co shall use, and shall ensure that the Belfast MSF Expansion Construction Contractor uses, the project management software system specified by the City.

21. ENERGY AND ENVIRONMENTAL REQUIREMENTS [ARTICLE 24]

21.1 Environmental Management / Contamination and Hazardous Substances [Section 24.1]

(a) Project Co shall comply with the provisions of Appendix 17 - Environmental Obligations.

21.2 Intentionally deleted [Section 24.3]

21.3 Intentionally deleted

22. INDEPENDENT CERTIFIER

22.1 Intentionally Deleted.

23. COMMISSIONING AND COMPLETION [ARTICLE 26]

23.1 Belfast MSF Expansion Commissioning Activities [Section 26.1]

(a) Project Co shall perform all Project Co Belfast MSF Expansion Commissioning related to the Belfast MSF Expansion, and shall support and facilitate the performance of all required commissioning by the City related to the Belfast MSF Expansion, as set forth in this Section 23 and in Appendix 14 –Commissioning in respect of Belfast MSF Expansion Substantial Completion and Belfast MSF Expansion Final Completion, as applicable.

(b) Project Co shall perform or cause to be performed all matters to ensure that Belfast MSF Expansion Substantial Completion is achieved by the Belfast MSF Expansion Scheduled Substantial Completion Date.

23.2 Belfast MSF Expansion Substantial Completion Certificate [Section 26.2]

(a) Project Co shall give the Independent Certifier and the City Representative at least 10 Business Days' notice prior to the date upon which Project Co anticipates all requirements for a Belfast MSF Expansion Substantial Completion shall be satisfied.

(b) Project Co shall give the Independent Certifier and the City Representative notice:

(i) [Intentionally Deleted];

(ii) (the "**Belfast MSF Expansion Substantial Completion Notice**") upon the satisfaction of all requirements for Belfast MSF Expansion Substantial Completion;

(iii) [Intentionally Deleted],

which Belfast MSF Expansion Substantial Completion Notice, shall describe, in reasonable detail, the satisfaction of the requirements for the Belfast MSF Expansion Substantial Completion together with Project Co's opinion as to whether the conditions for issuance of the Belfast MSF Expansion Substantial Completion Certificate have been satisfied.

(c) The City shall, within 5 Business Days after receipt of a Belfast MSF Expansion Substantial Completion Notice provide the Independent Certifier and Project Co with the City's opinion as to whether the conditions for issuance of the Belfast MSF Expansion Substantial Completion Certificate have been satisfied and, if applicable, any reasons as to why it considers that the Belfast MSF Expansion Substantial Completion Certificate, should not be issued.

(d) Within 5 Business Days after Project Co's receipt of the City's opinion pursuant to Section 23.2(c), the Parties shall cause the Independent Certifier to determine whether the conditions for issuance of the Belfast MSF Expansion Substantial Completion Certificate, have been satisfied, having regard for the opinions of both Project Co and the City, and to determine whether any Belfast MSF Expansion Minor Deficiencies exist, if applicable, and to issue to the City and to Project Co either:

(i) the Belfast MSF Expansion Substantial Completion Certificate setting out in such certificate the Belfast MSF Expansion Substantial Completion Date, and the Belfast MSF Expansion Minor Deficiencies List (if applicable) in accordance with Section 23.4; or

(ii) a report detailing the matters that the Independent Certifier considers are required to be performed by Project Co to satisfy the conditions for issuance of the Belfast MSF Expansion Substantial Completion Certificate.

(e) Where the Independent Certifier has issued a report in accordance with Section 23.2(d)(ii) and Project Co has not referred a Dispute in relation thereto for resolution in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement, Project Co shall, within 5 Business Days after receipt of such report, provide the Independent Certifier and the City Representative with:

(i) a detailed list indicating the rectification actions proposed for all matters raised in such report;

(ii) the schedule for completion of all such rectification actions; and

(iii) any additional Project Co Belfast MSF Expansion Commissioning that needs to be undertaken as a result of the rectification actions, and Project Co shall perform all such additional rectification actions and Project Co Belfast MSF Expansion Commissioning in a timely manner. Upon completion thereof, Project Co may give a further Belfast MSF Expansion Substantial Completion Notice and Sections 23.2(c) to (e), inclusive, shall be repeated until the Belfast MSF Expansion Substantial Completion Certificate has been issued.

(f) The Independent Certifier's decision to issue or not to issue the Belfast MSF Expansion Substantial Completion Certificate shall be final and binding on the Parties solely in respect of determining the relevant payment date, and a Dispute in relation to the Belfast MSF Expansion Substantial Completion Payment Date shall not be subject to resolution pursuant to Schedule 27 - Dispute Resolution Procedure to the Project Agreement, provided, however, that any other Dispute in relation to the Independent Certifier's decision to issue or not to issue Belfast MSF Expansion Substantial Completion Certificate or the Belfast MSF Expansion Final Completion Certificate may be referred for resolution pursuant to the Dispute Resolution Procedure.

23.3 Countdown Notice for Belfast MSF Expansion Substantial Completion [Section 26.3]

(a) [Intentionally Deleted].

(b) Project Co shall deliver a notice (a "**Belfast MSF Expansion Countdown Notice**") to the City and the Independent Certifier specifying the date on which Project Co anticipates that Belfast MSF Expansion Substantial Completion will be achieved (the "**Belfast MSF Expansion Anticipated Substantial Completion Date**") in relation to the Belfast MSF Expansion Scheduled Substantial Completion Date.

(c) The Belfast MSF Expansion Countdown Notice, with respect to subparagraph (b) above, shall be delivered not less than 60 days prior to the Belfast MSF Expansion Anticipated Substantial Completion Date. If Project Co fails to deliver the Belfast MSF Expansion Countdown Notice not less than 60 days prior to the Belfast MSF Expansion Scheduled Substantial Completion Date, the Belfast MSF Expansion Anticipated Substantial Completion Date shall be deemed to be the same date as the Belfast MSF Expansion Scheduled Substantial Completion Date.

(d) [Intentionally Deleted].

23.4 Belfast MSF Expansion Minor Deficiencies [Section 26.4]

(a) In the event that Belfast MSF Expansion Minor Deficiencies exist when Project Co gives a Belfast MSF Expansion Substantial Completion Notice, the Independent Certifier, in consultation with Project Co and the City, shall, within 15 Business Days of Project Co's application, prepare a list of all Belfast MSF Expansion Minor Deficiencies (a "**Belfast**

MSF Expansion Minor Deficiencies List") identified at that time and an estimate of the cost and the time for rectifying such Belfast MSF Expansion Minor Deficiencies.

(b) The Belfast MSF Expansion Minor Deficiencies List will contain the schedule for the completion and rectification of the Belfast MSF Expansion Minor Deficiencies. In determining the relevant time for rectifying Belfast MSF Expansion Minor Deficiencies, Project Co shall schedule the completion and rectification of Belfast MSF Expansion Minor Deficiencies so as to minimize, to the greatest extent reasonably possible, any lane or track closures, traffic diversions or restrictions or other impairment of the public's use and enjoyment of the System or the relevant portion thereof, or disruption of the Belfast MSF Expansion Project Scope or the Project Scope or the operations of the City, any Belfast MSF Expansion City Party, any Governmental Authority or any Other Belfast MSF Expansion Contractor, including the performance of the Governmental Activities and the Belfast MSF Expansion Other Works, and otherwise in accordance with the Traffic and Transit Management Plan.

(c) The Independent Certifier must prepare the Belfast MSF Expansion Minor Deficiencies List before the Belfast MSF Expansion Substantial Completion Certificate is issued, but shall not withhold the Belfast MSF Expansion Substantial Completion Certificate by reason solely that there are Belfast MSF Expansion Minor Deficiencies.

(d) The City may, in its Discretion, waive any requirement for Belfast MSF Expansion Substantial Completion, and the failure to meet any such requirement shall constitute a Belfast MSF Expansion Minor Deficiency.

23.5 Rectification of Belfast MSF Expansion Minor Deficiencies [Section 26.5]

(a) Project Co shall, in consultation with the City Representative and so as to minimize, to the greatest extent reasonably possible, any lane or track closures, traffic diversions or restrictions or other impairment of the public's use and enjoyment of the System or any portion thereof or disruption of the Belfast MSF Expansion Project Scope or of the activities of the City, any Belfast MSF Expansion City Party, any Governmental Authority or any Other Belfast MSF Expansion Contractor, including the performance of the Governmental Activities and the Belfast MSF Expansion Other Works, and otherwise in accordance with the Traffic and Transit Management Plan, complete and rectify all Belfast MSF Expansion Minor Deficiencies within 180 days of the issuance of the applicable Belfast MSF Expansion Minor Deficiencies List or such other period as the Independent Certifier may specify in the Belfast MSF Expansion Minor Deficiencies List.

(b) Project Co acknowledges and agrees that the completion and rectification of Belfast MSF Expansion Minor Deficiencies may require work outside of normal working hours in order to accommodate the efficient operation of the System or any portion thereof and to ensure compliance with the Traffic and Transit Management Plan.

23.6 Failure to Rectify Belfast MSF Expansion Minor Deficiencies [Section 26.6]

(a) If Project Co has failed to complete and rectify any Belfast MSF Expansion Minor Deficiency specified in any Belfast MSF Expansion Minor Deficiencies List:

(i) within 60 days of the issuance of the applicable Belfast MSF Expansion Minor Deficiencies List for the related Belfast MSF Expansion Minor Deficiencies where no time for rectification or completion has been specified by the Independent Certifier, or

(ii) within 30 days after the time for completion and rectification of any Belfast MSF Expansion Minor Deficiency where such a time has been specified in applicable Belfast MSF Expansion Minor Deficiencies List by the Independent Certifier,

the City may:

(iii) withhold from the next payment or payments otherwise due to Project Co a holdback amount that is 200% of the amount estimated by the Independent Certifier for the City to complete and rectify all such Belfast MSF Expansion Minor Deficiencies (to the extent then outstanding), which holdback shall be held in an interest bearing account; and

(iv) engage others to perform the work necessary to complete and rectify any such Belfast MSF Expansion Minor Deficiency, at the risk and cost of Project Co, and the City may deduct such cost from the holdback amount and interest earned thereon.

(b) Upon completion and rectification of each Belfast MSF Expansion Minor Deficiency, the City shall release to Project Co the amount of the holdback related to such Belfast MSF Expansion Minor Deficiency. Upon completion and rectification of all Belfast MSF Expansion Minor Deficiencies, the City shall release to Project Co the then remaining amount of the holdback, together with all interest accrued thereon. If the cost of such completion and rectification exceeds the amount of such holdback and interest, then Project Co shall reimburse the City for all such excess cost.

23.7 [Intentionally Deleted] [Section 26.7]

23.8 Belfast MSF Expansion Final Completion Certificate [Section 26.8]

(a) Project Co shall give the Independent Certifier and the City Representative at least 10 Business Days' notice prior to the date upon which Project Co anticipates all requirements for Belfast MSF Expansion Final Completion shall be satisfied.

(b) Project Co shall give the Independent Certifier and the City Representative notice (a "**Belfast MSF Expansion Final Completion Notice**") upon the satisfaction of all requirements for Belfast MSF Expansion Final Completion, which Belfast MSF Expansion Final Completion Notice shall describe, in reasonable detail, the satisfaction of the requirements for Belfast MSF Expansion Final Completion, including the

completion and rectification of all Belfast MSF Expansion Minor Deficiencies and completion of the MSF Reconfiguration Elements, the time required for completion of all outstanding seasonal work, together with Project Co's opinion as to whether the conditions for issuance of the Belfast MSF Expansion Final Completion Certificate have been satisfied.

(c) The City shall, within 5 Business Days after receipt of the Belfast MSF Expansion Final Completion Notice, provide the Independent Certifier and Project Co with the City's opinion as to whether the conditions for issuance of the Belfast MSF Expansion Final Completion Certificate have been satisfied and, if applicable, any reasons as to why it considers that the Belfast MSF Expansion Final Completion Certificate should not be issued.

(d) Within 5 Business Days after Project Co's receipt of the City's opinion pursuant to Section 23.8(c), the Parties shall cause the Independent Certifier to determine whether the conditions for issuance of the Belfast MSF Expansion Final Completion Certificate have been satisfied, having regard for the opinions of both Project Co and the City, and to issue to the City and to Project Co either:

(i) the Belfast MSF Expansion Final Completion Certificate, setting out in such certificate the Belfast MSF Expansion Final Completion Date; or

(ii) a report detailing the matters that the Independent Certifier considers are required to be performed by Project Co to satisfy the conditions for issuance of the Belfast MSF Expansion Final Completion Certificate.

(e) Where the Independent Certifier has issued a report in accordance with Section 23.8(d)(ii) and Project Co has not referred a Dispute in relation thereto for resolution in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement, Project Co shall, within 5 Business Days after receipt of such report, provide the Independent Certifier and the City Representative with:

(i) a detailed list indicating the rectification actions proposed for all matters raised in such report;

(ii) the schedule for completion of all such rectification actions;

(iii) any additional Project Co Belfast MSF Expansion Commissioning that needs to be undertaken as a result of the rectification actions, and

(iv) Project Co shall perform all such additional rectification actions relating to the Belfast MSF Expansion in a timely manner. Upon completion thereof, Project Co may give a further Belfast MSF Expansion Final Completion Notice and Sections 23.8(c) to (e), inclusive, shall be repeated until the Belfast MSF Expansion Final Completion Certificate, has been issued.

(f) Any Dispute in relation to the Independent Certifier's decision to issue or not to issue the Belfast MSF Expansion Final Completion Certificate may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement.

(g) If, within 30 days after the time specified in the Belfast MSF Expansion Final Completion Notice for completion of seasonal work, Project Co has failed to complete such seasonal work, the City may engage others to perform the work necessary to complete the seasonal work, at the risk and cost of Project Co. Project Co shall pay to the City the costs incurred by the City to complete such seasonal work within 10 Business Days of presentation of an invoice for such costs.

23.9 Effect of Certificates/Use [Section 26.9]

(a) The issue of the Belfast MSF Expansion Substantial Completion Certificate or the Belfast MSF Expansion Final Completion Certificate, the commencement of use by the City of any part of the Belfast MSF Expansion under the terms of this Schedule, or the commencement of any Governmental Activities shall, in no way:

(i) limit the obligations of Project Co under this Schedule including in respect of any defects, deficiencies or items of outstanding work existing or discovered prior to or after the date of any of such certificates or the date of the Belfast MSF Expansion Minor Deficiencies List; or

(ii) be construed as an approval by the City of the Belfast MSF Expansion Works or the way in which they have been carried out.

23.10 Determination of Substantial Completion of the Belfast MSF Expansion [Section 26.10]

(a) For the purposes of determining Belfast MSF Expansion Substantial Completion, and in accordance with Section 2(2) of the CLA, the Parties hereby agree not to expeditiously complete the MSF Reconfiguration Elements and to perform such modified Works after Belfast MSF Expansion Substantial Completion. The Parties hereby agree that, solely for the purposes of determining whether Belfast MSF Substantial Completion has been achieved, the price of the services or materials which are to be supplied, and which are required in order to complete the MSF Reconfiguration Elements shall be deducted from the total value of the Belfast MSF Expansion Works solely for the purposes of determining whether substantial performance of the Belfast MSF Expansion Works has occurred, and the payment certifier shall be instructed accordingly so that the performance of calculations of substantial performance in respect of the criteria to achieve Belfast MSF Expansion Substantial Completion shall exclude the value of the MSF Reconfiguration Elements. For greater certainty, there shall be no reduction in the amount of any payment by the City under this Schedule as a result of the application of this Section 23.10.

(b) The Parties agree that, as the Belfast MSF Expansion design progresses, it may be necessary to add to the MSF Reconfiguration Elements and, if either Party identifies any

such issue or element, it shall provide Notice as soon as reasonably practicable to the other Party and both Parties shall negotiate in good faith any such variations to Schedule A to the Belfast MSF Expansion Variation Confirmation as may be required to incorporate such issue or element as an MSF Reconfiguration Element.

23.11 Post-Completion Survey [Section 26.11]

(a) Not more than 90 days after the Belfast MSF Expansion Final Completion Date, Project Co shall cause an up-to-date topographical and an up-to-date legal survey of the Belfast MSF Expansion Lands to be completed by a duly qualified surveyor to be delivered to the City.

24. HUMAN RESOURCES [ARTICLE 28]

24.1 Subcontractors [Section 28.1]

(a) Project Co shall defend and indemnify the City from all claims, loss or damages arising out of or in connection with Project Co's contracts with any and all Belfast MSF Expansion Subcontractor(s) and any related Belfast MSF Expansion Subcontractor labour agreements in accordance with the provisions of this Schedule.

24.2 Admittance of Personnel [Section 28.2]

(a) The City shall have the right to order the removal from the Belfast MSF Expansion Site of any person employed by (or acting on behalf of) Project Co, or any Belfast MSF Expansion Project Co Party, whose presence, in the reasonable opinion of the City is likely to have an adverse effect on the Governmental Activities or who, in the reasonable opinion of the City is not a fit and proper person to be at the Belfast MSF Expansion Site for any reason, including a failure to comply with any of the City's policies or any immediate obligation of the City to ensure the safety and well being of persons at the Belfast MSF Expansion Site.

24.3 Confirmation of Action [Section 28.3]

(a) Any action taken under Section 24.2 [28.2] shall promptly be confirmed by the City to Project Co and, for greater certainty, shall not relieve Project Co of any of its obligations under this Schedule.

24.4 Finality as to Admission [Section 28.4]

(a) Any decision of the City made pursuant to Section 24.2 [28.2] shall be final and conclusive.

24.5 Staff Competency [Section 28.5]

(a) Project Co shall ensure that:

(i) there shall at all times be a sufficient number of persons employed or engaged by Project Co or any Belfast MSF Expansion Project Co Party (including all relevant grades of supervisory staff) engaged in the performance of the Belfast MSF Expansion Works with the requisite level of skill and experience to perform the Belfast MSF Expansion Works in accordance with this Schedule. For greater certainty, this obligation shall include ensuring that there are a sufficient number of such skilled and experienced persons employed or engaged by Project Co or any Belfast MSF Expansion Project Co Party to complete the Belfast MSF Expansion Works in accordance with the Belfast MSF Expansion Works Schedule and to cover periods of holiday, sickness and other absence;

(ii) all persons employed or engaged by Project Co or any Belfast MSF Expansion Project Co Party (including all relevant grades of supervisory staff) engaged in the performance of the Belfast MSF Expansion Works receive such training and supervision as is necessary to ensure the proper performance of this Schedule and compliance with all health and safety rules, procedures and requirements and Authority Requirement;

(iii) it creates and maintains, and causes all Belfast MSF Expansion Project Co Parties to create and maintain, a process which allows it to assess, monitor and correct, on an ongoing basis, the competency of persons employed or engaged by Project Co or any Belfast MSF Expansion Project Co Party (including all relevant grades of supervisory staff) engaged in the performance of the Belfast MSF Expansion Works to ensure the proper performance of this Schedule.

(b) Project Co and all Belfast MSF Expansion Project Co Parties shall be responsible for the cost of all training and certification for Belfast MSF Expansion Employees.

24.6 Human Resources Policies [Section 28.6]

(a) Project Co shall ensure that there are set up and maintained by it and by all Belfast MSF Expansion Project Co Parties, human resources policies and procedures covering all relevant matters relating to the Belfast MSF Expansion Works (including, for example, health and safety). Project Co and all Belfast MSF Expansion Project Co Parties shall ensure that the terms and the implementation of such policies and procedures comply with Applicable Law, Authority Requirement and Good Industry Practice (Works) and that they are published in written form and that copies of them (and any revisions and amendments to them) are available to the City on a timely basis.

24.7 Governmental Authority [Section 28.7]

(a) Project Co shall ensure that it and all Belfast MSF Expansion Project Co Parties comply at all times with any regulations, policies or directions set by any Governmental Authority related to labour, employment and/or human resources.

24.8 City Human Resources Policies [Section 28.8]

(a) The City may, by written notice, require that Project Co or any Belfast MSF Expansion Project Co Party comply with a specified human resources policy of the City.

(b) Project Co may, within 90 days of receiving such notice, notify the City, in writing, that compliance with such City policy necessitates a change in the Belfast MSF Expansion Output Specifications. Within 30 Business Days of receipt of such notice, the City shall respond to Project Co indicating whether or not it agrees that compliance with the Policy necessitates a change in the Belfast MSF Expansion Output Specifications. If it does agree, the City shall initiate the procedure set out in Schedule 22 – Variation Procedure to the Project Agreement as soon as reasonably practicable. If it does not agree, the matter may be referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement.

24.9 Convictions [Section 28.9]

(a) Project Co (to the extent permitted by Applicable Law) shall cause each Belfast MSF Expansion Project Co Party to, ensure that all potential employees (including, for greater certainty, permanent, temporary, full-time and part-time employees):

(i) are questioned concerning their Relevant Convictions; and

(ii) are required to complete and deliver to Project Co a criminal records search form.

24.10 Effect of Convictions [Section 28.10]

(a) Project Co (to the extent permitted by Applicable Law) shall, and shall cause each Belfast MSF Expansion Project Co Party to, ensure that no person who discloses any Relevant Convictions, or who is found to have any Relevant Convictions following the completion of a criminal records search, or of which Project Co or a Belfast MSF Expansion Project Co Party is aware or ought to be aware, is allowed access to the Belfast MSF Expansion Site, without the prior written consent of the City, in its Discretion.

24.11 Intentionally Deleted

24.12 Intentionally Deleted

25. DAMAGE AND DESTRUCTION [ARTICLE 30]

25.1 Restoration and Reinstatement of Damage or Destruction [Section 30.1]

(a) Unless this Schedule is terminated in accordance with its terms, if all or any part of the Belfast MSF Expansion Works is damaged or destroyed prior to Belfast MSF Expansion Final Completion, Project Co shall, at its own cost and expense, repair or replace, as applicable, the Belfast MSF Expansion Works or such part of the Belfast MSF Expansion Works, as applicable (the "**Belfast MSF Expansion Reinstatement Work**") promptly and in any event as soon as practicable in the circumstances. Except as otherwise expressly provided in this Schedule, damage to or destruction of all or any part of the Belfast MSF Expansion Works shall not terminate this Schedule or relieve Project Co of any of its obligations hereunder or entitle Project Co to any compensation from the City.

26. PAYMENT [ARTICLE 34]

Payment for Belfast MSF Expansion Works shall be made in accordance with the provisions of Appendix 21 - Construction Payments.

26.1 Electronic Invoicing [Section 34.7]

(a) Project Co shall cooperate with the reasonable requirements of the City, and shall submit its invoices and all other documentation relating to this Schedule in a form and with the structure and content as is reasonably required to be compatible with the City's information systems.

26.2 Payments [Section 34.10]

(a) Unless specific timeframes are stipulated for payment of any amounts owing or payable by one Party to the other Party under this Schedule, such amounts shall be due within 30 days of receipt or deemed receipt of an invoice therefor.

(b) Project Co shall maintain or cause to be maintained all holdbacks required pursuant to the CLA and shall only release holdbacks on being satisfied that no claims for lien can be claimed in respect of the Belfast MSF Expansion Subcontracts for which holdbacks are to be released.

26.3 Manner of Payment [Section 34.11]

(a) All payments under this Schedule shall be made in Canadian dollars and shall be electronically transferred, quoting the invoice number or description against which payment is made, in immediately available funds on the due date to a single bank account located in Canada as may be designated by the recipient from time to time by written notice to the other Party.

(b) If the due date is not a Business Day, then the electronic transfer shall be made on the Business Day immediately succeeding such day.

26.4 Set Off [Section 34.13]

(a) The Parties agree that their rights of set off at law or in equity are limited to the right of:

(i) the City to set off against any amounts otherwise due to Project Co pursuant to the terms of this Schedule, any amounts (including, without limitation, any amounts payable in accordance with Section 46) which are due to the City by Project Co pursuant to the terms of this Schedule; and

(ii) Project Co to set off against any amounts otherwise due to the City pursuant to the terms of this Schedule, any amounts (including, without limitation, any amounts payable in accordance with Section 46) which are due to Project Co by the City pursuant to the terms of this Schedule.

26.5 Effect of Payment [Section 34.14]

(a) No payment hereunder shall be construed as an acceptance or approval of incomplete, defective or improper performance by Project Co of any of its obligations under this Schedule, nor shall it operate to relieve Project Co from the performance of any of its obligations under this Schedule which have not been performed.

26.6 No Other Entitlement [Section 34.16]

(a) Project Co shall not be entitled to any payments, compensation, rights, remedies, benefits or entitlements under or in connection with this Schedule, except as specifically and expressly set out in this Schedule.

27. TAXES [ARTICLE 35]

27.1 Taxes

(a) All amounts specified in this Schedule are expressed exclusive of HST but inclusive of all other Taxes. Applicable HST shall be paid simultaneously with any amount due hereunder, including, for clarity, any compensation on termination.

(b) The City shall pay, when due and payable, all property taxes or payments in lieu of property taxes that are assessed in respect of ownership or use of the Belfast MSF Expansion Site.

27.2 Changes in Recoverability of Tax Credits [Section 35.2]

(a) The City will pay to Project Co from time to time, as the same is incurred by Project Co, amounts equal to any Irrecoverable Tax to the extent such Irrecoverable Tax results from a Belfast MSF Expansion Change in Law. In the event an Irrecoverable Tax becomes a Recoverable Tax as a result of a Belfast MSF Expansion Change in Law, Project Co will pay to the City from time to time, as the same is recovered by Project Co, amounts equal to such Recoverable Tax.

(b) For the purposes of this Section 27.2 [35.2], the term "**Irrecoverable Tax**" means HST or an irrecoverable sales tax levied by the Legislative Assembly of Ontario in lieu of all or a portion of HST incurred by Project Co in respect of the supply of any good or service to the City which is consumed, used or supplied, or to be consumed, used or supplied, exclusively by Project Co in the course of carrying out the Belfast MSF Expansion Works or otherwise performing the activities within the Belfast MSF Expansion Project Scope to the extent that Project Co is unable to recover or be credited with input tax credits, refunds, rebates or exemptions for such HST, or after obtaining an input tax credit, is required to pay an additional amount to the Canada Revenue Agency equal to all or part of the input tax credit claimed.

(c) For the purposes of this Section 27.2 [35.2], the term "**Recoverable Tax**" means HST incurred by Project Co in respect of the supply of any good or service to the City which is consumed, used or supplied, or to be consumed, used or supplied, exclusively by Project Co in the course of carrying out the Belfast MSF Expansion Works or otherwise performing the activities within the Belfast MSF Expansion Project Scope to the extent that Project Co is able to recover or be credited with input tax credits, refunds, rebates or exemptions for such HST.

28. FINANCIAL MODEL [ARTICLE 36]

28.1 Delivery and Use of Belfast MSF Expansion Financial Model [Section 36.2]

(a) In accordance with Appendix 2 - Completion Documents, Project Co shall deliver copies of the Belfast MSF Expansion Financial Model (2 copies on USB memory stick) to the City.

(b) Following the approval by the City of any amendment to the Belfast MSF Expansion Financial Model, Project Co shall promptly deliver copies of the revised Belfast MSF Expansion Financial Model, in the same form as the original Belfast MSF Expansion Financial Model (or such other form as may be agreed by the Parties from time to time), to the City.

(c) Project Co hereby grants to the City an irrevocable, royalty free, perpetual, non-exclusive and transferable licence, including the right to grant sub-licences, to use the Belfast MSF Expansion Financial Model or any revised Belfast MSF Expansion Financial Model for any purpose in connection with this Schedule, whether during or after the Belfast MSF Expansion Project Term.

(d) For greater certainty, Project Co acknowledges and agrees that the City shall not be liable to Project Co for, and Project Co shall not seek to recover from the City or any Belfast MSF Expansion City Party any damages, losses, costs, liabilities or expenses which may arise (whether in contract, tort or otherwise) as a result of any errors in the Belfast MSF Expansion Financial Model.

29. RECORDS, INFORMATION AND AUDIT [ARTICLE 37]

29.1 Records Provisions [Section 37.1]

(a) Project Co shall comply with Appendix 26 - Record Provisions.

(b) The provisions of Section 37.1(b) of the Project Agreement shall apply *mutatis mutandis* to the Belfast MSF Expansion.

29.2 Information and General Audit Rights [Section 37.2]

(a) The provisions of Section 37.2 of the Project Agreement shall apply *mutatis mutandis* to the Belfast MSF Expansion.

30. CHANGES IN LAW [ARTICLE 38]

30.1 Performance after Belfast MSF Expansion Change in Law [Section 38.1]

(a) Following any and all Belfast MSF Expansion Changes in Law, Project Co shall carry out the activities within the Belfast MSF Expansion Project Scope in accordance with the terms of this Schedule, including in compliance with Applicable Law.

30.2 Belfast MSF Expansion Works Change in Law [Section 38.2]

(a) On the occurrence of a Belfast MSF Expansion Works Change in Law:

(i) either Party may give notice to the other of the need for a Variation as a result of such Belfast MSF Expansion Works Change in Law;

(ii) the Parties shall meet within 10 Business Days of such notice to consult with respect to the effect of the Belfast MSF Expansion Works Change in Law and to reach an agreement on whether a Variation is required as a result of such Belfast MSF Expansion Works Change in Law, and, if the Parties have not, within 10 Business Days of this meeting, reached an agreement, either Party may refer the question of whether a Belfast MSF Expansion Works Change in Law has occurred or the effect of any Belfast MSF Expansion Works Change in Law for resolution in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement; and

(iii) the City shall, within 10 Business Days of agreement or determination that a Variation is required, issue a Variation Enquiry and the relevant provisions of Schedule 22 – Variation Procedure to the Project Agreement shall apply except that:

(A) Project Co may only object to any such Variation Enquiry on the grounds that the implementation of the Variation would not enable it to comply with the Belfast MSF Expansion Works Change in Law;

(B) Project Co shall be responsible for obtaining all Project Co Belfast MSF Expansion Permits, Licences and Approvals required in respect of the Variation;

(C) the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree;

(D) Project Co shall proceed to implement the Variation within such period as will enable it to comply with the Belfast MSF Expansion Works Change in Law as soon as reasonably practicable; and

(E) Project Co shall not be entitled to any payment or other compensation or relief from performance of its obligations under this Schedule in respect of any Belfast MSF Expansion Works Change in Law or associated Variation other than as established pursuant to Schedule 22 – Variation Procedure to the Project Agreement.

30.3 Belfast MSF Expansion Relevant Change in Law [Section 38.3]

(a) On the occurrence of a Belfast MSF Expansion Relevant Change in Law, either Party shall be entitled to seek compensation for any increase or decrease (as the case may be) in the net cost to Project Co of performing the activities within the Belfast MSF Expansion Project Scope so as to put such Party in no better and no worse position than it would have been in had the Belfast MSF Expansion Relevant Change in Law not occurred. Any such compensation shall be calculated in accordance with this Section 30.3.

(b) On the occurrence of a Belfast MSF Expansion Relevant Change in Law:

(i) either Party may give notice to the other of the need for a Variation as a result of such Belfast MSF Expansion Relevant Change in Law;

(ii) the Parties shall meet within 10 Business Days of such notice to consult with respect to the effect of the Belfast MSF Expansion Relevant Change in Law and to reach an agreement on whether a Variation is required as a result of such Belfast MSF Expansion Relevant Change in Law, and, if the Parties have not, within 10 Business Days of this meeting, reached an agreement, either Party may refer the question of whether a Belfast MSF Expansion Relevant Change in Law has occurred or the effect of any Belfast MSF Expansion Relevant Change in Law for resolution in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement; and

(iii) the City shall, within 10 Business Days of agreement or determination that a Variation is required, issue a Variation Enquiry and the relevant provisions of Schedule 22 – Variation Procedure to the Project Agreement shall apply except that:

(A) Project Co may only object to any such Variation Enquiry on the grounds that the implementation of the Variation would not enable it to comply with the Belfast MSF Expansion Relevant Change in Law;

(B) Project Co shall be responsible for obtaining all Belfast MSF Expansion Development Approvals and Project Co Belfast MSF Expansion Permits, Licences and Approvals required in respect of the Variation;

(C) the City shall not be entitled to withdraw any such Variation Enquiry unless the Parties otherwise agree;

(D) Project Co shall proceed to implement the Variation within such period as will enable it to comply with the Belfast MSF Expansion Relevant Change in Law as soon as reasonably practicable;

(E) the Parties shall, without prejudice to their respective general obligations to comply with the terms of this Schedule:

(I) use commercially reasonable efforts to mitigate the adverse effects of any Belfast MSF Expansion Relevant Change in Law and take commercially reasonable steps to minimize any increase in costs arising from such Belfast MSF Expansion Relevant Change in Law; and

(II) use commercially reasonable efforts to take advantage of any positive or beneficial effects of any Belfast MSF Expansion Relevant Change in Law and take commercially reasonable steps to maximize any reduction in costs arising from such Belfast MSF Expansion Relevant Change in Law; and

(F) any entitlement to compensation payable shall be in accordance with this Section 30.3, and any calculation of compensation shall take into consideration, *inter alia*:

(I) any failure by a Party to comply with Section 30.3(b)(iii)(E);

(II) Intentionally deleted;

(III) any increase or decrease in its costs resulting from such Belfast MSF Expansion Relevant Change in Law; and

(IV) any amount which Project Co recovers under any insurance policy (or would recover if it complied with its obligations to insure under this Schedule or the terms of any policy of insurance required under this Schedule) which amount, for greater certainty, shall not include the amount of any excess or deductibles or any amount above the maximum insured amount applicable to any such insurance policy.

(c) [Intentionally Deleted].

(d) Project Co shall not be entitled to any payment or compensation or, except as provided in Section 32 or otherwise in this Schedule, relief in respect of any Belfast MSF Expansion Relevant Change in Law, or the consequences thereof, other than in accordance with this Section 30.3, and Section 33 shall be construed accordingly.

(e) In relation to a Belfast MSF Expansion Relevant Change in Law that results in a net increase or decrease in costs incurred by Project Co in delivery of the activities within the Belfast MSF Expansion Project Scope, taking into consideration, *inter alia*, Section 30.3(b)(iii)(E)(II), if the cost impact of such Belfast MSF Expansion Relevant Change in Law in a given Contract Year (in aggregate with all other such Belfast MSF Expansion Relevant Changes in Law that have a cost impact in the same Contract Year) amounts to less than $10,000 (index linked), neither the City nor Project Co shall be entitled to any payment or compensation pursuant to this Section 30.3 or otherwise in respect of the cost impact of that Belfast MSF Expansion Relevant Change in Law in that Contract Year, or, except as provided in Section 32 or otherwise in this Schedule, any other relief in respect of such Belfast MSF Expansion Relevant Change in Law in that Contract Year.

30.4 Changes to OLRT Regulations [Section 38.4]

For greater certainty, a change to the OLRT Regulations, including the adoption of a supplemental or new OLRT Regulation, that relates to or otherwise impacts the Belfast MSF Expansion Project Scope shall be considered to be a Belfast MSF Expansion Discriminatory Change in Law if Project Co objects in writing to the change unless the City can demonstrate (with a supporting declaration from the City Representative) that:

(a) the change to the OLRT Regulations was: (i) caused by or the result of a Belfast MSF Expansion Change in Law emanating from a Governmental Authority other than the City and without prior consultation regarding the change by that Governmental Authority with the City and (ii) not a Belfast MSF Expansion Specific Change in Law; or

(b) the change to the OLRT Regulations: (i) was caused by or the result or outcome of a Belfast MSF Expansion Change in Law emanating from a department or division of the City having no direct authority or responsibility over the Belfast MSF Expansion; (ii) involved no prior consultation by that City department or division with, or direction from, a City employee or Belfast MSF Expansion City Party who has responsibility or authority in respect of the Belfast MSF Expansion; and (iii) is not a Belfast MSF Expansion Specific Change in Law.

30.5 City Rights, Powers and Authority [Section 38.5]

Nothing in this Schedule fetters or otherwise interferes with, limits or compromises the rights, powers, and authority of the City to:

(a) adopt, enact, implement, amend, repeal or replace any enactment, law or regulation, including the OLRT Regulations;

(b) exercise or refrain from exercising any discretion conferred upon the City under Applicable Laws and the Delegation Agreement; or

(c) administer, apply and enforce Applicable Laws, including the OLRT Regulations.

31. VARIATIONS [ARTICLE 39]

31.1 Variation Procedure [Section 39.1]

(a) Except as otherwise expressly provided in this Schedule, Schedule 22 – Variation Procedure to the Project Agreement shall apply in respect of Variations that relate to the Belfast MSF Expansion.

(b) For greater certainty, Project Co shall, subject to and in accordance with Schedule 22 – Variation Procedure to the Project Agreement, be entitled to a Variation if a written direction issued by or on behalf of the City to Project Co or any Belfast MSF Expansion Project Co Party results in a variation, addition, reduction, substitution, omission, modification, deletion, removal or other change to the whole or any part of the Belfast MSF Expansion Project Scope, including in relation to the whole or any part of the Belfast MSF Expansion Works.

(c) Without limiting Project Co's obligations pursuant to Schedule 22 – Variation Procedure to the Project Agreement, Project Co shall include in each Belfast MSF Expansion Subcontract, and shall cause each Belfast MSF Expansion Project Co Party to comply with, the Variation Procedure, to the extent that the Variation Procedure requires Project Co to minimize the cost and impact of Variations as to scope of the Belfast MSF Expansion Works.

31.2 Innovation and Value Engineering [Section 39.2]

(a) Intentionally deleted.

(b) If an innovation and value engineering proposal is at any time and from time to time originated and initiated solely by Project Co in relation to the Belfast MSF Expansion Works, Project Co may make an Innovation Proposal by notice to the City. The provisions of Section 39.2 of the Project Agreement shall apply to such an Innovation Proposal *mutatis mutandis*.

32. BELFAST MSF EXPANSION DELAY EVENTS [ARTICLE 40]

32.1 Definition [Section 40.1]

(a) For the purposes of this Schedule, "**Belfast MSF Expansion Delay Event**" means any of the following events or circumstances only to the extent, in each case, that it affects the Belfast MSF Expansion Works so as to cause a delay in achieving the Belfast MSF

Expansion Substantial Completion by the Belfast MSF Scheduled Substantial Completion Date:

(i) the implementation of a Variation to the extent Project Co has identified such delay in its Estimate and such delay has been documented in the Variation Confirmation;

(ii) any breach by the City of any of the City's obligations under this Schedule including any delay by the City in giving access to the Belfast MSF Expansion Lands pursuant to Section 12.1(a) of this Schedule, any obstruction of the rights afforded to Project Co under Section 12.1(a) of this Schedule or any delay by the City in carrying out its obligations set forth in Appendix 10 - Review Procedure, except to the extent that any such breach is caused, or contributed to, by Project Co or any Belfast MSF Expansion Project Co Party;

(iii) an uncovering of the Belfast MSF Expansion Works where such Belfast MSF Expansion Works are not subsequently found to be defective or not in compliance with the requirements of this Schedule (including the Belfast MSF Expansion Output Specifications and the Belfast MSF Expansion Design Data), unless such uncovering of the Belfast MSF Expansion Works was reasonable in the light of other defects or non-compliance previously discovered by the City in respect of the same or a similar component of the Belfast MSF Expansion Works;

(iv) a requirement pursuant to Section 14.2(e)(i), 14.2(f) or 14.2(g) for Project Co to perform any alteration, addition, demolition, extension or variation in the Belfast MSF Expansion Works, or to suspend or delay performance of the Belfast MSF Expansion Works, upon the discovery of Contamination, which alteration, addition, demolition, extension or variation in the Belfast MSF Expansion Works, or suspension or delay in the performance of the Belfast MSF Expansion Works, would not otherwise be required under this Schedule;

(v) a requirement pursuant to Section 14.3(c)(ii)(A) or 14.3(d) for Project Co to perform any alteration, addition, demolition, extension or variation in the Belfast MSF Expansion Works, or to suspend or delay performance of the Belfast MSF Expansion Works, upon the discovery of any fossils, artifacts and other objects having artistic, historic, archaeological or monetary value, including human remains and burial sites, which alteration, addition, demolition, extension or variation in the Belfast MSF Expansion Works, or suspension or delay in the performance of the Belfast MSF Expansion Works, would not otherwise be required under this Schedule;

(vi) a requirement pursuant to Section 14.4(a) or 14.4(c) for Project Co to perform any alteration, addition, demolition, extension or variation in the Belfast MSF Expansion Works, or to suspend or delay performance of the Belfast MSF Expansion Works, upon the discovery of Species-at-Risk for which the City is responsible, which alteration, addition, demolition, extension, or variation in the Belfast MSF Expansion Works, or suspension or delay in the performance of the

Belfast MSF Expansion Works, would not otherwise be required under this Schedule;

(vii) subject to compliance by Project Co with the provisions of Section 8.6 [9.7], damage, costs or delays from the execution of Additional Belfast MSF Expansion Works or Belfast MSF Expansion Third Party Works on the Belfast MSF Expansion by Additional Belfast MSF Expansion Contractors or Belfast MSF Expansion Third Party Contractors, as applicable, in the circumstances described in Section 8.6(e) [9.7(e)];

(viii) a requirement pursuant to Section 13.1 of Schedule 27 – Dispute Resolution Procedure to the Project Agreement for Project Co to proceed in accordance with the direction of the City during the pendency of a Dispute relating to the Belfast MSF Expansion Project Scope, which Dispute is subsequently determined in Project Co's favour;

(ix) an event of Belfast MSF Expansion Force Majeure;

(x) a Belfast MSF Expansion Relief Event;

(xi) a Belfast MSF Expansion Relevant Change in Law;

(xii) any change to the terms, conditions or requirements of the Environmental Assessments, except in each case to the extent resulting from any change by Project Co in the design of the Belfast MSF Expansion Project or from any other act or omission on the part of Project Co;

(xiii) the discovery of any Latent Defect for which the City is responsible pursuant to Section 16.5 of the Project Agreement as applied to the Belfast MSF Expansion by Section 14.5, including a requirement pursuant to Section 16.5(b) of the Project Agreement as so applied for Project Co to undertake any action in accordance with the instructions of the City to remedy a Latent Defect for which the City is responsible pursuant to Section 16.5(a) of the Project Agreement as so applied;

(xiv) [intentionally deleted];

(xv) a stop work order issued by a Governmental Authority in respect of the Belfast MSF Expansion Works, provided that such order was not issued as a result of a Belfast MSF Expansion Relief Event, an act of Belfast MSF Expansion Force Majeure or as a result of an act, omission or fault of Project Co or a Belfast MSF Expansion Project Co Party;

(xvi) [intentionally deleted];

(xvii) a failure by the City to obtain a requirement pursuant to Section 7.2(c) provided Project Co has fulfilled its obligations pursuant to Section 7.2(c);

(xviii) [intentionally deleted];

(xix) [intentionally deleted];

(xx) [intentionally deleted];

(xxi) any proposed amendment to the OLRT Regulations are or the Support Documentation is consistent with the requirements of Section 2(a) of Schedule 15-4 – Regulatory Standards to the Project Agreement and the City's refusal to approve the such amendments has resulted or will result in a delay or incremental expense or liability to Project Co in the performance of activities within the Belfast MSF Expansion Project Scope that cannot be reasonably mitigated by Project Co; or

(xxii) a Delay Event occurs under Article 40 of the Project Agreement.

32.2 Consequences of a Belfast MSF Expansion Delay Event [Section 40.2]

(a) Project Co shall provide written notice to the City Representative and the Independent Certifier within 5 Business Days of becoming aware of the occurrence of Belfast MSF Expansion Delay Event. Project Co shall, within 10 Business Days after such notification, provide further written details to the City Representative and the Independent Certifier which shall include:

(i) a statement of which Belfast MSF Expansion Delay Event the claim is based upon;

(ii) details of the circumstances from which the Belfast MSF Expansion Delay Event arises;

(iii) details of the contemporary records which Project Co shall maintain to substantiate its claim for extra time;

(iv) details of the consequences (whether direct or indirect, financial or non-financial) which such Belfast MSF Expansion Delay Event may have upon the Belfast MSF Expansion Scheduled Substantial Completion Date; and

(v) details of any measures which Project Co proposes to adopt to mitigate the consequences of such Belfast MSF Expansion Delay Event.

(b) As soon as possible but in any event within 3 Business Days of Project Co receiving, or becoming aware of, any supplemental information which may further substantiate or support Project Co's claim, Project Co shall submit further particulars based on such information to the City Representative and the Independent Certifier.

(c) The City Representative shall, after receipt of written details under Section 32.2(a) [40.2(a)], or of further particulars under Section 32.2(b) [40.2(b)], be entitled by written notice to require Project Co to provide such further supporting particulars as the City

Representative may reasonably consider necessary. Project Co shall afford the City Representative and the Independent Certifier reasonable facilities for investigating the validity of Project Co's claim, including, without limitation, on-site inspection.

(d) Subject to the provisions of this Section 32 [40], the City Representative shall allow Project Co an extension of time equal to the delay caused by the Belfast MSF Expansion Delay Event and shall fix a revised Belfast MSF Expansion Scheduled Substantial Completion Date as soon as reasonably practicable and in any event within 10 Business Days of the later of:

(i) the date of receipt by the City Representative of Project Co's notice given in accordance with Section 32.2(a) [40.2(a)] and the date of receipt of any further particulars (if such are required under Section 32.2(c) [40.2(c)]), whichever is later; and

(ii) the date of receipt by the City Representative of any supplemental information supplied by Project Co in accordance with Section 32.2(b) [40.2(b)] and the date of receipt of any further particulars (if such are required under Section 32.2(c) [40.2(c)]), whichever is later.

(e) intentionally deleted.

(f) intentionally deleted.

(g) intentionally deleted.

(h) Intentionally deleted.

(i) If:

(i) the City Representative declines to fix a revised Belfast MSF Expansion Scheduled Substantial Completion Date;

(ii) Project Co considers that a different Belfast MSF Expansion Scheduled Substantial Completion Date should be fixed; or

(iii) there is a dispute as to whether a Belfast MSF Expansion Delay Event has occurred,

then Project Co shall be entitled to refer the matter for determination by the Independent Certifier. The decision of the Independent Certifier may be disputed by either Party and referred for resolution in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement.

32.3 Mitigation [Section 40.3]

(a) If Project Co is (or claims to be) affected by a Belfast MSF Expansion Delay Event, Project Co shall, and shall require all Belfast MSF Expansion Project Co Parties to, take and continue to take commercially reasonable steps:

(i) to eliminate or mitigate the consequences of such event upon the performance of its obligations under this Schedule;

(ii) to continue to perform its obligations under this Schedule to the extent possible notwithstanding the Belfast MSF Expansion Delay Event; and

(iii) to resume performance of its obligations under this Schedule affected by the Belfast MSF Expansion Delay Event as soon as practicable.

(b) To the extent that Project Co does not comply with its obligations under this Section 32.3 [40.3], such failure shall be taken into account in determining Project Co's entitlement to an extension of time pursuant to this Section 32 [40].

33. BELFAST MSF EXPANSION COMPENSATION EVENTS [ARTICLE 41]

33.1 Definition

(a) For the purposes of this Schedule, "**Belfast MSF Expansion Compensation Event**" means any event referred to in Sections 32.1(a)(ii), 32.1(a)(iii), 32.1(a)(iv), 32.1(a)(v), 32.1(a)(vi), 32.1(a)(viii), 32.1(a)(xii), 32.1(a)(xiii), 32.1(a)(xv), 32.1(a)(xvii), 32.1(a)(xxi) and 32.1(a)(xxii) as a direct result of which Project Co has incurred loss or expense, whether or not any of these events has also caused a delay.

33.2 Consequences of a Belfast MSF Expansion Compensation Event

(a) If a Belfast MSF Expansion Compensation Event occurs, Project Co's sole right to compensation shall be as set out in this Section 33 [41]. For greater certainty, except as aforesaid, no other Belfast MSF Expansion Delay Event shall entitle Project Co to receive any compensation, except as otherwise provided in:

(i) Schedule 22 – Variation Procedure to the Project Agreement, in the case of a Belfast MSF Expansion Delay Event referred to in Section 32.1(a)(i) [40.1(a)(i)];

(ii) Section 35 [44], in the case of a Belfast MSF Expansion Delay Event referred to in Section 32.1(a)(ix) [40.1(a)(ix)];

(iii) Section 34 [43], in the case of a Belfast MSF Expansion Delay Event referred to in Section 32.1(a)(x) [40.1(a)(x)]; and

(iv) Section 30 [38], in the case of a Belfast MSF Expansion Delay Event referred to in Section 32.1(a)(xi) [40.1(a)(xi)].

(b) Subject to Sections 33.3 and 33.4 [41.3 and 41.4], if it is agreed, or determined in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement, that there has been a Belfast MSF Expansion Compensation Event, Project Co shall be entitled to such compensation as would place Project Co in no better and no worse position than it would have been in had the relevant Belfast MSF Expansion Compensation Event not occurred. For greater certainty, in respect of a Belfast MSF Expansion Compensation Event that is also a Belfast MSF Expansion Delay Event, such compensation will include amounts which, but for the Belfast MSF Expansion Delay Event, would have been paid by the City to Project Co. Project Co shall promptly provide the City Representative with any information the City Representative may require in order to determine the amount of such compensation.

(c) If the City is required to compensate Project Co pursuant to this Section 33.2 [41.2], then the City shall either pay such compensation as a lump sum payment or by payments at times and in a manner to be agreed with Project Co, acting reasonably.

33.3 Mitigation

(a) If Project Co is (or claims to be) affected by a Belfast MSF Expansion Compensation Event, Project Co shall, and shall require all Belfast MSF Expansion Project Co Parties to, take and continue to take commercially reasonable steps to minimize the amount of compensation due in accordance with this Section 33 [41] in relation to any Belfast MSF Expansion Compensation Event.

(b) To the extent that Project Co does not comply with its obligations under this Section 33.3 [41.3], such failure shall be taken into account in determining Project Co's entitlement to relief pursuant to this Section 33 [41].

33.4 Insured Exposure

(a) The compensation payable to Project Co pursuant to this Section 33 [41] shall be reduced by any amount which Project Co or a Belfast MSF Expansion Project Co Party recovers, or is entitled to recover, under any insurance policy, or would have recovered if it had complied with the requirements of this Schedule in respect of insurance or the terms of any policy of insurance required under this Schedule, which amount, for greater certainty, shall not include any excess or deductibles or any amount over the maximum amount insured under any such insurance policy.

34. BELFAST MSF EXPANSION RELIEF EVENTS

34.1 Definition

(a) For the purposes of this Schedule, "**Belfast MSF Expansion Relief Event**" means any of the following events or circumstances to the extent, in each case, that it causes any failure by a Party to perform any of its obligations under this Schedule:

(i) fire, explosion, lightning, storm, tempest, hurricane, tornado, flood, ionizing radiation (to the extent it does not constitute Belfast MSF Expansion Force Majeure), earthquake, riot or civil commotion;

(ii) failure by any Utility Company, Railway Company, local authority or other like body to perform works or provide services, provided, however, that a failure by any Utility Company to perform works or provide services in connection with the construction, installation or relocation of Utility Infrastructure in connection with the Belfast MSF Expansion Works shall not, in any event, be cause for a Belfast MSF Expansion Relief Event, unless Project Co:

(A) has performed its obligations under any applicable Utility Agreement and the relevant Utility Company has failed to meet its obligations thereunder; and

(B) has made all, and is continuing to make any, commercially reasonable efforts to diligently enforce its legal rights under any applicable Utility Agreement and otherwise cause the Utility Company to perform those works or services;

(iii) accidental loss or damage to the Belfast MSF Expansion Works or any roads servicing the Belfast MSF Expansion Site;

(iv) without prejudice to any obligation of Project Co to provide stand-by power facilities in accordance with this Schedule, failure or shortage of power, fuel or transport;

(v) blockade or embargo falling short of Belfast MSF Expansion Force Majeure;

(vi) any official or unofficial strike, lockout, work to rule or other labour-related action generally affecting the Belfast MSF Expansion, the construction industry (or a significant sector of the industry), the facilities maintenance industry or transit systems in the Province of Ontario; or

(vii) any civil disobedience or protest action, including any action taken by any person or persons protesting or demonstrating against the carrying out of any part of the Belfast MSF Expansion Project Scope or the construction and/or operation of transit systems or public highways in general, provided, however, that a civil disobedience or protest action shall not, in any event, be cause for a Belfast MSF Expansion Relief Event unless Project Co has fully complied with Section 8.5 [9.6];

provided, in each case, that such event does not arise (directly or indirectly) as a result of any act or omission of the Party claiming relief and (i) in the case of Project Co claiming relief, as a result of any act or omission of any Belfast MSF Expansion Project Co Party or (ii) in the case of the City claiming relief, as a result of any act or omission of any Belfast MSF Expansion City Party.

34.2 Consequences of a Belfast MSF Expansion Relief Event

(a) Subject to Section 34.3 [43.3] no right of termination, other than either Party's right to terminate this Schedule pursuant to Section 38.1 [47.1], shall arise under this Schedule or the Project Agreement by reason of any failure by a Party to perform any of its obligations under this Schedule or the Project Agreement, but only to the extent that such failure to perform is caused by the occurrence of a Belfast MSF Expansion Relief Event (it being acknowledged and agreed by the Parties that all other rights and obligations of the Parties under this Schedule or the Project Agreement remain unaffected by the occurrence of a Belfast MSF Expansion Relief Event).

(b) In respect of a Belfast MSF Expansion Relief Event that is also a Belfast MSF Expansion Delay Event pursuant to Section 32.1(a)(ix) [40.1(a)(ix)]:

(i) Project Co shall only be relieved of its obligations under this Schedule to the extent, if any, provided for in Section 32 [40]; and

(ii) in respect of a Belfast MSF Expansion Relief Event occurring prior to the Initial Capital Investment Date or Belfast MSF Expansion Substantial Completion which Initial Capital Investment or Belfast MSF Expansion Substantial Completion is affected by that Belfast MSF Expansion Delay Event and referred to in Section 34.1(a)(ii) [43.1(a)(ii)], 34.1(a)(iv) [43.1(a)(iv)], 34.1(a)(v) [43.1(a)(v)], 34.1(a)(vi) [43.1(a)(vi)] or 34.1(a)(vii) [43.1(a)(vii)] on the earlier of: (A) the Initial Capital Investment Date, (B) the Belfast MSF Expansion Substantial Completion Date, and (C) the date of payment of the City Belfast MSF Expansion Default Termination Sum or Belfast MSF Expansion Non-Default Termination Sum (and as a part thereof) in accordance with Appendix 23 – Compensation on Termination, the City shall pay to Project Co an amount equal to the Belfast MSF Expansion Senior Debt Service Amount accrued and paid or which became payable in accordance with the Belfast MSF Expansion Lending Agreements during the period of delay by Project Co or any Belfast MSF Expansion Project Co Party to the Belfast MSF Expansion Senior Lenders up to and including such date, together with interest thereon at the rate payable on the Belfast MSF Expansion Senior Debt Amount, which, but for the Belfast MSF Expansion Delay Event, would not have been paid by Project Co to the Belfast MSF Expansion Senior Lenders.

(c) Subject to Section 40 [49], Project Co's sole right to payment or otherwise in relation to the occurrence of a Belfast MSF Expansion Relief Event shall be as provided in this Section 34 [43].

34.3 Mitigation and Process

(a) Where a Party is (or claims to be) affected by a Belfast MSF Expansion Relief Event, such Party shall take commercially reasonable steps to mitigate the consequences of the Belfast MSF Expansion Relief Event upon the performance of its obligations under this Schedule, shall resume performance of its obligations affected by the Belfast MSF

Expansion Relief Event as soon as practicable and shall use commercially reasonable efforts to remedy its failure to perform.

(b) To the extent that the Party claiming relief does not comply with its obligations under this Section 34.3 [43.3], such failure shall be taken into account in determining such Party's entitlement to relief pursuant to this Section 34 [43].

(c) The Party claiming relief shall give written notice to the other Party within 5 Business Days of such Party becoming aware of the relevant Belfast MSF Expansion Relief Event. Such initial notice shall give sufficient details to identify the particular event claimed to be a Belfast MSF Expansion Relief Event.

(d) A subsequent written notice shall be given by the Party claiming relief to the other Party within a further 5 Business Days of the initial notice, which notice shall contain such relevant information relating to the failure to perform (or delay in performing) as is available, including, without limitation, the effect of the Belfast MSF Expansion Relief Event on the ability of the Party to perform, the action being taken in accordance with Section 34.3(a) [43.3(a)], the date of the occurrence of the Belfast MSF Expansion Relief Event, and an estimate of the period of time required to overcome the Belfast MSF Expansion Relief Event and/or its effects.

(e) The Party claiming relief shall notify the other as soon as the consequences of the Belfast MSF Expansion Relief Event have ceased and of when performance of its affected obligations can be resumed.

(f) If following the issue of any notice referred to in Section 34.3(d) [43.3(d)], the Party claiming relief receives or becomes aware of any further information relating to the Belfast MSF Expansion Relief Event and/or any failure to perform, such Party shall submit such further information to the other Party as soon as reasonably possible.

34.4 Insured Exposure

(a) The compensation payable to Project Co pursuant to this Section 34 [43] shall be reduced by any amount which Project Co or a Belfast MSF Expansion Project Co Party recovers, or is entitled to recover, under any insurance policy, or would have recovered if it had complied with the requirements of this Schedule in respect of insurance or the terms of any policy of insurance required under this Schedule, which amount, for greater certainty, shall not include any excess or deductibles or any amount over the maximum amount insured under any such insurance policy.

35. BELFAST MSF EXPANSION FORCE MAJEURE

35.1 Definition

(a) For the purposes of this Schedule, "**Belfast MSF Expansion Force Majeure**" means any of the following events or circumstances which directly causes either Party to be unable to perform all or a material part of its obligations under this Schedule:

(i) war, civil war, armed conflict, terrorism, acts of foreign enemies or hostilities;

(ii) nuclear or radioactive contamination of the Belfast MSF Expansion Works and/or the Belfast MSF Expansion Site, unless Project Co or any Belfast MSF Expansion Project Co Party is the source or cause of the contamination;

(iii) chemical or biological contamination of the Belfast MSF Expansion Works and/or the Belfast MSF Expansion Site, from any event referred to in Section 35.1(a)(i) [44.1(a)(i)];

(iv) pressure waves caused by devices traveling at supersonic speeds; or

(v) the discovery of any Species-at-Risk, fossils, artifacts and other objects having artistic, historic, archaeological or monetary value, including human remains and burial sites, which, as a result of Applicable Law, requires the Belfast MSF Expansion Works to be abandoned.

35.2 Consequences of Belfast MSF Expansion Force Majeure

(a) Subject to Section 35.3 [44.3], the Party claiming relief shall be relieved from liability under this Schedule to the extent that, by reason of the Belfast MSF Expansion Force Majeure, it is not able to perform its obligations under this Schedule or the Project Agreement.

(b) In respect of an event of Belfast MSF Expansion Force Majeure that is also a Belfast MSF Expansion Delay Event pursuant to Section 32.1(a)(ix) [40.1(a)(ix)]:

(i) Project Co shall only be relieved of its obligations under this Schedule or the Project Agreement to the extent, if any, provided for in Section 32 [40]; and

(ii) where such Belfast MSF Expansion Delay Event causes a delay in achieving the Initial Capital Investment or Belfast MSF Expansion Substantial Completion, on the earlier of (A) the Scheduled Initial Capital Investment Date (B) the Belfast MSF Expansion Scheduled Substantial Completion Date, and (C) the date of payment of the City Belfast MSF Expansion Default Termination Sum or Belfast MSF Expansion Non-Default Termination Sum (and as a part thereof) in accordance with Appendix 23 – Compensation on Termination, the City shall pay to Project Co an amount equal to the Belfast MSF Expansion Senior Debt Service Amount accrued and paid or which became payable in accordance with the Belfast MSF Expansion Lending Agreements during the period of delay by Project Co or any Belfast MSF Expansion Project Co Party to the Belfast MSF Expansion Senior Lenders up to and including such date, together with interest thereon at the rate or rates payable on the principal amount of debt funded under the Belfast MSF Expansion Lending Agreements, which, but for the Belfast MSF Expansion Delay Event, would not have been paid by Project Co to the Belfast MSF Expansion Senior Lenders.

(c) Subject to Section 40 [49], Project Co's sole right to payment or otherwise in relation to the occurrence of an event of Belfast MSF Expansion Force Majeure shall be as provided in this Section 35 [44].

35.3 Mitigation and Process

(a) Where a Party is (or claims to be) affected by an event of Belfast MSF Expansion Force Majeure, such Party shall take commercially reasonable steps to mitigate the consequences of such event of Belfast MSF Expansion Force Majeure upon the performance of its obligations under this Schedule, shall resume performance of its obligations affected by the event of Belfast MSF Expansion Force Majeure as soon as practicable and shall use commercially reasonable efforts to remedy its failure to perform.

(b) To the extent that the Party claiming relief does not comply with its obligations under this Section 35.3 [44.3], such failure shall be taken into account in determining such Party's entitlement to relief pursuant to this Section 35 [44].

(c) The Party claiming relief shall give written notice to the other Party within 5 Business Days of such Party becoming aware of the relevant event of Belfast MSF Expansion Force Majeure. Such initial notice shall give sufficient details to identify the particular event claimed to be an event of Belfast MSF Expansion Force Majeure.

(d) A subsequent written notice shall be given by the Party claiming relief to the other Party within a further 5 Business Days of the initial notice, which notice shall contain such relevant information relating to the failure to perform (or delay in performing) as is available, including, without limitation, the effect of the event of Belfast MSF Expansion Force Majeure on the ability of the Party to perform, the action being taken in accordance with Section 35.3(a) [44.3(a)], the date of the occurrence of the event of Belfast MSF Expansion Force Majeure, and an estimate of the period of time required to overcome the event of Belfast MSF Expansion Force Majeure and its effects.

(e) The Party claiming relief shall notify the other as soon as the consequences of the event of Belfast MSF Expansion Force Majeure have ceased and of when performance of its affected obligations can be resumed.

(f) If, following the issue of any notice referred to in Section 35.3(d) [44.3(d)], the Party claiming relief receives or becomes aware of any further information relating to the event of Belfast MSF Expansion Force Majeure and/or any failure to perform, such Party shall submit such further information to the other Party as soon as reasonably possible.

35.4 Insured Exposure

(a) The compensation payable to Project Co pursuant to this Section 35 [44] shall be reduced by any amount which Project Co or a Belfast MSF Expansion Project Co Party recovers, or is entitled to recover, under any insurance policy, or would have recovered if it had complied with the requirements of this Schedule in respect of insurance or the terms of

any policy of insurance required under this Schedule, which amount, for greater certainty, shall not include any excess or deductibles or any amount over the maximum amount insured under any such insurance policy.

35.5 Modifications

(a) The Parties shall use commercially reasonable efforts to agree to any modifications to this Schedule which may be equitable having regard to the nature of an event or events of Belfast MSF Expansion Force Majeure. Schedule 27 – Dispute Resolution Procedure to the Project Agreement shall not apply to a failure of the City and Project Co to reach agreement pursuant to this Section 35.5 [44.5].

36. PROJECT CO DEFAULT [ARTICLE 45]

36.1 Project Co Belfast MSF Expansion Events of Default [Section 45.1]

(a) For the purposes of this Schedule, "**Project Co Belfast MSF Expansion Event of Default**" means any one or more of the following events or circumstances:

(i) the occurrence of any of the following events other than as a consequence of a breach by the City of its payment obligations under the Project Agreement, including this Schedule:

(A) Project Co admits in writing its inability to pay its debts generally as they become due, or makes a general assignment for the benefit of creditors, or a receiver, manager, administrator, administrative receiver, receiver and manager, trustee, custodian or other similar official or any other like person is appointed by or on behalf of or at the instance of a creditor of Project Co with respect to Project Co or any of the property, assets or undertaking of Project Co, or any creditor of Project Co takes control, or takes steps to take control, of Project Co or any of Project Co's assets, or any proceedings are instituted against Project Co that result in Project Co being declared or ordered bankrupt or in administration, liquidation, winding-up, reorganization, compromise, arrangement, adjustment, protection, relief or composition of it or with respect to it or its debts or obligations, or any such proceedings are instituted by Project Co seeking any such result, or any such proceedings are instituted by a person other than Project Co, the City, a Belfast MSF Expansion City Party or a person related to any of them seeking such result and such proceedings have or will have a material adverse effect on the Governmental Activities (where such proceedings have not been withdrawn, stayed, discharged, or are otherwise of no further effect, within 90 days of being instituted), under any Applicable Law (including the *Bankruptcy and Insolvency Act* (Canada) and the *Companies' Creditors Arrangement Act* (Canada)) relating to bankruptcy, insolvency or reorganization of or relief with respect to debtors or debtors' obligations or assets or other similar matters, or seeking the appointment of a receiver, manager, administrator,

administrative receiver, receiver and manager, trustee, custodian or other similar official or like person for it or with respect to any of its assets, or any resolutions are passed or other corporate actions of Project Co are taken to authorize any of the actions set forth in this Section 36.1(a)(i)(A) [45.1(a)(i)(A)];

(B) Project Co ceases performing a substantial portion of its business, or a substantial portion of such business is suspended or is not being performed, whether voluntarily or involuntarily, that has or will have a material adverse effect on Project Co's ability to perform its obligations under this Schedule;

(C) if any execution, sequestration, extent, garnishment or other process of or order by any court becomes enforceable against Project Co or if a distress or analogous process is levied against any property of Project Co that materially adversely affects Project Co's ability to perform its obligations hereunder; or

(D) Project Co shall suffer any event, or any event or set of circumstances occurs or comes about, analogous to the foregoing events or sets of circumstances set out in this Section 36.1(a)(i) [45.1(a)(i)] in any jurisdiction in which it is incorporated or resident and such event or set of circumstances would, if set out in Section 36.1(a)(i)(A) [45.1(a)(i)(A)], (B), or (C), constitute a Project Co Belfast MSF Expansion Event of Default;

(ii) Project Co failing to achieve Belfast MSF Expansion Substantial Completion within 365 days after the Belfast MSF Expansion Scheduled Substantial Completion Date (the "**Belfast MSF Expansion Longstop Date**");

(iii) Project Co:

(A) failing to deliver a rectification plan under Section 20.3(a)(iii)(B) [22.3(a)(iii)(B)];

(B) intentionally deleted;

(C) intentionally deleted;

(iv) Project Co making any representation or warranty in this Schedule that is false or misleading when made, and that has or will have at any time a material adverse effect on the performance of the activities within the Belfast MSF Expansion Project Scope, the Governmental Activities or that may compromise (1) the City's or any Belfast MSF Expansion City Party's reputation or integrity or the nature of the City or the Belfast MSF Expansion Project, or (2) the ability of the City to conduct its affairs, so as to negatively affect public perception of the City or the Belfast MSF Expansion Project, and, in the case of a false or misleading

representation or warranty that is capable of being remedied, such breach is not remedied within 10 Business Days of receipt of notice of the same from the City;

(v) Project Co committing a breach of its obligations under this Schedule (other than a breach that is referred to in Sections 36.1(a)(i) to 36.1(a)(iv) [45(a)(i) to (iv)] inclusive or 36.1(a)(vi) to 36.1(a)(xx) [45.1(a)(vi) to (xxi)] inclusive) which has or will have a material adverse effect on the Governmental Activities other than where such breach is a consequence of a breach by the City of its obligations under this Schedule, and upon becoming aware of such breach Project Co failing to remedy such breach in accordance with all of the following:

(A) Project Co shall:

(I) immediately commence and thereafter diligently continue to remedy the breach and to mitigate any adverse effects on the City and the Governmental Activities;

(II) put forward, within 5 Business Days of receipt of notice of such breach from the City, a reasonable plan and schedule for diligently remedying the breach and mitigating its effect, which plan and schedule shall specify in reasonable detail the manner in which, and the latest date by which, such breach is proposed to be remedied, which latest date shall in any event be within 60 days of notice of such breach, or if such breach is not capable of being rectified in such period then such longer period as is reasonable in the circumstances; and

(III) thereafter perform its obligations to achieve all elements of such plan and schedule in accordance with its terms within the time for the performance of its obligations thereunder; and

(B) upon Project Co failing to comply with any of the provisions of Section 36.1(a)(v)(A) [45.1(a)(v)(A)]:

(I) Project Co shall continue to diligently remedy the breach and to mitigate any adverse effects on the City and the Governmental Activities;

(II) Project Co shall, within 3 Business Days after notice from the City, submit a plan and schedule, which the City shall have no obligation to accept, for remedying the breach and mitigating its effect within such period, if any, acceptable to the City, in its Discretion, and thereafter perform its obligations to achieve all elements of such plan and schedule in accordance with its terms within the time for the performance of its obligations thereunder; and

(III) for greater certainty, Project Co failing to comply with any of the provisions of this Section 36.1(a)(v)(B) [45.1(a)(v)(B)] , or the City, in its Discretion, not accepting the plan and schedule submitted by Project Co pursuant to that Section, shall constitute a Project Co Belfast MSF Expansion Event of Default;

(vi) Project Co wholly abandoning the Belfast MSF Expansion Works for a period which exceeds 3 Business Days from receipt by Project Co of a written request to return to the Belfast MSF Expansion Site, other than as a consequence of a breach by the City of its obligations under this Schedule;

(vii) Intentionally deleted;

(viii) Intentionally deleted;

(ix) Intentionally deleted;

(x) Intentionally deleted;

(xi) Intentionally deleted;

(xii) Intentionally deleted;

(xiii) Project Co failing to remove an Encumbrance that relates to the Belfast MSF Expansion Lands that arose due to an act or omission of Project Co or any Belfast MSF Expansion Project Co Party (other than a Title Encumbrance and any Encumbrance derived through the City) within 45 days of the earlier of:

(A) the registration of such Encumbrance against title to the Belfast MSF Expansion Lands or any part thereof; and

(B) the date on which Project Co or any Belfast MSF Expansion Project Co Party knew, or ought to have known, about the existence of such Encumbrance;

(xiv) Project Co failing to pay any sum or sums due to the City under this Schedule, which sum or sums are not being disputed by Project Co in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement and which sum or sums, either singly or in aggregate, exceed(s) $250,000 (index linked), and such failure continues for 30 days from receipt by Project Co of a notice of non-payment from the City;

(xv) Intentionally deleted;

(xvi) Project Co failing to comply with Appendix 28 – Refinancing;

(xvii) Project Co failing to obtain any bond, security or insurance required to be obtained by or on behalf of Project Co pursuant to this Schedule or any such

bond, security or insurance being vitiated or otherwise ceasing to be in full force and effect or in material compliance with the requirements set out in this Schedule, other than as a consequence of a breach by the City of its obligations under this Schedule, and:

(A) in respect of insurance, such breach by Project Co is not remedied within 10 Business Days of the occurrence of the breach; and

(B) in respect of a bond or security, such breach by Project Co is not remedied within 5 Business Days of Project Co becoming aware of such breach;

(xviii) Project Co failing to comply with any determination, order or award made against Project Co in relation to the Belfast MSF Expansion Project Scope in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement;

(xix) Intentionally deleted;

(xx) Project Co failing to comply with Section 24.5 [28.5];

(xxi) Intentionally deleted.

(b) Intentionally deleted.

36.2 Notification of Occurrence [Section 45.2]

(a) Project Co shall, promptly upon Project Co becoming aware of the occurrence, notify the City of the occurrence, and details, of any Project Co Belfast MSF Expansion Event of Default and of any event or circumstance which is likely, with the passage of time, giving of notice, determination of any condition, or otherwise, to constitute or give rise to a Project Co Belfast MSF Expansion Event of Default.

36.3 Right to Termination [Section 45.3]

(a) On the occurrence of a Project Co Belfast MSF Expansion Event of Default, or at any time after the City becomes aware of a Project Co Belfast MSF Expansion Event of Default (and, if the occurrence of a Project Co Belfast MSF Expansion Event of Default is disputed by Project Co in good faith, then following confirmation in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement that a Project Co Belfast MSF Expansion Event of Default has occurred), the City may, subject to Section 36.4, terminate this Schedule in its entirety by written notice having immediate effect, such notice to be given to Project Co, and to any person specified in the Belfast MSF Expansion Lenders' Direct Agreement to receive such notice.

36.4 Remedy Provisions [Section 45.4]

(a) In the case of a Project Co Belfast MSF Expansion Event of Default referred to in Sections 36.1(a)(i)(B), 36.1(a)(i)(C) or 36.1(a)(i)(D) [45.1(a)(i)(B), (C) or (D)] (where the Project Co Belfast MSF Expansion Event of Default referred to in

Section 36.1(a)(i)(D) [45.1(a)(i)(D)] is analogous to a Project Co Belfast MSF Expansion Event of Default referred to in 36.1(a)(i)(B) or 36.1(a)(i)(C) [45.1(a)(i)(B) or (C)]), 36.1(a)(iii) [45.1(a)(iii)], 36.1(a)(iv) [45.1(a)(iv)], 36.1(a)(vi) [45.1(a)(vi)], 36.1(a)(xiv) [45.1(a)(xiv)], 36.1(a)(xvi) [45.1(a)(xvi)], 36.1(a)(xvii) [45.1(a)(xvii)] (where the Project Co Belfast MSF Expansion Event of Default referred to in Section 36.1(a)(xvii) [45.1(a)(xvii)] is not in respect of insurance), 36.1(a)(xviii) [45.1(a)(xviii)] or 36.1(a)(xx) [45.1(a)(xx)] the City shall, prior to being entitled to terminate this Schedule, give notice of default to Project Co, and to any person specified in the Belfast MSF Expansion Lenders' Direct Agreement to receive such notice, and Project Co shall:

(i) within 5 Business Days of such notice of default, put forward a reasonable plan and schedule for diligently remedying the relevant Project Co Belfast MSF Expansion Event of Default, which schedule shall specify in reasonable detail the manner in, and the latest date by which, such Project Co Belfast MSF Expansion Event of Default is proposed to be remedied, which latest date shall, in any event, be within 30 days of the notice of default, or if such breach is not capable of being remedied in such period then such longer period as is acceptable to the City, acting reasonably; and

(ii) thereafter, perform its obligations to achieve all elements of such plan and schedule in accordance with its terms within the time for the performance of its obligations thereunder.

(b) Where Project Co puts forward a plan and schedule in accordance with Section 36.4(a)(i) [45.4(a)(i)] that has a date for the Project Co Belfast MSF Expansion Event of Default to be remedied that is beyond 30 days from the notice of default, the City shall have 5 Business Days from receipt of the same within which to notify Project Co that the City does not accept such longer period in the plan and schedule and that the 30 day limit will apply, failing which the City shall be deemed to have accepted the longer period in the plan and schedule.

(c) If a Project Co Belfast MSF Expansion Event of Default, of which a notice of default was given under Section 36.4(a) [45.4(a)], occurs and:

(i) Project Co fails to immediately commence and thereafter diligently continue to remedy the Project Co Belfast MSF Expansion Event of Default and to mitigate any adverse effects on the City and the Governmental Activities; or

(ii) Project Co fails to put forward a plan and schedule pursuant to Section 36.4(a)(i) [45.4(a)(i)]; or

(iii) such Project Co Belfast MSF Expansion Event of Default is not remedied within 30 days of such notice of default or such longer period as is established pursuant to the plan and schedule established pursuant to Sections 36.4(a) and (b) [45.4(a) and (b)]; or

(iv) where Project Co puts forward a plan and schedule pursuant to Section 36.4(a)(i) [45.4(a)(i)] and Project Co fails to perform its obligations thereunder necessary to achieve all elements of such plan and schedule in accordance with its terms within the time for the performance of its obligations,

then the City may terminate this Schedule in its entirety by written notice with immediate effect, such notice to be given to Project Co, and to any person specified in the Belfast MSF Expansion Lenders' Direct Agreement to receive such notice.

(d) Notwithstanding that the City may give the notice referred to in Section 36.4(a) [45.4(a)], and without prejudice to the other rights of the City in this Section 36.4 [45.4], at any time during which a Project Co Belfast MSF Expansion Event of Default is continuing, the City may, at Project Co's risk and expense, take such steps as the City considers appropriate, either itself or by engaging others (including a third party) to take such steps, to perform or obtain the performance of Project Co's obligations under this Schedule or to remedy such Project Co Belfast MSF Expansion Event of Default.

(e) Upon the occurrence of a Project Co Belfast MSF Expansion Event of Default that Project Co has remedied pursuant to this Section 36.4 [45.4], such occurrence of a Project Co Belfast MSF Expansion Event of Default shall thereafter cease to be a Project Co Belfast MSF Expansion Event of Default and the City shall not be entitled to terminate this Schedule for that occurrence of a Project Co Belfast MSF Expansion Event of Default.

(f) Intentionally deleted.

36.5 Intentionally deleted [Section 45.5]

36.6 City's Costs [Section 45.6]

(a) Project Co shall reimburse the City for all reasonable costs (including all applicable Taxes and all legal or professional services, legal costs being on a full indemnity basis) properly incurred by the City in exercising its rights under this Section 36 [45], including any relevant increased administrative expenses. The City shall take commercially reasonable steps to mitigate such costs.

36.7 No other Rights to Terminate [Section 45.7]

(a) The City shall have no right or entitlement to terminate this Schedule, or to accept any repudiation of this Schedule, and shall not purport to exercise any such right or entitlement except as set forth in Sections 36 and 38 [45 and 47].

36.8 Project Co Obligations

(a) Subject to Sections 39.3(a)(xii) and 39.3(a)(xiii), the exercise by the City of any of its rights or remedies pursuant to this Section 36, shall not, in any event, relieve Project Co from any of its obligations with respect to the MSF under the Project Agreement including any obligation to provide Maintenance Services.

37. CITY DEFAULT [ARTICLE 46]

37.1 City Belfast MSF Expansion Events of Default [Section 46.1]

(a) For the purposes of this Schedule, "**City Belfast MSF Expansion Event of Default**" means any one or more of the following events or circumstances:

(i) the City failing to pay any sum or sums due to Project Co under this Schedule, which sum or sums are not being disputed by the City in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement and which sum or sums, either singly or in aggregate, exceed(s) $250,000 (index linked), and:

(A) in respect of a Construction Period Payment or the Belfast MSF Expansion Substantial Completion Payment, such failure continues for 10 Business Days;

(B) intentionally deleted;

(C) intentionally deleted; or

(D) in respect of any other payment due and payable by the City to Project Co under this Schedule, such failure continues for 90 days,

in any such case, from receipt by the City of a notice of non-payment from or on behalf of Project Co;

(ii) the City committing a material breach of its obligations under Section 8 [9] or of its obligations under Section 14 of the Project Agreement as applied to the Belfast MSF Expansion by Section 12 (other than as a consequence of a breach by Project Co of its obligations under this Schedule), which breach materially adversely affects the ability of Project Co to perform its obligations under this Schedule for a continuous period of not less than 60 days; or

(iii) an act of any Governmental Authority which renders it impossible for Project Co to perform all or substantially all of its obligations under this Schedule (other than as a consequence of a breach by Project Co of its obligations under this Schedule) for a continuous period of not less than 60 days (for greater certainty, the non-issuance of, or the imposition of any conditions or limitations in, any of the Project Co Belfast MSF Expansion Permits, Licences and Approvals shall not constitute an "**act of any Governmental Authority**").

37.2 Project Co's Options [Section 46.2]

(a) On the occurrence of a City Belfast MSF Expansion Event of Default and while the same is continuing, Project Co may give notice to the City of the occurrence of such City Belfast MSF Expansion Event of Default, which notice will specify the details thereof,

and, at Project Co's option and without prejudice to its other rights and remedies under this Schedule, may:

(i) suspend performance of the Belfast MSF Expansion Design and Construction Works until such time as the City has remedied such City Belfast MSF Expansion Event of Default; or

(ii) if such City Belfast MSF Expansion Event of Default has not been remedied within 30 days of receipt by the City of notice of the occurrence of such City Belfast MSF Expansion Event of Default, terminate this Schedule in its entirety by notice in writing having immediate effect.

37.3 Project Co's Costs [Section 46.3]

(a) The City shall reimburse Project Co for all reasonable costs (including all applicable Taxes and all legal or professional services, legal costs being on a full indemnity basis) properly incurred by Project Co in exercising its rights under this Section 37 [46], including any relevant increased administrative expenses. Project Co shall take commercially reasonable steps to mitigate such costs.

37.4 No Other Rights to Terminate [Section 46.4]

(a) Project Co shall have no right or entitlement to terminate this Schedule, nor to accept any repudiation of this Schedule, and shall not exercise, nor purport to exercise, any such right or entitlement except as expressly set forth in this Schedule.

38. RELIEF EVENT AND NON-DEFAULT TERMINATION [ARTICLE 47]

38.1 Termination for Belfast MSF Expansion Relief Event [Section 47.1]

(a) If a Belfast MSF Expansion Relief Event occurs and the effects of the Belfast MSF Expansion Relief Event continue for 180 days from the date on which the Party affected gives notice to the other Party pursuant to Section 34.3(c) [43.3(c)], either Party may, at any time thereafter, terminate this Schedule by written notice to the other Party having immediate effect, provided that the effects of the Belfast MSF Expansion Relief Event continue during such period to prevent either Party from performing a material part of its obligations under this Schedule.

38.2 Termination for Belfast MSF Expansion Force Majeure [Section 47.2]

(a) If an event of Belfast MSF Expansion Force Majeure occurs and the Parties, having used commercially reasonable efforts, have failed to reach agreement on any modification to this Schedule pursuant to Section 35.5 [44.5] within 180 days from the date on which the Party affected gives notice to the other Party as set out therein, either Party may, at any time thereafter, terminate this Schedule by written notice to the other Party having immediate effect, provided that the effects of the event of Belfast MSF Expansion Force Majeure continue during such period to prevent either Party from performing a material part of its obligations under this Schedule.

38.3 Termination for Convenience [Section 47.3]

(a) The City shall, in its Discretion and for any reason whatsoever, be entitled to terminate this Schedule at any time on 180 days' written notice to Project Co.

(b) In the event of notice being given by the City in accordance with this Section 38.3 [47.3], the City shall, at any time before the expiration of such notice, be entitled to direct Project Co to refrain from commencing, or allowing any third party to commence, the Belfast MSF Expansion Works, or any part or parts of the Belfast MSF Expansion Works, where such Belfast MSF Expansion Works, or the part or parts of the Belfast MSF Expansion Works, have not yet been commenced.

39. EFFECT OF TERMINATION [ARTICLE 48]

39.1 Termination [Section 48.1]

(a) This Section 39 [48] shall apply to any termination of this Schedule.

39.2 Continued Effect - No Waiver

(a) Notwithstanding any breach of this Schedule by a Party, the other Party may elect to continue to treat this Schedule as being in full force and effect and to enforce its rights under this Schedule without prejudice to any other rights which such other Party may have in relation to such breach. The failure of either Party to exercise any right under this Schedule, including any right to terminate this Schedule and any right to claim damages, shall not be deemed to be a waiver of such right for any continuing or subsequent breach.

39.3 Effect of Termination [Section 48.4]

(a) On the termination of this Schedule:

(i) if termination is prior to the Belfast MSF Expansion Substantial Completion, in so far as any transfer shall be necessary to fully and effectively transfer such property to the City as shall not already have been transferred to the City pursuant to Section 45.1 [55.1] Project Co shall transfer to, and there shall vest in, the City, free from all Encumbrances (other than the Title Encumbrances and any Encumbrances caused or consented to by the City), such part of the Belfast MSF Expansion Works as shall have been constructed and, such items of the plant and equipment as shall have been procured by Project Co, and, if the City so elects:

(A) all plant, equipment and materials (other than those referred to in Section 39.3(a)(i)(B)) [48.4(a)(i)(B)] on or near to the Belfast MSF Expansion Site shall remain available to the City for the purposes of completing the Belfast MSF Expansion Works; and

(B) all construction, plant and equipment shall remain available to the City for the purposes of completing the Belfast MSF Expansion Works, subject to

payment by the City of the relevant Belfast MSF Expansion Construction Contractor's reasonable charges;

(ii) if termination is prior to the Belfast MSF Expansion Substantial Completion, Project Co shall deliver to City (to the extent such items have not already been delivered to the City) one complete set of all Project Data and Drawings (to the extent applicable to the Belfast MSF Expansion Project);

(iii) Intentionally deleted;

(iv) subject to the rights and obligations set forth in Schedule 41 – Intellectual Property to the Project Agreement, the City will be entitled to retain all Project Co Intellectual Property (to the extent applicable to the Belfast MSF Expansion Project), Subcontractor Intellectual Property (with respect to each Belfast MSF Expansion Subcontractor and to the extent applicable to the Belfast MSF Expansion Project) and Third Party Intellectual Property that has been Delivered up to the Belfast MSF Expansion Termination Date or that is Delivered pursuant to this Section 39.3 [48.4], which may thereafter be Used by the City in accordance with the Licences granted in this Schedule;

(v) in so far as title shall not have already passed to the City pursuant to this Schedule, Project Co shall hand over to, and there shall vest in, the City, free from all Encumbrances (other than the Title Encumbrances and any Encumbrances caused or consented to by the City), the Belfast MSF Expansion, together with all other assets and rights capable of being transferred that are necessary for the performance of the Belfast MSF Expansion Project and the activities within the Belfast MSF Expansion Project Scope and all facilities and equipment, and to the extent that any such assets or rights are not capable of being transferred by Project Co to the City, Project Co shall enter into agreements or make other arrangements in order to permit the use of the assets or rights by the City in order to enable it, or its designated agents or Belfast MSF Expansion Subcontractors, to continue to perform the activities which would have otherwise been performed by Project Co if this Schedule had not been terminated;

(vi) if the City so elects, Project Co shall ensure that any of the Belfast MSF Expansion Subcontracts between Project Co and a Belfast MSF Expansion Subcontractor (including the Belfast MSF Expansion Contracts), and any other instrument entered into between any such Belfast MSF Expansion Subcontractor and Project Co for securing the performance by such Belfast MSF Expansion Subcontractor of its obligations in respect of the Belfast MSF Expansion Project Scope or to protect the interests of Project Co, shall be novated or assigned to the City or its nominee, provided that where termination occurs other than as a result of a Project Co Belfast MSF Expansion Event of Default, the consent of the relevant Belfast MSF Expansion Subcontractor shall be required, and further provided that any such novation or assignment of a Belfast MSF Expansion Subcontract with any Belfast MSF Expansion Contractor or shall be made to the

City pursuant to, and subject to, the terms of the applicable Belfast MSF Expansion Contractor's Direct Agreement;

(vii) Project Co shall, or shall ensure that any Belfast MSF Expansion Project Co Party shall, offer to sell (and if the City so elects, execute such sale) to the City at a fair value (determined as between a willing vendor and willing purchaser, with any Disputes as to such fair value being resolved in accordance with Schedule 27 – Dispute Resolution Procedure to the Project Agreement), free from all Encumbrances (other than the Title Encumbrances and any Encumbrances caused or consented to by the City), all or any part of the stocks of material and other assets, road vehicles, construction equipment, spare parts and other moveable property owned by Project Co or any Belfast MSF Expansion Project Co Parties and dedicated to or predominantly used in respect of the Belfast MSF Expansion Works;

(viii) Intentionally deleted;

(ix) Project Co shall use commercially reasonable efforts to assign, or otherwise transfer, to the City, free from all Encumbrances (other than the Title Encumbrances and any Encumbrances caused or consented to by the City), the benefit of all manufacturers' warranties, including all documentation in respect thereof, in respect of mechanical and electrical and equipment used or made available by Project Co under this Schedule and included in the Belfast MSF Expansion;

(x) Project Co shall deliver to the City all information, reports, documents, records and the like referred to in in Appendix 26 – Record Provisions, except where such are required by Applicable Law to be retained by Project Co or the Belfast MSF Expansion Project Co Parties (in which case complete copies shall be delivered to the City);

(xi) Project Co will return to the City all City Intellectual Property (to the extent applicable to the Belfast MSF Expansion Project) and Confidential Information of the City (to the extent applicable to the Belfast MSF Expansion Project);

(xii) if termination is prior to the Belfast MSF Expansion Substantial Completion:

(A) the City shall negotiate in good faith with Project Co and the Maintenance Contractor such amendments to the Project Agreement (including the Rolling Stock Variation) as shall place Project Co, the Construction Contractor and the Maintenance Contractor in no better and no worse position in respect of the provision of the Maintenance Services, the carrying out of the Construction Activities or in relation to Project Co's obligations under the Project Agreement (including the Rolling Stock Variation) as each of them would have been in had the Rolling Stock and Communication Equipment Activities or Belfast MSF Expansion Activities not been carried out, including the negotiation of alternative

arrangements for storage and maintenance space for the Vehicles at no incremental cost to Project Co or the Maintenance Contractor; and

(B) the City shall compensate Project Co and the Maintenance Contractor for any incremental cost, liability or expense that either of them may reasonably suffer or incur in having complied with or in continuing to comply with its obligations under the Project Agreement (including the Rolling Stock Variation) as a result of the Rolling Stock and Communication Equipment Activities or Belfast MSF Expansion Activities.

(xiii) if termination is following the Belfast MSF Expansion Substantial Completion, but prior to the completion of the MSF Reconfiguration Elements, the City shall reconfigure the heavy maintenance bays to the maintenance configuration per the Stage 1 design prior to December 31, 2022 or the City shall compensate Project Co and the Maintenance Contractor for any incremental cost, liability or expense that either of them may reasonably suffer or incur in having complied with or in continuing to comply with its obligations under the Project Agreement as a result of the lack of overhaul bays due to the incompletion of the MSF Reconfiguration Elements.

39.4 Ownership of Information [Section 48.5]

(a) Subject to Section 51 of the Project Agreement, all information obtained by Project Co, including the As Built Drawings and other technical drawings and data, supplier agreements and contracts, utilities consumption information, environmental and technical reports, lease, licence and subletting data and contracts, asset condition data, standard operating procedures, processes and manuals and all other information directly related to the Belfast MSF Expansion Project Scope accumulated over the course of the Belfast MSF Expansion Project Term shall be the property of the City and upon termination of this Schedule shall be provided or returned to the City, as applicable, in electronic format acceptable to the City, acting reasonably, where it exists in electronic format, and in its original format, when not in electronic format.

39.5 Provision in Subcontracts [Section 48.6]

(a) Project Co shall make provision in all Belfast MSF Expansion Subcontracts to which it is a party (including requiring the relevant Belfast MSF Expansion Project Co Parties to make such provision and to require other Belfast MSF Expansion Project Co Parties to make such provision) to ensure that the City shall be in a position to exercise its rights, and Project Co shall be in a position to perform its obligations, under this Section 39 [48].

39.6 Survival [Section 48.9]

(a) Except as otherwise provided in this Schedule, termination of this Schedule shall be without prejudice to, and shall not affect:

(i) all representations, warranties and indemnities under this Schedule; and

(ii) any provision of this Schedule which is expressed to survive termination, which is required to give effect to such provision which survives termination or to such termination or the consequences of such termination,

all of which shall survive the termination of this Schedule, including for termination on the Belfast MSF Expansion Expiry Date.

40. COMPENSATION ON TERMINATION [ARTICLE 49]

40.1 Compensation on Termination [Section 49.1]

(a) If this Schedule is terminated in accordance with the terms hereof, then Appendix 23 – Compensation on Termination shall apply and the City shall pay Project Co any applicable compensation on termination.

40.2 Full and Final Settlement [Section 49.2]

(a) Except as otherwise provided in Section 40.2(b) [49.2(b)], any compensation paid pursuant to this Section 40 [49], including pursuant to Appendix 23 – Compensation on Termination in the total amount owing thereunder, shall be in full and final settlement of any claims, demands and proceedings of Project Co and the City, and each shall be released from all liability to the other in relation to any breaches or other events leading to such termination of this Schedule, and the circumstances leading to such breach or termination, and Project Co and the City shall be precluded from exercising all other rights and remedies in respect of any such breach or termination whether in contract, tort, restitution, statute, at common law or otherwise.

(b) Section 40.2(a) [49.2(a)] shall be without prejudice to:

(i) any liability of either Party to the other, including under the indemnities contained in this Schedule, that arose prior to the Belfast MSF Expansion Termination Date (but not from the termination itself or the events leading to such termination) to the extent such liability has not already been set off pursuant to Section 26.4 of this Schedule or taken into account pursuant to Appendix 23 – Compensation on Termination in determining or agreeing upon the City Belfast MSF Expansion Default Termination Sum, Belfast MSF Expansion Non-Default Termination Sum or any other termination sum, as the case may be;

(ii) any liabilities arising under or in respect of any breach by either Party of their obligations under Section 39.6 [48.9] of this Schedule, or the Sections referred to therein, which did not lead to such termination and which arises or continues after the Belfast MSF Expansion Termination Date; and

(iii) any amount owing to the City in relation to:

(A) taxes or tax withholdings, including workers' compensation levies;

(B) fines, penalties or restitution orders by a court under any Federal or Provincial statute;

(C) any order made by a court under the *Civil Remedies Act*, S.O. 2001, c.28 and

(D) any fraud or other criminal offence committed against the City.

41. INTELLECTUAL PROPERTY

41.1 Intellectual Property Ownership and Licences

(a) The provisions of Schedule 41 - Intellectual Property to the Project Agreement shall apply *mutatis mutandis* to the Belfast MSF Expansion.

42. CONFIDENTIALITY/COMMUNICATIONS

42.1 Confidentiality

(a) The provisions of Article 52 of the Project Agreement shall apply *mutatis mutandis* to the Belfast MSF Expansion.

43. PERSONAL INFORMATION

43.1 Personal Information

(a) The provisions of Article 53 of the Project Agreement shall apply *mutatis mutandis* to the Belfast MSF Expansion.

44. INSURANCE AND PERFORMANCE SECURITY [ARTICLE 54]

44.1 General Requirements [Section 54.1]

(a) Project Co and the City shall comply with the provisions of Appendix 25 – Insurance and Performance Security Requirements.

44.2 No Relief from Liabilities and Obligations [Section 54.1]

(a) Neither compliance nor failure to comply with the insurance provisions of this Schedule shall relieve Project Co or the City of their respective liabilities and obligations under this Schedule.

45. TITLE [ARTICLE 55]

45.1 Title [Section 55.1]

(a) Title to each item and part of the Belfast MSF Expansion, including any materials, supplies, equipment, facilities, parts and any other deliverable or component items, but not the risk of loss or damage or destruction thereto or thereof, shall pass to the City (or

as the City may direct) upon the receipt of such item on the Belfast MSF Expansion Site, provided however that title to items of tangible personal property (personal property that can be seen, weighed, measured, felt or touched or that is in any way perceptible to the senses and includes computer programs, natural gas and manufactured gas) that comprise the Belfast MSF Expansion or are to be affixed or attached to the Belfast MSF Expansion prior to Belfast MSF Expansion Substantial Completion shall pass to the City (or as the City may direct) at the time that such items are included in the Belfast MSF Expansion or are so affixed or attached.

46. INDEMNITIES

46.1 Project Co Indemnities to the City

(a) Project Co shall indemnify and save harmless the City, each Belfast MSF Expansion City Party and each of their respective directors, officers, employees, agents and representatives from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, or arising out of any one or more of the following:

(i) Intentionally deleted;

(ii) any physical loss of or damage to all or any part of the Belfast MSF Expansion Site, or to any equipment, assets or other property related thereto;

(iii) the death or personal injury of any person;

(iv) any physical loss of or damage to property or assets of any third party;

(v) any other loss or damage of any third party including injurious affection arising from or in consequence of any act or omission of Project Co in respect of the Belfast MSF Expansion Works that are not in compliance with the requirements set out in this Schedule and in the Applicable Law including the City's by-laws;

(vi) Intentionally Deleted; and

(vii) Intentionally deleted**;**

in each case, arising, directly or indirectly, out of, or in consequence of, or involving or relating to, the performance or any breach of this Schedule by Project Co or any act or omission of Project Co or any Belfast MSF Expansion Project Co Party related to the Belfast MSF Expansion Project Scope, except to the extent caused, or contributed to, by:

(viii) the breach of this Schedule by the City; or

(ix) Intentionally deleted;

(x) in respect of Sections 46.1(a)(ii), 46.1(a)(iii), 46.1(a)(iv) or 46.1(a)(v) [56.1(a)(ii), 56.1(a)(iii), 56.1(a)(iv), or 56.1(a)(v)] any act or omission of the City or any Belfast MSF Expansion City Party; or

(xi) Intentionally deleted;

(b) Project Co shall indemnify and save harmless the City and each of its directors, officers, employees, agents and representatives from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, or arising out of any breach of a representation or warranty by Project Co in this Schedule.

(c) Project Co shall indemnify and save harmless the City and each of its directors, officers, employees, agents and representatives from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, arising out of, or involving or relating to any one or more of the following:

(i) the performance by Project Co of this Schedule not in accordance with or in breach of the requirements of any Belfast MSF Expansion Permits, Licences and Approvals, Applicable Law or requirements of Governmental Authorities, or the failure of Project Co to obtain all necessary Project Co Belfast MSF Expansion Permits, Licences and Approvals in accordance with this Schedule;

(ii) the failure of Project Co to manage, remediate and/or remove, as applicable, any Contamination as required in accordance with Section 14.2(a) [16.2(a)] or the failure of Project Co to discharge its obligations under Sections 14.2(e) and 14.2(f) [16.2(d) and 16.2(e)];

(iii) any release of Contamination or Existing Contamination described in Sections 14.2(b)(i) and 14.2(b)(ii) [16.2(b)(i) and 16.2(b)(ii)]; or

(iv) the provision of assistance by the City to Project Co pursuant to Section 8.5(c)[9.6(c)],

except to the extent that such Direct Losses are caused, or contributed to, by the breach of this Schedule by the City or by any act or omission of the City or any Belfast MSF Expansion City Party.

(d) Without prejudice to the City's rights under Section 36[45] and any other rights under this Schedule, if the City exercises its step-in rights under any Belfast MSF Expansion Contractor's Direct Agreement, Project Co shall indemnify the City for all obligations of Project Co assumed by the City under the Belfast MSF Expansion Construction Contract, and for all reasonable costs and expenses incurred by the City in relation to the exercise of the City's rights.

(e) Project Co shall indemnify the City for damages suffered or incurred on account of any payment not duly made by Project Co pursuant to the terms of this Schedule on the due date, by payment of an amount equal to the Payment Compensation Amount calculated

from day to day at a rate per annum from the day after the date on which payment was due up to and including the date of payment.

(f) Where a demand, claim, action or proceeding is made or brought against the City or any Belfast MSF Expansion City Party that any Project Co Intellectual Property (to the extent applicable to the Belfast MSF Expansion Project) or the Use thereof by the City or any Belfast MSF Expansion City Party or the use of any materials, machinery or equipment in connection with the Belfast MSF Expansion Project Scope infringes an Intellectual Property Right of a third party or misappropriates any confidential information or otherwise violates any right of a third party, unless such infringement has arisen out of the use of the allegedly infringing Project Co Intellectual Property (to the extent applicable to the Belfast MSF Expansion Project), materials, machinery or equipment by the City or any Belfast MSF Expansion City Party otherwise than in accordance with the terms of this Schedule, Project Co shall defend the City and such Belfast MSF Expansion City Party from and against all such demands, claims, actions and proceedings in accordance with Section 46.3 [56.3]; and shall indemnify and save harmless the City and such Belfast MSF Expansion City Party from and against all Direct Losses arising out of or relating to such demands, claims, actions and proceedings or the settlement thereof.

46.2 City Indemnities to Project Co

(a) The City shall indemnify and save harmless Project Co and the Belfast MSF Expansion Project Co Parties and each of their respective directors, officers, employees, agents and representatives from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, or arising out of any one or more of the following:

(i) the death or personal injury of any person arising, directly or indirectly, out of, or in consequence of, or involving or relating to, the performance or breach of this Schedule by the City or any act or omission of any Belfast MSF Expansion City Party, except to the extent caused, or contributed to, by the breach of this Schedule by Project Co or by any act or omission of Project Co or any Belfast MSF Expansion Project Co Party;

(ii) any physical loss of or damage to all or any part of any property or assets of Project Co or any Belfast MSF Expansion Project Co Party, arising, directly or indirectly, out of, or in consequence of, or involving or relating to, breach of this Schedule by the City or any deliberate or negligent act or omission of any Belfast MSF Expansion City Party, except to the extent caused, or contributed to, by the breach of this Schedule by Project Co or by any act or omission of Project Co or any Belfast MSF Expansion Project Co Party;

(iii) any physical loss of or damage to property or assets of any third party, or any other loss or damage of any third party, arising, directly or indirectly, out of, or in consequence of, or involving or relating to, breach of this Schedule by the City or any deliberate or negligent act or omission of any Belfast MSF Expansion City Party, except to the extent caused, or contributed to, by the breach of this

Schedule by Project Co or by any act or omission of Project Co or any Belfast MSF Expansion Project Co Party; and

(iv) Intentionally deleted;

provided that there shall be excluded from the indemnity given by the City any liability for the occurrence of risks against which Project Co is required to insure under this Schedule to the extent of the proceeds available or that should have been available but for a failure by Project Co to comply with its obligations to properly insure under this Schedule.

(b) The City shall indemnify and save harmless Project Co and its directors, officers, employees, agents and representatives from and against any and all Direct Losses which may be suffered, sustained, incurred or brought against them as a result of, in respect of, or arising out of any breach of a representation or warranty by the City herein.

(c) The City shall indemnify Project Co for damages suffered or incurred on account of any Payment not duly made by the City pursuant to the terms of this Schedule on the due date, by payment of an amount equal to the Payment Compensation Amount calculated from day to day at a rate per annum from the day after the date on which payment was due up to and including the date of payment.

46.3 Conduct of Claims

(a) The provisions of Section 56.3 of the Project Agreement shall apply *mutatis mutandis* to the conduct of claims made by a third person against a Party having, or claiming to have, the benefit of an indemnity pursuant to this Schedule. The Party having, or claiming to have, the benefit of the indemnity is referred to as the "**Beneficiary**" and the Party giving the indemnity is referred to as the "**Indemnifier**".

46.4 Mitigation – Indemnity Claims

(a) For greater certainty, Section 64.5 of the Project Agreement, which is applicable to this Schedule pursuant to Section 52, applies to any indemnity given under this Schedule and any such indemnity shall not extend to Direct Losses which could have been reduced or avoided by the Beneficiary complying with such Section.

47. LIMITS ON LIABILITY

47.1 Indirect Losses

(a) Without prejudice to the Parties' rights in respect of payments provided for herein, the indemnities under this Schedule shall not apply and there shall be no right to claim damages for breach of this Schedule, in tort or on any other basis whatsoever, to the extent that any loss claimed by either Party is:

(i) for punitive, exemplary or aggravated damages;

(ii) for loss of profits, loss of use, loss of production, loss of business or loss of business opportunity sustained by either Party and not by third parties; or

(iii) is a claim for consequential loss or for indirect loss of any nature suffered or allegedly suffered by either Party,

(collectively, "**Indirect Losses**").

47.2 No Liability in Tort

(a) Subject to the indemnities provided herein, neither the City nor any Belfast MSF Expansion City Party shall be liable in tort to Project Co or any Belfast MSF Expansion Project Co Party, and neither Project Co nor any Belfast MSF Expansion Project Co Party shall be liable in tort to the City or any Belfast MSF Expansion City Party in respect of any negligent act or omission of any such person relating to or in connection with this Schedule and no such person shall bring such a claim.

47.3 Sole Remedy

(a) Intentionally Deleted

(b) Intentionally Deleted

(c) Notwithstanding any other provision of this Schedule, and except to the extent recovered under any of the insurances required pursuant to Appendix 25 – Insurance and Performance Security Requirements, neither Party shall be entitled to recover compensation or make a claim under this Schedule, or any other agreement in relation to the Belfast MSF Expansion Project, in respect of any loss that it has incurred (or any failure of the other Party) to the extent that the Party has already been compensated in respect of that loss or failure pursuant to this Schedule, or otherwise.

47.4 Maximum Liability

(a) Subject to Section 47.4(b) [57.4(b)], the maximum aggregate liability of each Party in respect of all claims under Section 56 of the Project Agreement and under Section 46 shall not exceed $20,000,000. This limit shall be index linked and shall be exclusive of any insurance or performance security proceeds received or which will be received pursuant to policies maintained in accordance with Appendix 25 – Insurance and Performance Security Requirements. This limit shall not apply in cases of wilful misconduct or deliberate acts of wrongdoing.

(b) Nothing in this Section 47.4 [57.4] shall restrict, limit, prejudice or in any other way impair the rights and/or remedies of the Parties under any other provision of this Schedule.

48. DISPUTE RESOLUTION PROCEDURE

(a) All Disputes shall be resolved in accordance with, and the Parties shall comply with, Schedule 27 – Dispute Resolution Procedure to the Project Agreement.

49. ASSIGNMENT, SUBCONTRACTING AND CHANGES IN CONTROL [ARTICLE 59]

(a) The provisions of Article 59 of the Project Agreement shall apply *mutatis mutandis* to this Schedule.

50. NOTICES [ARTICLE 61]

(a) The provisions of Article 61 of the Project Agreement shall apply *mutatis mutandis* to this Schedule.

51. EMERGENCY MATTERS [ARTICLE 62]

(a) The provisions of Article 62 of the Project Agreement shall apply *mutatis mutandis* to this Schedule, provided that Project Co shall not be obliged to develop emergency procedures for any period after the Belfast MSF Expansion Final Completion Date.

52. GENERAL [ARTICLE 64]

(a) The provisions of Article 64 with the exception of Section 64.7 of the Project Agreement shall apply *mutatis mutandis* to this Schedule.

SCHEDULE 46

INTERFACE AND DESIGN MANAGEMENT

1. DEFINITIONS

1.1 Definitions

(a) In this Schedule, unless the context indicates a contrary intention, capitalized terms used herein which are defined in this Schedule and/or the MOU (and not otherwise defined in this Schedule) shall have meanings given to them in this Schedule and/or the MOU. The MOU shall survive this Schedule. The following terms shall have the following meanings:

(i) **"City Confirmation Request"** means a request in writing delivered by the City to Project Co requesting Project Co to: (A) confirm whether the matter or thing identified in the request is Divergent; and/or (B) in circumstances in which the City considers that a Divergence should result in a reduction to the Fixed Price, review a proposal by the City contained in the request for a Fixed Price Adjustment with respect to that Divergence; and/or (C) to confirm whether a proposed course of action to be taken by the City as identified in the request will eliminate a matter or thing that has been accepted by the City as Divergent or that has been determined to be Divergent by the Dispute Resolution Procedure.

(ii) **"City Objectives"** means in connection with the delivery of the Stage 2 LRT Project:

(A) to derive optimum value for the public sector dollars contributed to the Stage 2 LRT Project in line with the risk profile associated with the Stage 2 LRT Project Variations;

(B) to realise a single point of accountability for service availability and lifecycle maintenance for the Expanded System;

(C) to benefit from the efficiencies of this Project Agreement and associated infrastructure by negotiating one or more Variations to that contract for those project elements that demonstrate value for money, including by reference to the original competitive pricing for the Stage 1 Project;

(D) that the result of any negotiations in respect of the Stage 2 LRT Project must maintain the carefully negotiated risk transfer and commercial arrangements from this Project Agreement (as certain elements may be enhanced and modified in the context of the recent light rail projects in the Province of Ontario) provided that the parties will be left with no proportionately greater risk in the aggregate (additional risk in some areas will be priced and/or

offset by lower risk in other areas); and the result of any such negotiations shall be in accordance with the Agreed Parameters; and

(E) that the result of the negotiation and the overall plan to implement the Stage 2 LRT Project shall be satisfactory to and approved by the City's federal and provincial funding partners.

(iii) **"Confirmation Response"** means a response in writing to be provided by Project Co to the City in response to a City Confirmation Request (including, for greater certainty, any City Confirmation Request that is deemed to be made by the City with respect to any IDM Submittal pursuant to Section 2.2(a) of this Schedule) which response shall include, at a minimum: (A) with respect to a City Confirmation Request which contains a proposal by the City for Fixed Price Adjustment whether Project Co accepts or rejects that proposal; and, (B) with respect to any matter or thing identified in the City Confirmation Request which Project Co considers to be Divergent: (i) a Variation Notice with respect to that matter or thing which shall, for greater certainty, include an explanation of the manner in which the Divergence is anticipated to influence the maintenance and lifecycle of the Expanded System and a proposal for any Fixed Price Adjustment resulting therefrom; and (ii) a recommendation for a course of action to be undertaken by the City to eliminate any Divergence that would result in an increase in the level of incremental effort to carry out the Maintenance Services, which recommendation shall have regard to DB Co's obligations under the DB Co Works Agreement and shall be consistent with the City Objectives; and (C) with respect to any proposed course of action by the City identified in a City Confirmation Request to eliminate any matter or thing accepted by the City as Divergent, or determined to be Divergent by the Dispute Resolution Procedure, either (i) confirmation that the proposed course of action will eliminate the Divergence; or (ii) a detailed explanation as to why it will not, and further recommendations for the elimination of the Divergence. For greater certainty, a Confirmation Response may also include Project Co Review Suggestions.

(iv) "**Consultants**" means those professional firms and consultants providing professional architectural, engineering, planning, consulting, Light Rail Vehicle procurement, maintenance, repair and specialty procurement IDM Services which may be retained by Project Co in respect of the delivery of the IDM Services.

(v) "**DB Co**" means a third party who is the successful proponent in connection with the DB Co Works RFP.

(vi) "**DB Co Commissioning**" has the meaning given to it in the DB Co Works Agreement.

(vii) "**DB Co Commissioning Submittal**" means DB Co Commissioning Tests, DB Co Final Commissioning Program, and any submittals relating to DB Co Commissioning required to be submitted by DB Co to the City pursuant to

Schedule 14 – Commissioning to the DB Co Works Agreement and "**DB Co Commissioning Submittals**" shall have a corresponding meaning.

(viii) "**DB Co Commissioning Tests**" means Commissioning Tests as defined in the DB Co Works Agreement.

(ix) "**DB Co Final Commissioning Program**" means the Final Commissioning Program as defined in the DB Co Works Agreement.

(x) "**DB Co Report Card**" means a Report Card (as defined in the DB Works Agreement) required to be submitted by DB Co to the City pursuant to Schedule 20 – Lands to the DB Co Works Agreement and "**DB Co Report Cards**" shall have a corresponding meaning.

(xi) "**DB Co Variation**" has the meaning ascribed to the term "Variation" under the DB Co Works Agreement.

(xii) "**DB Co Variation Confirmation**" has the meaning ascribed to the term "Variation Confirmation" under the DB Co Works Agreement.

(xiii) "**DB Co Variation Directive**" has the meaning ascribed to the term "Variation Directive" under the DB Co Works Agreement.

(xiv) "**DB Co Variation Inquiry**" has the meaning ascribed to the term "Variation Inquiry" under the DB Co Works Agreement.

(xv) "**DB Co Works**" has the meaning given to such term in Appendix 3, Part C, Section 1.1 to the MOU.

(xvi) "**DB Co Works Agreement**" means the design, build and finance project agreement to be entered into between the City and DB Co, including the schedules thereto.

(xvii) "**DB Co Works Agreement Documents**" means the DB Co Works Agreement and any agreements to be entered into by or at the behest of DB Co in connection of the DB Co Works, but not including the Stage 2 Interface Agreement.

(xviii) "**DB Co Works RFP**" means the request for proposals issued by the City to selected Persons in connection with the carrying out of the DB Co Works.

(xix) "**DB Co Works Submittal**" means a works submittal required to be submitted by DB Co to the City pursuant to Schedule 10 – Review Procedure to the DB Co Works Agreement and "**DB Co Works Submittals**" shall have a corresponding meaning.

(xx) **"Dispute Resolution Procedure"** means the dispute resolution procedure (specifically by an Expert) under Section 5 of Schedule 27 – Dispute Resolution Procedure to this Project Agreement.

(xxi) "**Divergence**" occurs where any matter or thing to be reviewed or observed by Project Co in the performance of the IDM Services including:

(A) any IDM Submittal or any matter or thing required or specified by the DB Co Works Agreement to be subject to the review, commissioning or variation procedures set out in Schedules 10, 14 or 22 of the DB Co Works Agreement;

or

(B) any other matter or thing: (i) in any specific information and material provided and/or made available to Project Co by the City with respect to the DB Co Works; or (ii) observed by Project Co in any inspection, attendance or review in which Project Co participates,

would result in: (i) any of the Agreed Parameters (including Stage 2 Assumptions) including in terms of Project Co's pricing or assumption of risk contemplated thereunder, whether by way of increase or decrease, not being complied with; or (ii) in a gross (non-industry standard) inefficiency in the Stage 2 Maintenance Services which Project Co could not reasonably have considered in its pricing assumptions given the level of design detail available to it as of the date of the MOU. "**Divergent**" shall have a corresponding meaning. Divergence shall not, however, include any Excluded Divergence and Excluded Divergence is expressly excluded from this definition of Divergence.

For the purposes of this definition, paragraphs (A) and/or (B) above may include an observation by Project Co, based on the design of the DB Co Works as presented in an IDM Submittal, that:

(A) suitable Additional Property Interests (as defined in Schedule 20 – Lands of the DB Co Works Agreement) should be requested by DB Co pursuant to Section 8 of Schedule 20 of the DB Co Works Agreement; or

(B) suitable property interests should otherwise be reserved by the City from any of the Lands (as defined in Schedule 20 – Lands of the DB Co Works Agreement) that are not designated as "System Infrastructure Lands" therein,

in each case for the benefit of Project Co for the duration of the Maintenance Period in respect of the Stage 2 System,

in order to facilitate the efficient maintenance of the Stage 2 System by Project Co in accordance with this Project Agreement as envisaged by the MOU, the Agreed Parameters and the Stage 2 Assumptions.

(xxii) "**East Final Completion Date**" has the meaning given to it in the DB Co Works Agreement.

(xxiii) "**Excluded Divergence**" means any Schedule 43 Divergence and any other matter or thing that has been accepted or determined, or should have been identified as being Divergent pursuant to any prior requirement to identify any Divergence as provided for in this Schedule.

(xxiv) "**Expanded System**" means the System (as it is defined in this Project Agreement as of March 16, 2017) as expanded by the Stage 2 System.

(xxv) "**Expanded System Revenue Service Availability**" means substantial completion of the Stage 2 System and the overall systems integration has been completed such that the Expanded System operates as a single coherent system.

(xxvi) "**Expanded System Revenue Service Availability Date**" means the date upon which Expanded System Revenue Service Availability has been achieved. The anticipated target date for Expanded System Revenue Service Availability is December 31, 2023.

(xxvii) "**Final Notice of Divergence**" has the meaning given to it in Section 4(a).

(xxviii) "**Fixed Price**" has the meaning ascribed to it in the MOU.

(xxix) "**Fixed Price Adjustment**" means any increase or decrease to the annual maintenance costs and the annual lifecycle costs portions of the Fixed Price to address the level of incremental or reduced effort to carry out the Maintenance Services resulting from a Divergence.

(xxx) "**Highway Works**" has the meaning given to it in the DB Co Works Agreement.

(xxxi) "**IDM Event of Default**" means any material failure of Project Co to perform the IDM Services in accordance with this Schedule which is not rectified within 30 days of notification by the City.

(xxxii) "**IDM Services**" means the design review, construction and commissioning oversight to be provided by Project Co pursuant to this Schedule to identify any Divergence that relates to, or which may influence, the maintenance and lifecycle of the Expanded System, and includes, for greater certainty, the duties of Project Co set out in Section 2 of this Schedule.

(xxxiii) "**IDM Services Commencement Date**" means financial close of the DB Co Works Agreement.

(xxxiv) [INTENTIONALLY DELETED]

(xxxv) "**IDM Submittal**" means the DB Co Works Submittals, DB Co Commissioning Submittals, DB Co Report Cards and any subsequent updates of any such documents excluding, however any DB Co Works Submittals DB Co Commissioning Submittals or DB Co Report Cards applicable to the Highway Works, and includes any DB Co Variation Confirmation, DB Co Variation Directive or DB Co Variation Inquiry.

(xxxvi) "**IDM Term**" has the meaning given to it in Section 11.1(a).

(xxxvii) "**Maintenance Services**" means the scope of work to be performed by Project Co pursuant to the Maintenance Service Variation Confirmation.

(xxxviii) "**Maintenance Service Variation Confirmation**" means the Stage 2 Maintenance Services Variation Confirmation dated as of the Escrow Release Date (as defined in the Scope 5 Escrow Agreement) between Project Co and the City.

(xxxix) "**MOU**" means the memorandum of understanding dated March 16, 2017 between Project Co and the City governing the Parties' approach to the integration of the Stage 2 LRT Project into this Project Agreement.

(xl) "**Notice of Complaint**" has the meaning given to it in Section 11.2(a)(i).

(xli) "**Notice of IDM Termination**" means a notice of termination of the IDM Services as defined in Section 11.2(a)(iii).

(xlii) "**Preliminary Notice of Divergence**" has the meaning given to it in Section 4(a).

(xliii) "**Project Agreement**" means the Project Agreement dated February 12, 2013 entered into between Project Co and the City, as amended from time to time.

(xliv) "**Project Co Assumption Verification**" means RTG Assumption Verification as defined in the MOU.

(xlv) "**Project Co Review Suggestions**" means, in connection with the performance of IDM Services, comments from Project Co which, while not resulting in a Divergence, would result in reduced construction cost and/or more efficient maintenance over the asset life (it being acknowledged and agreed that Project Co may propose changes to either its scope or to DB Co's design or construction means and/or methodology as long as the overall impact over the life of this Project Agreement would be cost-effective for the City).

(xlvi) "**Project Manager**" means the individual identified as such in Section 2.1(b).

(xlvii) "**Scope 5 Escrow Agreement**" means the escrow agreement entered into as of April 23, 2019 by and between the City, Project Co and Norton Rose Fulbright Canada LLP, as escrow agent.

(xlviii) "**Schedule 43 Divergence**" means any matter or thing that has been determined, or could have been determined, to be Divergent (as that term is defined in Schedule 43 to this Project Agreement) pursuant to the provisions of that schedule.

(xlix) "**Stage 2 Assumptions**" means the following assumptions in respect of the DB Co Works and Project Co's assumption of risk in respect of the Expanded System as contemplated by the MOU:

(A) following achievement of the Expanded System Revenue Service Availability Date, Project Co shall assume full responsibility for maintaining availability of the Expanded System in accordance with the Stage 2 Maintenance PSOS (including the obligation to the deliver the Stage 2 Maintenance Services for the fixed price outlined in Appendix 3 Part E - Financial Parameters of the MOU);

(B) unless otherwise agreed, as a general matter the Output Specifications (in respect of the System as it is defined in this Project Agreement as at March 16, 2017) will provide an appropriate starting point and standard for maintaining availability of the Expanded System in accordance with Stage 2 Maintenance PSOS, together with any relevant items set out in the maintenance and rehabilitation pricing assumptions provided as part of the Price Form set out as Attachment 1 to Part E of Appendix 3 of the MOU;

(except to the extent the City otherwise retains responsibility for any matter under either this Project Agreement or the Stage 2 LRT Project Variations (for example, such as the role of the City as operator in the commissioning process)),

(C) the terms of the DB Co Works Agreement and the Stage 2 Interface Agreement shall follow the assumptions set out in Appendix 3, Part C, Section 1.2 of the MOU and Appendix 3, Part F, Section 1.5 of the MOU, respectively; and

(D) the overall goal of the Stage 2 LRT Project procurement process is to achieve the City Objectives (including value for money for the City), provided that priority shall be given to ensuring that the assumptions in respect of the DB Co Works Agreement and the Stage 2 Interface Agreement are complied with, subject to any deviations to this approach which the Parties may agree (for example, higher risk profile for DB Co in return for reduced maintenance cost risk margin).

(l) "**Stage 2 East Extension**" means the east extension of the Confederation Line from Blair station to Trim as generally illustrated by the darker blue lines to the east of the Confederation Line in Figure 1: Summary of Stage 2 Project Components of the MOU including all related DB Co Works.

(li) "**Stage 2 Interface Agreement**" means the agreement to be entered into among Project Co, DB Co and the City in respect of certain interface issues between the stakeholders of the Expanded System, as envisaged by Section 1.5 of Part F of Appendix 3 of the MOU.

(lii) "**Stage 2 LRT Project**" means the Stage 2 East Extension and the Stage 2 West Extension and includes both the Stage 2 Project Co Expanded Scope and the DB Co Works.

(liii) "**Stage 2 LRT Project Variations**" means one or more Variations executed or to be initiated by the City in accordance with the terms of Schedule 22 to the Project Agreement (subject to the terms of the MOU) to implement the Stage 2 Project Co Expanded Scope, which were referred to under the MOU as the "Stage 1 PA Variations" and which include this Schedule.

(liv) "**Stage 2 Maintenance Services**" means the services described in Section 1.5 of Appendix 2 of the MOU.

(lv) "**Stage 2 Maintenance PSOS**" means the output specifications being developed for the Stage 2 Project Co Expanded Scope, which was referred to under the MOU as the "Stage 2 RTG PSOS".

(lvi) "**Stage 2 Project Co Expanded Scope**" means the additional works and services described in Appendix 2 of the MOU intended to be delivered by Project Co as part of the Stage 2 LRT Project, which was referred to under the MOU as the "RTG Expanded Scope" and which includes the IDM Services.

(lvii) "**Stage 2 West Extension**" means the west extension of the Confederation Line from Tunney's Pasture to Moodie Drive as generally illustrated by the darker blue lines to the west of the Confederation Line in Figure 1: Summary of Stage 2 Project Components of the MOU including all related DB Co Works.

(lviii) "**Unavoidable Delay**" means any condition or cause beyond the reasonable control of Project Co that prevents or delays Project Co in fulfilling its obligations under this Schedule, provided that Project Co has acted in a reasonable manner consistent with its obligations hereunder with respect to such condition or cause.

(lix) "**Variation**" has the meaning ascribed to it in the Maintenance Service Variation Confirmation.

(lx) **"Variation Enquiry"** has the meaning ascribed to it in Schedule 22 – Variation Procedure of the Maintenance Service Variation Confirmation

(lxi) "**Variation Notice**" has the meaning ascribed to it in Schedule 22 – Variation Procedure of the Maintenance Service Variation Confirmation.

(lxii) "**West Final Completion Date**" has the meaning given to it in the DB Co Works Agreement.

2. INTERFACE AND DESIGN MANAGEMENT SERVICES

2.1 Duties

(a) Project Co shall provide the IDM Services all in accordance with and in the manner more particularly set out in this Schedule.

(b) Project Co shall provide the resources and staff necessary for the delivery of the IDM Services. As at the date hereof, the Project Manager for the IDM Services is James Messel. Project Co shall treat such Project Manager as if such person were a Key Individual performing IDM Services and the provisions of Section 10.4(c) of the Project Agreement shall apply to such Project Manager, *mutatis mutandis*, during the period that Project Co is providing the IDM Services.

(c) Project Co shall provide design review and construction and commissioning oversight for DB Co Works which have influence on maintenance and lifecycle of the Expanded System and shall identify all occurrences of Divergence relating thereto and proposals for all Fixed Price Adjustments resulting therefrom. Without limitation, Project Co shall issue Confirmation Responses or Notices of Divergence as required by Sections 2, 3 and 4 of this Schedule. In this regard and without limitation, Project Co shall be sufficiently knowledgeable about the terms and conditions of the DB Co Works Agreement, including review processes applicable to IDM Submittals, to provide Confirmation Responses and Notices of Divergence within the time periods and as otherwise required by the terms of this Schedule.

(d) Project Co shall be responsible for assisting in the design procurement and commissioning from a maintenance and lifecycle perspective during construction relating to those elements of the DB Co Works that will impact on maintenance and rehabilitation of the Expanded System and shall identify all occurrences of Divergence relating thereto.

(e) Project Co and any relevant Project Co Parties shall have the right to:

(i) receive notice from the City of any "punchlist" inspections of the DB Co Works, to participate in any such inspections and to review with the owner's engineer;

(ii) receive copies from the City, in a timely manner, of all relevant tests, inspection reports, and other related materials relating to construction materials and methods of construction, and to receive notice from the City of all related tests, inspections and other reviews sufficiently in advance (acting reasonably) so as to permit Project Co to prepare for the attendance at such tests, inspections and other reviews. Without limitation, Project Co and, if applicable, the Project Co Parties have the right to be present at the DB Co Start-Up Meeting, Design Workshops, and Works Committee Meetings. The Project Co Parties will only actively participate in such tests, inspections, meetings and other reviews at the request of the City and otherwise shall only be observers in such tests, inspections, meetings and other reviews; and

(iii) receive copies from the City, in a timely manner, of final as-built drawings.

(f) Following attendance at an inspection or review referred to in Section 2.1(e)(i), or receipt of documentation in Sections 2.1(e)(ii) and 2.1(e)(iii), Project Co will provide comments and timely feedback as to the impact of the DB Co Works on the Project from a maintenance and lifecycle perspective and from the perspective of mitigating latent defect risks to be assumed by Project Co, and any anticipated impact on maintenance and rehabilitation of the Expanded System and shall provide any Confirmation Response, Preliminary Notice of Divergence or Final Notice of Divergence as required by the terms of this Schedule as a result of such participation in inspections and reviews and receipt of documentation.

(g) Other than as specified herein, neither Project Co nor any of its Affiliates, acting in its capacity as the provider of IDM Services, shall enter, directly or indirectly, into any ancillary agreement, side letter or similar additional agreement with DB Co with respect to the IDM Services, without the prior written consent of the City.

(h) For the avoidance of doubt and without limitation, the IDM Services shall not:

(i) form part of the Approved Purposes, the Civic Works, the Design and Construction Works, the Highway Work, the Maintenance, the Maintenance Services, the Procurement Support Services, Work or Works; or

(ii) form part of the definition of, or be required for, 2017 Readiness, Substantial Completion, Final Completion or Revenue Service Availability.

(i) The City acknowledges and agrees that Project Co's attendance and/or participation at the tests, inspections, reviews, meetings and workshops identified in Section 2.1(e)(ii), or any observations made by Project Co thereat, shall not exclude or limit Project Co's rights in respect of DBF Defects (as defined in the DB Co Works Agreement) under the Stage 2 Interface Agreement.

2.2 Design Review, Construction and Commissioning Oversight

(a) Project Co and any relevant Project Co Parties shall have the right to access and receive copies in a timely manner of all IDM Submittals. Upon receipt of any IDM Submittal the City shall as soon as reasonably practicable, and in any event not later than two (2) Business Days of such receipt, provide a copy or otherwise make the IDM Submittal available to Project Co for review and comment. Each IDM Submittal provided or made available to Project Co shall be deemed to include a City Confirmation Request with respect to all matters contained in the IDM Submittal. Prior to the commencement of the provision of IDM Services by Project Co pursuant to this Schedule, the City shall use commercially reasonable efforts to provide Project Co with access to the Electronic Data Management System for the purpose of enabling Project Co to receive IDM Submittals from DB Co concurrently with the City.

(b) Project Co shall conduct its review of each City Confirmation Request (including each IDM Submittal) and provide its Confirmation Response with respect to each City Confirmation Request (including each IDM Submittal) as soon as reasonably practicable and in any event in connection with any Confirmation Response with respect to an IDM Submittal, not later than three (3) Business Days prior to the date upon which the City is required to respond to DB Co with respect to the applicable IDM Submittal pursuant to the DB Co Works Agreement. Within three (3) Business Days of the City providing comments to DB Co in respect of any IDM Submittal, the City shall provide copies of such comments to Project Co (whether or not such comments from the City include comments from Project Co), provided that the City may remove any comments which it deems, acting reasonably, to be either (i) confidential in nature or (ii) items which do not have any influence on maintenance and lifecycle of the Expanded System, prior to providing such copies to Project Co. Notwithstanding the provisions Schedule 22- Variation Procedure of the Maintenance Service Variation Confirmation, the Variation Notice included in the Confirmation Response shall not indicate the latest date by which a Variation Enquiry must be issued.

(c) If the City rejects Project Co's determination that the matter or thing identified in the Confirmation Response is Divergent or if there is a dispute as to whether or not a proposed course of action will eliminate a Divergence, the City shall notify Project Co of such rejection or dispute in writing providing reasons for such rejection or dispute within three (3) Business Days of receipt of the Confirmation Response. Within two (2) Business Days of receipt of the City's notice of rejection or dispute, Project Co may refer the issue of Divergence or elimination of Divergence for resolution pursuant to the Dispute Resolution Procedure and if Project Co does not refer the issue of Divergence or elimination of Divergence for resolution pursuant to the Dispute Resolution Procedure within that time period, Project Co shall not be entitled to claim or otherwise assert that the matter or thing identified in the Confirmation Response is Divergent or claim any resulting Fixed Price Adjustment with respect thereto and shall

be deemed to accept that the proposed course of action in question will eliminate the Divergence.

(d) If Project Co rejects a City proposal for a Fixed Price Adjustment contained in a City Confirmation Request, the City may at any time thereafter refer the issue of whether or not there should be a Fixed Price Adjustment as proposed by the City for resolution pursuant to the Dispute Resolution Procedure.

(e) If the issue of a Divergence or a dispute as to whether a proposed course of action to eliminate a Divergence will result in its elimination has been referred to the Dispute Resolution Procedure, then the question of any Fixed Price Adjustment resulting from a determination of Divergence shall also be determined in that Dispute Resolution Procedure; provided, however, that Project Co's rights of objection with respect to the determination of any Fixed Price Adjustment will continue to be restricted in the manner contemplated by Section 1.1 of Appendix 3 – Agreed Parameters of the MOU in any Dispute Resolution Procedure.

(f) If the City accepts Project Co's determination in a Confirmation Response that there is a Divergence, or if any matter or thing is determined to be Divergent pursuant to the Dispute Resolution Procedure the City may at its election:

(i) propose to Project Co a course of action to eliminate the Divergence which may include taking any available steps the City may have pursuant to the DB Co Works Agreement to eliminate such Divergence, including but not limited to:

(A) requiring DB Co to comply with its obligations under the DB Co Works Agreement to the extent required to eliminate the Divergence, if such option is available; or

(B) initiating a DB Co Variation requiring DB Co to undertake the DB Co Works in manner that will eliminate the Divergence.

and shall, as soon as reasonably practicable, notify Project Co in writing as to City's proposed course of action to eliminate the Divergence, and the timeframe and process by which the City intends to eliminate the Divergence (and in this regard the City may issue a further City Confirmation Request with respect to the City's proposed course of action to eliminate the Divergence); and/or

(ii) elect to treat the Divergence as a Variation and issue a Variation Enquiry pursuant to Schedule 22 – Variation Procedure of the Maintenance Service Variation Confirmation, in which case all references to the term "Estimate" in that Schedule shall be deemed to be references to the Fixed Price Adjustment hereunder; provided, for greater certainty, Project Co's rights of objection under Section 1.5 of Schedule 22 of the Maintenance Service Variation Confirmation will continue to be restricted in the manner contemplated by Section 1.1 of Appendix 3 – Agreed Parameters of the MOU.

(g) If the City elects to proceed under both subparagraphs 2.2(f)(i) and 2.2(f)(ii) above, then the City shall be entitled to defer the issuance of a Variation Confirmation under Schedule 22 – Variation Procedure of the Maintenance Service Variation Confirmation until such time as the City has elected whether or not to eliminate the Divergence pursuant to subparagraph 2.2(f)(i) above.

(h) The City acknowledges and agrees that, pursuant to Section 9.12(a)(iii) of the Maintenance Service Variation Confirmation, the City shall not make or agree to make any amendment to or variation of the DB Co Works Agreement without complying with the provisions of Schedule 43 to this Project Agreement, *mutatis mutandis*.

3. CITY CONFIRMATION REQUESTS GENERAL

(a) In addition to the provisions of Section 2 of this Schedule, the City may from time to time and at any time during the IDM Term deliver a City Confirmation Request to Project Co with respect to any specific matter or thing identified and/or provided by the City to Project Co that has not previously been the subject of a City Confirmation Request, Preliminary Notice of Divergence or Final Notice of Divergence. Unless some other time period has been specified in this Schedule for the delivery of Confirmation Response, Project Co shall deliver a Confirmation Response as soon as reasonably practicable to each City Confirmation Request and in any event, not later than ten (10) Business Days from receipt of the City Confirmation Request.

(b) The provisions of Sections 2.2 (c) to 2.2(g) shall apply *mutatis mutandis* to any City Confirmation Request issued pursuant to this Section 3.

(c) In the event Project Co does not provide a Confirmation Response to any City Confirmation Request provided or deemed to be provided pursuant this Schedule within the time specified, and otherwise in compliance with the requirements of this Schedule, Project Co shall: (i) not be entitled to claim or otherwise assert that the matter or thing identified in the City Confirmation Request is Divergent or claim any resulting Fixed Price Adjustment with respect thereto; and (ii) be deemed to have accepted any proposal for a Fixed Price Adjustment contained in the City Confirmation Request.

(d) The Parties agree that Project Co shall not be responsible under this Schedule for ensuring that DB Co or the DB Co Works are in compliance with the DB Co Works Agreement. The City acknowledges and agrees that neither Project Co nor any Project Co Party will have any liability (A) if a document submitted by DB Co and reviewed by Project Co pursuant to this Schedule results in a non-compliance with the DB Co Works Agreement by DB Co or a breach by DB Co of Applicable Law or (B) for any loss of claim arising due to some defect in any documents, drawings, specifications or certificates submitted by DB Co.

(e) The City acknowledges and agrees that any review and comment by Project Co of any IDM Submittals shall not relieve DB Co of the risk and responsibility for the Project

Operations (as defined in the DB Co Works Agreement) and for meeting all of DB Co's obligations under and requirements of the DB Co Works Agreement. Without limiting the generality of the foregoing, any and all errors or omissions in IDM Submittals or of any review and comment shall not exclude or limit DB Co's obligations or liabilities in respect of the Works under the DB Co Works Agreement or exclude or limit Project Co's rights in respect of DBF Defects (as defined in the DB Co Works Agreement) under the Stage 2 Interface Agreement.

4. NOTICES OF DIVERGENCE

(a) In addition to issuing Confirmation Responses pursuant to Sections 2 and 3 of this Schedule, Project Co shall as part of the IDM Services review all information and material made available to it by the City with respect to the DB Co Works, or observed by Project Co in the performance of the IDM Services including in any inspection, attendance or review in which Project Co participates, and which has not otherwise been the subject of a City Confirmation Request, to identify any matter or thing that Project Co considers to be Divergent and any Fixed Price Adjustment resulting therefrom. Within two (2) Business Days upon Project Co determining that a matter or thing is Divergent under this Section 4(a), Project Co shall deliver to the City a notice in writing (the "**Preliminary Notice of Divergence**") with respect to the matter or thing which Project Co has determined to be Divergent, and within four (4) Business Days of delivery of any Preliminary Notice of Divergence, Project Co shall deliver to the City an additional notice in writing (the "**Final Notice of Divergence**") which shall contain all the information, including any proposal for a Fixed Price Adjustment, and recommendations with respect to the Divergence that is required to be provided by Project Co in a Confirmation Response.

(b) The provisions of Sections 2.2(c) to 2.2 (g) shall apply *mutatis mutandis* to any Final Notice of Divergence delivered by Project Co as if, and to the same extent as though the Final Notice of Divergence was a Confirmation Response.

(c) In the event Project Co does not provide a Preliminary Notice of Divergence or a Final Notice of Divergence as required under Section 4(a) within the time specified and otherwise in compliance with the requirements of this Schedule, Project Co shall not be entitled to claim or otherwise assert that any matter or thing that could otherwise have been identified by Project Co as being Divergent at that time is Divergent or claim any resulting Fixed Price Adjustment with respect thereto.

5. NO CLAIMS OR ASSERTIONS OF DIVERGENCE

(a) For greater certainty, Project Co shall not be entitled to claim or otherwise assert that any matter or thing is Divergent or claim any resulting Fixed Price Adjustment with respect thereto, if the matter or thing is an Excluded Divergence.

(b) Without limitation, Project Co shall not be entitled to claim or otherwise assert that any matter or thing is Divergent or claim any resulting Fixed Price Adjustment with respect

thereto, if the matter or thing has or should been identified by Project Co as being Divergent and Project Co has or should have made a proposal for Fixed Price Adjustment with respect thereto in the relevant Confirmation Response, or in the first Final Notice of Divergence required to be issued by Project Co after the matter or thing has been identified by Project Co as being Divergent and in the case of any identified matter or thing, that matter or thing has been accepted by the City as being Divergent, or has been determined to be Divergent pursuant to the Dispute Resolution Procedure.

(c) In addition to the foregoing, Project Co shall not in any event be entitled to claim or otherwise assert that any matter or thing is Divergent or claim any resulting Fixed Price Adjustment with respect thereto after the expiration of the IDM Term except for matters or things identified or that should have been identified as being Divergent and with respect to which a proposal for a Fixed Price Adjustment has or should have been made pursuant to a Confirmation Response or Final Notice of Divergence issued in accordance with the requirements of this Schedule within the IDM Term, and in the case of identified matter or thing: (i) that matter or thing has been accepted by the City as being Divergent or; (ii) that matter or thing has been has been determined to be Divergent pursuant to the Dispute Resolution Procedure; or (iii) the status of that matter or thing remains subject to the Dispute Resolution Procedure initiated within the IDM Term.

6. AUDIT RIGHTS

(a) Project Co shall have audit rights on quality information provided during the performance of IDM Services. Any such audits are at the sole cost and expense of Project Co.

7. CONSULTANTS

(a) Project Co shall provide to the City and maintain a list of Consultants and sub-Consultants engaged in the provision of the IDM Services, organized by discipline.

8. STANDARD OF CARE AND UNAVOIDABLE DELAY

(a) Project Co shall perform the IDM Services with the reasonable skill and care as would normally be exercised by licensed or registered professionals having knowledge and experience in providing services of a similar nature, scope and complexity to the IDM Services.

(b) The IDM Services will be provided in a manner that is consistent with the Stage 2 Assumptions and Project Co’s assumption of risk contemplated thereunder. Project Co shall also have due regard to the City Objectives in the performance of the IDM Services and assist the City to achieve the City Objectives, in so far as they do not conflict with Project Co’s legitimate expectations outlined in the Stage 2 Assumptions. In carrying out the IDM Services, Project Co will be expected to consider the combined best interests of both Parties, and shall promptly inform the City of any potential conflicts of interests that arise.

(c) The City shall act in good faith in cooperating with Project Co in the performance of the IDM Services in accordance with this Schedule, including when considering any Confirmation Response or Final Notice of Divergence issued by Project Co as part of the IDM Services.

(d) If Project Co is prevented from, or delayed in, the performance of its duties by an event of Unavoidable Delay, the date for performance shall be delayed by a period of time equal to the period of Unavoidable Delay. Project Co will notify the City as soon as practicable after becoming aware of an event of Unavoidable Delay and will, from time to time, notify the City of the expected duration of the period of Unavoidable Delay.

(e) If, during the course of any review by Project Co contemplated hereunder, Project Co requests further information or clarification, in writing, from the City in connection with such review, the City shall use all reasonable efforts to provide such information and/or clarification to Project Co within a reasonable period of time following receipt of such written request from Project Co.

(f) Any timeline for comment, confirmation and/or review by Project Co contemplated in this Schedule may be extended as set out herein, or if not set out herein, may be extended as permitted by the City (acting reasonably).

(g) Project Co: (i) confirms that it is generally familiar with the general requirements, design and performance criteria of the City in connection with the IDM Services and the City Objectives; and (ii) subject to Section 8(b), covenants that it will apply this familiarity in the delivery of the IDM Services with respect to the Stage 2 LRT Project.

9. INSURANCE

(a) Project Co shall, at the City's expense, effect and maintain (i) Project Specific Professional Liability insurance and (ii) Commercial General Liability insurance, each in an aggregate amount of $5,000,000, to protect itself and its employees from claims, losses or damages arising out of the performance of IDM Services rendered by Project Co and its employees, agents and subcontractors under this Schedule and caused by any error, omission or negligent act for which it is legally liable. Project Co shall maintain this insurance in force throughout the IDM Term. [INTENTIONALLY DELETED]

(b) Project Co shall, at its own expense, also effect and maintain insurance to protect itself from claims under workers' compensation acts; from claims for damages because of bodily injury, including personal injury, sickness, disease, or death of any employees.

(c) Certificates of insurance shall be delivered to the City prior to commencement of IDM Services. The certificates shall contain a provision that the coverage afforded under the policies shall not be cancelled or reduced in limits by endorsement until at least thirty (30) days' prior written notice has been given to the City.

10. [INTENTIONALLY DELETED]

11. TERM

11.1 Duration

(a) The IDM Services to be provided under this Schedule shall commence on the IDM Services Commencement Date and shall continue in full force and effect until the earlier of (A) the date upon which the later of the East Final Completion Date or the West Final Completion Date is achieved under the DB Co Works Agreement, and (B) such other date, if any, on which termination of the IDM Services takes effect in accordance with the terms of this Schedule (the "**IDM Term**").

11.2 Termination by the City

(a) The City may terminate the IDM Services for cause if at any time there occurs a IDM Event of Default which is continuing. Such termination is to be conducted on the following basis:

(i) the City shall give written notice ("**Notice of Complaint**") to Project Co specifying in reasonable detail the IDM Event of Default;

(ii) if the IDM Event of Default in question is one that is capable of being cured, then within fifteen (15) days of receipt of such Notice of Complaint, Project Co shall commence to cure such default and proceed diligently thereafter to cure such default until such default is cured;

(iii) if the IDM Event of Default in question is one that is capable of being cured and, if within the fifteen (15) day period referred to in Section 11.2(a)(ii), Project Co fails to commence to cure such default or if at any time after the expiry of such fifteen (15) day period Project Co fails to proceed diligently to cure such default, the City may terminate the IDM Services by written notice ("**Notice of IDM Termination**") to Project Co stating that the IDM Services are terminated and the reasons therefor. Such termination shall be effective as of and from the last day of the month in which the Notice of IDM Termination is given to Project Co;

(iv) if the IDM Event of Default in question is one that is not capable of being cured, then within fifteen (15) days of receipt of such Notice of Complaint, Project Co shall deliver in writing to the City a reasonable plan to prevent the reoccurrence of such IDM Event of Default, which plan is satisfactory to the City (acting reasonably) and Project Co shall proceed diligently thereafter to implement such plan; and

(v) if the IDM Event of Default in question is one that is not capable of being cured, and, if within the fifteen (15) day period referred to in Section 11.2(a)(iv), Project Co fails to deliver the plan referred to in that Section or if at any time after the

expiry of such fifteen (15) day period Project Co fails to proceed diligently to implement such plan to the satisfaction of the City (acting reasonably), the City may terminate the IDM Services by giving Project Co a Notice of IDM Termination (and shall include the reasons for the termination). Such termination shall be effective as of and from the last day of the month in which the Notice of IDM Termination is given to Project Co.

(vi) in the event the City terminates the IDM Services for cause pursuant to this Section 11.2(a), Project Co shall not thereafter be entitled to claim or otherwise assert that any matter or thing is Divergent or claim any resulting Fixed Price Adjustment with respect thereto.

(b) Upon written notice to Project Co, the City may terminate the IDM Services for its convenience, without obligation or liability of any nature except as set out in Section 11.4.

(c) The City agrees that nothing in or arising out of this Schedule and no performance or delay or failure in the performance of this Schedule (including any delay or failure relating to the performance of the IDM Services) shall give rise to or be capable of giving rise to a Project Co Event of Default. To the extent that any claim by the City under this Schedule would cause Project Co to be unable to meet its obligations under the Lending Agreements, payment of such claim shall be deferred until such time Project Co is able to meet make such payment without breaching its obligations under the Lending Agreements.

11.3 Termination by Project Co

(a) If the City defaults [INTENTIONALLY DELETED] or in any material respect of any other obligation under this Schedule and such default shall continue for more than thirty (30) days after notice thereof is given to the City, Project Co may suspend performance of IDM Services, but only until [INTENTIONALLY DELETED] or the default is otherwise cured. If such default continues for sixty (60) days from the date such notice of default has been given to the City, Project Co may terminate the IDM Services by notice to the City with immediate effect. The election to terminate shall not be construed to be an election of remedies and a waiver of other potential remedies available to it at law and/or in equity.

11.4 Consequences of Termination

(a) The IDM Services are being provided alongside the continued operation of the MOU with a view to finalizing all of the Stage 2 LRT Project Variations. If the City validly terminates the IDM Services on the grounds of a IDM Event of Default, the City shall be entitled to consider this as a material breach of the MOU for the purposes of Section 3 of the MOU and take the actions described thereunder (such as recovery of additional costs incurred to replace the IDM Services).

(b) In addition, but subject to Section 11.2(a)(vi) if the IDM Services hereunder are terminated for a IDM Event of Default and Project Co remains the intended provider of the Stage 2 Maintenance Services, the City will act in good faith to ensure that the DB Co Works and DB Co Works Agreement Documents shall reflect the Stage 2 Assumptions, but, subject to the foregoing and to the Parties' respective rights and obligations under Section 1.5 of Part F of Appendix 3 to the MOU, Project Co shall not be entitled to claim that any decision made by the City in such circumstances has impacted Project Co's pricing assumptions in the Price Form.

(c) If the IDM Services are terminated early for any reason other than IDM Event of Default, and Project Co remains the intended provider of the Stage 2 Maintenance Services, then the waivers in 11.4(b) shall not apply, and the City acknowledges that if the DB Co Works or any of the DB Co Works Agreement Documents are Divergent, this shall entitle Project Co to an adjustment (which, for clarity, may be an adjustment in respect of Project Co's scope of work, assumption of risk and/or pricing) under the terms of the MOU and any relevant Stage 2 LRT Project Variation which incorporates the relevant Stage 2 Assumptions.

(d) [INTENTIONALLY DELETED]

(e) If the IDM Services are terminated early, Project Co shall promptly deliver to the City copies of all records and documents (with the exception of Sensitive Information) maintained under the terms of this Schedule, which are in the possession or control of Project Co, relating directly or indirectly to the IDM Services, in accordance with the terms of Section 4.4 of Schedule 26 – Records Provisions to this Project Agreement.

12. GENERAL

12.1 Dispute Resolution Procedure

(a) For the purposes of this Schedule, Section 5.1 of Schedule 27 – Dispute Resolution Procedure shall be amended as follows:

(i) the word "or" at the end of Section 5.1(c) shall be deleted;

(ii) the "," at the end of Section 5.1(d) shall be deleted and replaced "; or";

(iii) following Section 5.1(e), a new Section 5.1(f) shall be added as follows:

"(e) the determination of any matter submitted to the Dispute Resolution Procedure pursuant to Schedule 46 - Interface and Design Management to the Project Agreement,"

(a) For the avoidance of doubt, "includes" and "including", whether or not used with the words "without limitation" or "but not limited to", shall not be deemed limited by the specific enumeration of items but shall, in all cases, be deemed to be without limitation

and construed and interpreted to mean "includes without limitation" and "including without limitation".

12.2 [INTENTIONALLY DELETED]