

PARTICULAR SPECIFICATION

APPENDIX N

GUIDELINES ON APPROVAL IN PRINCIPLE (AIP)

1 General

- 1.1 This document specifies the Technical Acceptance (TA) procedures.
- 1.2 The purpose of this procedural requirement is to impose a discipline on the design process that encourages good practice, faster design approval and better utilization of resources in ensuring the quality of works. Most importantly, the procedures are in place to minimise the possible risks to public and others who may be affected.
- 1.3 The TA procedures entail a review of the Designer's design assumption of the proposal in three stages as shown in the table below:

Stages	Descriptions	Remarks
Stage 1	Before commencement of detailed design	The Approval in Principle (AIP) document for the detailed design of the Proposals by the Designer shall be reviewed / agreed and signed by the Designer / Checker in consultations with the Authority and then submitted to the Authority for acceptance.
Stage 2	Upon completion of detailed design	The Design and Check Certificates are to be endorsed by the Designer / Checker and submitted to the Authority.
Stage 3	Before submission of certificate of as-built structural plans/calculations to BCA	The As-Built Compliance Certificates are to be endorsed by the Designer / Checker and submitted to the Authority.

Please refer to the TA procedure flow chart in the **Attachment**.

- 1.4 The TA does not in any way modify the contractual and statutory responsibilities of any party for the work carried out or the legal responsibilities of professional engineers.
- 1.5 The procedures, format and terms used in this, including the Approval in Principle (AIP) forms, Technical Acceptance Schedules (TAS) and certificates provided in **Annexes A to C**, are contract-neutral and should be taken as samples. The certificates shall be amended and agreed with the Authority to suit specific contract requirements.

2 Definitions

2.1 The following definitions shall apply throughout this Appendix.

Approval in Principle (AIP) Document	These documents include forms, CAD drawings, reports and any other files, which records the agreed basis and criteria for the detailed design of a structure.
Technical Acceptance (TA)	The submission of Proposal agreements between the Design and Checker and subsequent provision/acceptance of certificates confirming that the design, specification and construction works complies with the agreed AIP document.
Technical Acceptance Schedule (TAS)	The schedule of documents accepted to be used for the design of a structure. This includes the relevant standards, LTA Civil Design Criteria, Material & Workmanship Specifications.
Proposals	Design assumptions relating to the design or assessment of the structures.
Designer	A Designer is a person responsible for the overall design including proprietary components and Earth Retaining or Stabilising Structures (ERSS). The Designer means QP (Design) for permanent works and PE (Temporary Works) for temporary works. QP(D) refers to QP(GEO)(D), where applicable.
Design Team	A group of engineers responsible for the design and proposals. It may comprise an appropriate mix of specialists under the direction of a QP (Design)/ PE (Temporary Works).
Checker	The Accredited Checker or Independent Checker who is responsible for the independent check of the design and proposals. The Checking Team shall be competent in the field of work undertaken and have relevant experience and appropriate Engineering qualifications.
Checking Team	A group of engineers responsible for checking the design proposal. It may comprise a mix of specialists under the direction of the Checker.
Authority	The term 'Authority' used throughout the document shall mean the Employer.
Contractor	The organisation contracted by the Authority to undertake construction works on its behalf.
Departure	Criterion, which departs from, or is an aspect not covered by, the Standards contained in the Technical Approval Schedule.
Geotechnical Report	Report(s) that contain geotechnical information relevant to the design, proposals or assessment.

3 Application

- 3.1 The TA applies to all structural work proposals (temporary or permanent), except for those that are exempted from the Building Control Act (Chapter 29) Building Control Regulations, First Schedule – Insignificant Building Works.
- 3.2 Independent checks shall be carried out for all Proposals. The Proposals shall be placed in one of the two (2) Categories: **Minor or Major structures** as shown in the table below:

Category	Descriptions	Remarks
Minor Structures	Building works that are <u>listed</u> in the Fourth Schedule of the Building Control Regulations	Independent checks by another engineer who may be from the Design Team, shall be carried out.
Major Structures	All building works that are NOT listed in the Fourth Schedule of the Building Control Regulations	The proposals shall be checked by an Accredited Checker of another organisation. (Refer to Second Schedule of Building Control (Accredited Checkers and Accredited Checking Organisations) Regulations – Task that must be carried out by Accredited Checkers)

- 3.3 AIP documents shall be submitted for all minor and major structures.

4 Proposal Requirement

- 4.1 Proposals for Designs shall be in accordance with the Authority's Specifications, Design Criteria, relevant codes of practice, Building Control Act and other requirements from the relevant authorities. Any deviation from the Authority's Design Criteria are not allowed unless with the Authority's approval in writing.
- 4.2 The Proposals shall satisfy and/ or consider aspects relating to:
- Sustainability (sustainable development which meets the needs of the present without compromising the ability of future generations to meet their own needs e.g. prudent use of natural resources);
 - Environment (to minimise the impact of structures on both the natural and built environment);

- c) Aesthetics;
 - d) Buildability (the extent to which the design facilitates ease of construction, allowing the most efficient and economic use of resources, subject to the overall requirements for the completed project);
 - e) Structure robustness (the ability of a structure not to be damaged disproportionately in the event of accident, misuse or deterioration);
 - f) Durability;
 - g) Maintenance and operational commitments in terms of whole life costs in design options and choices of materials;
 - h) Provision of access for periodic inspection; and
 - i) Provisions for future enhanced loads or future widening and describe how the structure may be upgraded. In the case of road tunnels, it may be necessary to make provision for future development above or adjacent to the tunnel.
- 4.3 The Proposals shall state any assumptions that have been made with regard to construction methods, processes or temporary works aspects that are significant considerations in the design. If construction methods, processes or temporary works during the course of construction have structural implications different from those assumed by the Designer, a further TA shall be completed before the commencement of construction of that part of the works.
- 4.4 The Designer shall consult other authorities at an early stage and submit his proposals early for their approval. This applies to major structures, including tunnel portals, tunnel service buildings and landscaping and those structures in environmentally sensitive locations, such as National Parks, areas of outstanding natural beauty, green-belts, urban areas, etc.
- 4.5 The Designer may seek to introduce cost savings, innovative techniques, research findings or developments in the state of the art by the adoption of Departures.
- 4.6 Any proposed Departures together with reasons and justification, including benefits shall be submitted to the Authority for consideration. Applications for Departures shall allow adequate time of consideration by the Authority prior to inclusion in the AIP document or an addendum to the AIP document.
- 4.7 The Designer should consult the Checker at the earliest appropriate opportunity to allow timely consideration to be given to the Proposals and avoid the risk of abortive work.

5 Checker's Role and Checking Procedures

5.1 The Checker shall carry out a comprehensive examination of all aspects of the design and ensure that the design complies with the Authority's requirements including the following:

- a) Proposed Departure(s) where required by the Authority and
- b) Specification clauses that affect structural integrity, e.g. new materials.

The Checker shall ensure that the calculations and assessed capacities are translated accurately into design details, specification clauses and drawings and are fit for purpose.

5.2 The Checker shall be responsible for the following:

- a) Checking with due professional skill and care, in accordance with the accepted AIP document. In the course of checking, the Checker shall draw the attention of the Designer and the Authority to any aspect of the AIP document where changes are considered necessary.
- b) The applicability and accuracy of all computer programs used in the check and shall ensure the validity of the programs for each application.

5.3 The Checker's analytical work shall be independent of that of the Designer and carried out without exchange of calculation sheets or similar information between the Designer and the Checker.

5.4 The start of the check need not await the completion of the design. Both activities may proceed in parallel as far as is practicable.

5.5 The method of analysis employed by the respective teams need not be the same. The Designer and Checker should consult each other during the course of their work to ensure that the results they are obtaining are comparable.

6 Submission of AIP document (Stage 1)

6.1 The submissions of AIP document to the Authority shall be in accordance with the Authority's specifications. Generally, submissions comprise a completed AIP document, a location plan, a general arrangement drawing, relevant parts of the Geotechnical Report, documents relating to consultation and any other relevant information. Calculations and detailed drawings are not required as part of the submission.

6.2 The AIP document shall record all the agreed criteria on which the design is to be based. The Checker shall review and agree with the proposed AIP document.

- 6.3 Any changes to an accepted AIP document to account for subsequent variations during design or construction shall render the AIP document subject to re-approval and submitted to the Authority. This shall be confirmed either in the form of an amended version of the accepted AIP document or as a separate addendum to the accepted AIP document. Submissions clearly indicating deletions or additions that have been made to the accepted AIP document shall be signed by the Designer and Checker and forwarded with supporting information to the Authority. Addenda shall refer to the original AIP document by the date signed by the Checker.
- 6.4 The preparation of the AIP document is a continuing exercise. The period over which it extends will vary according to the size and complexity of the structure and number of Departures. To avoid any unnecessary delay, AIP document may be given in stages in the form of interim AIP document as principles are evolved and agreed. However, the use of the interim AIP document should not be allowed to prejudice the acceptance of an AIP document for the full structure.
- 6.5 If the construction has not yet commenced within this period, the AIP document shall be re-submitted to the Authority. The Authority shall review the AIP document and determine whether any updating or amendment to the design is required. In such circumstances the outcome shall be recorded in an amendment or addendum to the AIP document and submission to the Authority will be required before the construction can proceed.
- 6.6 The design shall comply with the accepted AIP document. Sample AIP document forms are given in **Annex A**, but different forms may be used depending on the Authority's requirements.
- 6.7 The Designer shall be responsible for the applicability and accuracy of all computer programs used and shall also ensure the validity of the programs for each application.

7 Submission of AIP document (Stage 2)

- 7.1 The Design and Check certificate are required to be signed by the designer and checker to declare the satisfactory completion of the design works with due professional skills, diligence.
- 7.2 The Design and Check certificate shall refer to the relevant AIP document and any addenda by their respective dates signed by the Checker. Departures, if any, shall be re-submitted to the Authority.

- 7.3 Where additional and substitute Specification clauses have been prepared, they should be submitted for acceptance by the Authority. They may be submitted either individually or collectively provided they are warranted equal in all respect to those specified and the Authority's acceptance is obtained in writing before making a substitution. Where clauses affect structural integrity e.g. new materials, they shall be checked in accordance with the Authority's M&W Specification and AIP document.
- 7.4 Sample certificates are contained in **Annex C**. However, the wording may vary depending on the Authority's requirements/type of contract. If the completed certificate consists of more than one page, each page should be identifiable by the name of the project and by the name and reference number of the Structure and the date of preparation.

The forms of certificate specified in the contract requirements shall be used.

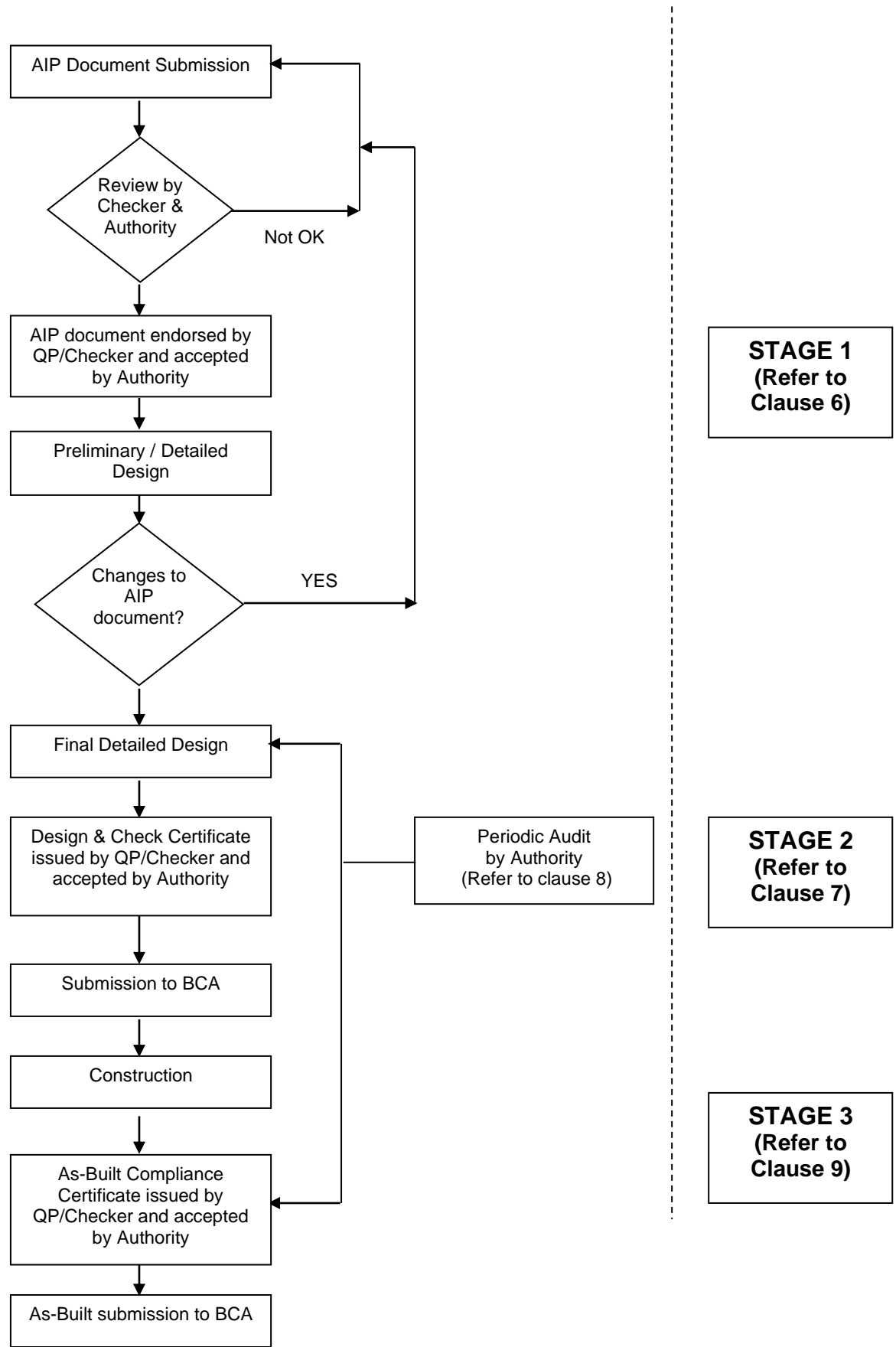
8 Audits

- 8.1 The Authority may conduct audits on the Designer and Checker at periodic intervals to ensure that the design process is followed accurately by Designer and Checker.

9 Submission of AIP document (Stage 3)

- 9.1 The As-Built Compliance Certificates are required to be signed by the designer and checker and submit to the Authority before submission of certificate of As-Built Structural Plans/Calculations to BCA.
- 9.2 The As-Built Compliance Certificate shall refer to the relevant AIP document, Design & Check Certificates, Specification and as-built drawings/calculations. The sample certificates can be found in **Annex C**.

Attachment – Technical Approval Flow Chart



APPROVAL IN PRINCIPLE - A1-1
(Cut-and-Cover Tunnels and Ramps, Stations, Underpasses and Entrances)

Contract No/Name of Project: _____

APPLICATION FOR APPROVAL IN PRINCIPLE

1. INTRODUCTION
 - 1.1 Project description and scope
2. SITE DETAILS
 - 2.1 Adjacent structures / buildings
 - 2.2 Adjacent services / utilities including diversions
 - 2.3 Site constraints (e.g. Interfacing / traffic / services constraints and obstruction)
3. PROPOSED STRUCTURE
 - 3.1 Description of structure (e.g. types of structures, arrangement, configuration, etc.)
 - 3.2 Basic layout and sections including geometry dimensions and depths
 - 3.3 Provision for future development, if any
4. STRUCTURAL SCHEMATIC
 - 4.1 Functional framing
 - 4.2 Load transfer and load path
 - 4.3 Stability consideration (vertical / lateral)
 - 4.4 Identification of key elements (e.g. Foundations, cantilever/transfer beam, slender columns etc.)
 - 4.5 Design method of construction and sequence of works
 - 4.6 Key ancillary support elements
 - 4.7 Key design risks and hazards associated with the proposed scheme
5. DESIGN CRITERIA
 - 5.1 Design situation and design life
 - 5.2 Actions
 - a) Permanent actions
 - b) Variable actions
 - c) Soil and water actions
 - d) Actions from road and railway vehicles
 - e) Surcharge
 - f) Wind and thermal actions
 - g) Actions induced by cranes and machinery during lifting (e.g. pulling / pushing etc.)
 - h) Accidental actions
 - i) Any special action not covered above (e.g. future development loads)
 - 5.3 Ultimate limit state
 - a) EQU Limit state (e.g. unbalanced loads)
 - b) STR Limit state
 - c) GEO Limit state
 - d) UPL Limit state

- e) HYD Limit state
 - f) Combination of actions to CDC including partial factors and model factors as well as all construction stage checks
- 5.4 Serviceability limit state
- a) Allowable settlement and deflection
 - b) Allowable crack width
 - c) Combination of actions to CDC including partial factors and model factors as well as all construction stage checks
- 5.5 Authorities consulted and any special conditions required
6. Existing conditions
- 6.1 Geotechnical conditions
- a) Adequacy of the geological and geotechnical data
 - b) Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any proposed changes
 - c) If the Geotechnical Design Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations
- 6.2 Structural conditions
- a) Available data (e.g. As-built information)
 - b) Visual inspection reports
 - c) If as-built information to be verified due to importance of structures, then method / approach to verify the data (e.g. Foundation verification)
 - d) If as-built information is not available, methods to investigate structural elements including foundations (e.g. Investigation of pile toe)
7. STRUCTURAL / GEOTECHNICAL ANALYSIS AND DESIGN
- 7.1 Description and diagram of idealised structure to be used for analysis (e.g. Free-body diagrams) with boundary conditions and highlight key combination of actions.
- 7.2 Assumptions considered in the design
- 7.3 Methods of analysis proposed for the design of structure and foundations
- 7.4 Method of deriving locked-in forces arising from the proposed construction sequence, if applicable
- 7.5 Assumptions intended for calculation of structural element stiffness
- 7.6 Proposed range of soil parameters to be used for geotechnical design
- 7.7 Sensitivity analysis and proposed variation of parameters
- 7.8 Proposal to verify the analysis and countercheck analytical solutions
- 7.9 Materials and strength
- a) Material characteristic and properties
- 7.10 Durability aspect of design
- a) Exposure condition, nominal cover, concrete mix design, etc.
 - b) Fire resistance
 - c) Water tightness and waterproofing details
- 7.11 Design of critical connections and detailing
- 7.12 List of relevant documents
- a) List of relevant documents from the Technical Acceptance Schedules (TAS)
 - b) Additional relevant Standards proposed to be used
 - c) List of relevant documents from Particular Specification

- 7.13 Proposed departures from Standards given in 7.12
 7.14 Proposed method of dealing with aspects not covered by Standards in 7.12

8. MAINTENANCE AND OPERATIONS

- 8.1 Proposed arrangements for future maintenance and inspection
- a) Access for inspection and repairs
 - b) Delivery route and access for equipment
 - c) Arrangement to facilitate future replacement of equipment
 (e.g. Provision of lifting hooks/points, lighting/ventilation, signages, etc.)

9. DRAWINGS AND DOCUMENTS

- 9.1 List of drawings & documents accompanying submission
- a) Conceptual drawings include location plans, a general arrangement drawing, relevant parts of the Geotechnical Report, documents relating to consultation and any other relevant information
 - b) Typical construction sequence
 - c) Structural detailing and typical connection details for key structural elements

10. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed	_____	_____
Name	_____	_____
	QP(Design)	QP(Design, Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

11. I HAVE REVIEWED THE ABOVE AND AGREE THAT THEY ARE ACCEPTABLE

Signed	_____	_____
Name	_____	_____
	Accredited Checker	Specialist Accredited Checker (Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

APPROVAL IN PRINCIPLE – A1-2
(Bored Tunnels / Mined Tunnels)

Contract No/Name of Project: _____

APPLICATION FOR APPROVAL IN PRINCIPLE

1. INTRODUCTION
 - 1.1 Project description and scope
2. SITE DETAILS
 - 2.1 Adjacent structures / buildings
 - 2.2 Adjacent underground services / utilities
 - 2.3 Site constraints (e.g. interfacing / traffic / services constraints)
3. PROPOSED STRUCTURE
 - 3.1 Description of structure (e.g. types of structure, arrangement, configuration etc.)
 - 3.2 Basic layout and sections including geometric dimensions (e.g. diameter, soil overburden etc.)
 - 3.3 Ground treatments and purpose (if any)
 - 3.4 Dimensions of the tunnel and space provision (including maximum / minimum clearance between tunnels / type of track etc.)
 - 3.5 Provision for future works (e.g. shafts for future TBM launch / retrieval)
 - 3.6 Provision for future development, if any (e.g. required by other stakeholders)
4. STRUCTURAL SCHEMATIC
 - 4.1 Details of Segmental Lining
 - 4.2 Details of Cross Passages, Escape Shafts and Sumps
 - 4.3 Details of Mined Tunnels (if any)
 - 4.4 Load transfer and load path at temporary and permanent conditions
 - 4.5 Stability consideration (vertical / lateral)
 - 4.6 Critical structural elements (e.g. transfer elements)
 - 4.7 Construction Method and Sequences
 - 4.8 Key ancillary support elements (e.g. steel frame support during cross passage / mined tunnel construction)
 - 4.9 Key design and construction risks and hazards associated with the proposed scheme
5. DESIGN CRITERIA
 - 5.1 Design situation and design life
 - 5.2 Selection of tunnel geometry and size
 - 5.3 Selection of segment width and configuration
 - 5.4 Actions
 - a) Permanent actions
 - b) Variable actions
 - c) Soil and water actions
 - d) Actions from road and railway vehicles
 - e) Surcharge
 - f) Wind and thermal actions

- g) Actions induced by cranes and machinery during lifting (e.g. pulling / pushing etc.)
- h) Accidental actions
- i) Any special actions not covered above

5.5 Ultimate limit state and checks on CDC

- a) EQU Limit state
- b) STR Limit state
- c) GEO Limit state
- d) UPL Limit state
- e) HYD Limit state
- f) Combinations of actions and combination factors, partial factors for materials, model factor

5.6 Serviceability limit state

- a) Allowable settlement and deflection
- b) Allowable crack width
- c) Combinations of actions and combination factors, partial factors for materials, model factor

5.7 Design considerations for Joints

5.8 Design considerations for Tapered Rings

5.9 Design considerations for Bolts, bolt pockets and other fixings

5.10 Criteria for Building Impact Assessment

6. EXISTING CONDITIONS

6.1 Geotechnical conditions

- a) Adequacy of the geological and geotechnical data (both lateral and vertical extents)
- b) Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any proposed changes
- c) If the Geotechnical Design Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice and assumptions

6.2 Structural conditions

- a) Available data (e.g. As-built information)
- b) Visual inspection reports
- c) If as-built information to be verified due to importance of structures, then method / approach to verify the data (e.g. Foundation verification)
- d) If as-built information is not available, methods to investigate structural elements including foundations (e.g. Investigation of pile toe)

7. STRUCTURAL / GEOTECHNICAL ANALYSIS AND DESIGN

7.1 Description and diagram of idealised structure to be used for analysis (e.g. Free-body diagrams)

7.2 Assumptions considered in the design

7.3 Methods of analysis proposed for the design of structure and foundations

7.4 Assumptions intended for calculation of structural element stiffness

7.5 Proposed range of soil parameters to be used for geotechnical design

- 7.6 Sensitivity analysis and proposed variation of parameters
- 7.7 Proposal to verify the analysis and countercheck analytical solutions
- 7.8 Materials and strength
 - a) Material characteristic and properties (including ground treatment, if applicable)
 - b) Effects of resistance for critical elements including foundations
- 7.9 Durability aspect of design
 - a) Exposure condition, nominal cover, concrete mix design, etc.
 - b) Fire resistance
 - c) Water tightness and water proofing details
- 7.10 Design of critical connections and detailing
- 7.11 List of relevant documents
 - a) List of relevant documents from the TAS
 - b) Additional relevant Standards proposed to be used
 - c) List of relevant documents from Particular Specification
- 7.12 Proposed departures from Standards given in 7.11
- 7.13 Proposed method of dealing with aspects not covered by Standards in 7.11

- 8. MAINTENANCE AND OPERATIONS
 - 8.1 Proposed arrangements for future maintenance and inspection
 - a) Access for inspection and repairs
 - b) Delivery route and access for equipment

- 9. IMPACT ASSESSMENT OF ADJACENT STRUCTURES/BUILDINGS
 - 9.1 Settlement prediction due to proposed activities
 - 9.2 Sensitivity of predicted settlements
 - 9.3 Building Impact Assessment

- 10. INSTRUMENTATION AND MONITORING
 - 10.1 Type and Number of Instruments
 - 10.2 Frequency of Monitoring
 - 10.3 Critical Instruments
 - 10.4 Review Levels

- 11. DRAWINGS AND DOCUMENTS
 - 11.1 List of drawings & documents accompanying submission.

12. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed	_____	_____
Name	_____	_____
	QP(Design)	QP(Design, Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

13. I HAVE REVIEWED THE ABOVE AND AGREE THAT THEY ARE ACCEPTABLE

Signed	_____	_____
Name	_____	_____
	Accredited Checker	Specialist Accredited Checker (Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

APPROVAL IN PRINCIPLE – A1-3
(Box Culverts, Open Canals, Drains and Sumps)

Contract No/Name of Project: _____

APPLICATION FOR APPROVAL IN PRINCIPLE

1. INTRODUCTION
 - 1.1 Project description and scope
2. SITE DETAILS
 - 2.1 Adjacent structures / buildings
 - 2.2 Adjacent underground services / utilities
 - 2.3 Site constraints (e.g. Interfacing / traffic / services constraints and obstruction)
3. PROPOSED STRUCTURE
 - 3.1 Description of structure (e.g. types of structures, arrangement, configuration, etc.)
 - 3.2 Basic layout and sections including geometry dimensions and depths
 - 3.3 Vehicular restraint systems type
 - 3.4 Provision for future development, if any
4. STRUCTURAL SCHEMATIC
 - 4.1 Functional framing
 - 4.2 Load transfer and load path
 - 4.3 Stability consideration (vertical / lateral)
 - 4.4 Identification of key elements (e.g. Foundations, transfer beam etc.)
 - 4.5 Design method of construction and sequence of works
 - 4.6 Key ancillary support elements
 - 4.7 Key design risks and hazards associated with the proposed scheme
5. DESIGN CRITERIA
 - 5.1 Design situation and design life
 - 5.2 Actions
 - a) Permanent actions
 - b) Variable actions
 - c) Actions from road vehicles
 - d) Soil and water actions
 - e) Surcharge
 - f) Thermal actions
 - g) Any other action not covered above (e.g. provision for future extension)
 - 5.3 Ultimate limit state
 - a) EQU Limit state (e.g. unbalanced loads)
 - b) STR Limit state
 - c) GEO Limit state
 - d) UPL Limit state
 - e) HYD Limit state
 - f) Combination of actions including partial factors, model factors and combination factors as well as all construction stage checks

- 5.4 Serviceability limit state
 - a) Allowable settlement and deflection
 - b) Allowable crack width
 - c) Combination of actions including partial factors and model factors as well as all construction stage checks
- 5.5 Authorities consulted and any special conditions required
- 6. EXISTING CONDITIONS
 - 6.1 Geotechnical conditions
 - a) Adequacy of the geological and geotechnical data
 - b) Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any proposed changes
 - c) If the Geotechnical Design Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations
 - 6.2 Structural conditions
 - a) Available data (e.g. As-built information)
 - b) Visual inspection reports
 - c) If as-built information to be verified due to importance of structures, then method / approach to verify the data (e.g. Foundation verification)
 - d) If as-built information is not available, methods to investigate structural elements including foundations (e.g. Investigation of pile toe)
- 7. STRUCTURAL / GEOTECHNICAL ANALYSIS AND DESIGN
 - 7.1 Description and diagram of idealised structure to be used for analysis (e.g. Free-body diagrams) with boundary conditions and highlight key combination of actions.
 - 7.2 Methods of analysis proposed for the design of structure and foundations
 - 7.3 Assumptions intended for calculation of structural element stiffness
 - 7.4 Proposed range of soil parameters to be used for geotechnical design
 - 7.5 Proposal to verify the analysis and countercheck analytical solutions
 - 7.6 Materials and strength
 - a) Material characteristic and properties
 - 7.7 Durability aspect of design such as exposure condition, nominal cover, concrete mix design, etc.
 - 7.8 Design of critical connections and detailing
 - 7.9 List of relevant documents
 - a) List of relevant documents from the Technical Acceptance Schedules (TAS)
 - b) Additional relevant Standards proposed to be used
 - c) List of relevant documents from Particular Specification
 - 7.10 Proposed departures from Standards given in 7.9
 - 7.11 Proposed method of dealing with aspects not covered by Standards in 7.9
- 8. MAINTENANCE AND OPERATIONS
 - 8.1 Proposed arrangements for future maintenance and inspection
 - a) Access for inspection and repairs
- 9. DRAWINGS AND DOCUMENTS

- 9.1 List of drawings & documents accompanying submission
- a) Conceptual drawings include location plans, a general arrangement drawing, relevant parts of the Geotechnical Report, documents relating to consultation and any other relevant information
 - b) Typical construction sequence
 - c) Structural detailing and typical connection details for key structural elements

10. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed	_____	_____
Name	_____	_____
	QP(Design)	QP(Design, Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

11. I HAVE REVIEWED THE ABOVE AND AGREE THAT THEY ARE ACCEPTABLE

Signed	_____	_____
Name	_____	_____
	Accredited Checker	Specialist Accredited Checker (Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

APPROVAL IN PRINCIPLE – A2-1**(Temporary Retaining Walls / Temporary Earth Retaining or Stabilising Structures)**

Contract No/Name of Project: _____

APPLICATION FOR APPROVAL IN PRINCIPLE

1. INTRODUCTION
 - 1.1 Project description and scope
2. SITE DETAILS
 - 2.1 Adjacent structures / buildings
 - 2.2 Traffic / construction decks (as applicable)
 - 2.3 Adjacent underground services / utilities
 - 2.4 Site constraints (e.g. Interfacing / traffic / services constraints)
3. PROPOSED STRUCTURE
 - 3.1 Description of Temporary Works (e.g. critical sections in terms of geometry / geology / site constraints)
 - 3.2 Basic layout and sections including geometry dimensions and depths
 - 3.3 Ground treatments and purpose (if any)
 - 3.4 Provision for future development (if any)
4. TEMPORARY ERSS SCHEME
 - 4.1 Schematic Sections (indicating key structural elements)
 - 4.2 Stability considerations (vertical / lateral)
 - 4.3 Structural elements (e.g. ERSS wall, waler, strut, kingpost etc.)
 - 4.4 Construction Method and Sequences
 - 4.5 Connections and ancillary support elements (if any)
 - 4.6 Key design and construction risks and hazards associated with the proposed scheme
5. DESIGN CRITERIA
 - 5.1 Design situation and design life
 - 5.2 Actions
 - a) Permanent actions
 - b) Variable actions
 - c) Soil and water actions
 - d) Actions from road and railway vehicles
 - e) Surcharge
 - f) Wind and thermal actions
 - g) Actions induced by cranes and machinery (e.g. pulling / pushing etc.)
 - h) Actions during execution
 - i) Road traffic actions and other actions specifically for road bridges
 - j) Accidental actions
 - k) Any special action not covered above (e.g. future development loads)
 - 5.3 Ultimate limit state and checks on CDC
 - a) EQU Limit state (e.g. unbalanced loads)
 - b) STR Limit state
 - c) GEO Limit state
 - d) UPL Limit state

- e) HYD Limit state
 - f) Combination of actions, to Partial factors, Model factors and Combination factors
- 5.4 Serviceability limit state
 - a) Allowable settlement and deflection
 - b) Allowable crack width
 - c) Combination of actions, to Partial factors, Model factors and Combination factors
- 5.5 Redundancy or One-Strut Failure check
- 5.6 Criteria for Building Impact Assessment
- 6. EXISTING CONDITIONS
 - 6.1 Geotechnical conditions
 - a) Adequacy of the geological and geotechnical data (both lateral and vertical extents)
 - b) Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any proposed changes
 - c) If the Geotechnical Design Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of ERSS elements
 - 6.2 Structural conditions
 - a) Available data (e.g. As-built information)
 - b) Visual inspection reports
 - c) If as-built information to be verified due to importance of structures, then method / approach to verify the data (e.g. Foundation verification)
 - d) If as-built information is not available, methods to investigate structural elements including foundations (e.g. Investigation of pile toe)
- 7. STRUCTURAL / GEOTECHNICAL ANALYSIS AND DESIGN
 - 7.1 Assumptions considered in the design
 - 7.2 Methods of analysis proposed for ERSS sections and design of ERSS elements
 - 7.3 Method of deriving locked-in forces arising from the proposed construction sequence, if necessary
 - 7.4 Assumptions intended for calculation of structural element stiffness
 - 7.5 Proposed range of soil parameters to be used for geotechnical design
 - 7.6 Tolerances allowed for in design of ERSS wall, foundation pile, king-post etc.
 - 7.7 Sensitivity analysis and proposed variation of parameters
 - 7.8 Proposal to verify the analysis and countercheck analytical solutions
 - 7.9 Materials and strength
 - a) Material characteristic and properties (including ground treatment, if applicable)
 - b) Effects of resistance for critical elements including foundations
 - 7.10 Water tightness and water proofing details
 - 7.11 Design of critical connections and detailing
 - 7.12 List of relevant documents
 - a) List of relevant documents from the TAS
 - b) Additional relevant Standards proposed to be used
 - c) List of relevant documents from Particular Specification
 - 7.13 Proposed departures from Standards given in 7.12
 - 7.14 Proposed method of dealing with aspects not covered by Standards in 7.12

8. IMPACT ASSESSMENT OF ADJACENT STRUCTURES/BUILDINGS
 - 8.1 Settlement Prediction due to proposed activities (including installation and removal effects)
 - 8.2 Sensitivity of predicted settlements
 - 8.3 Building Impact Assessment
9. INSTRUMENTATION AND MONITORING
 - 9.1 Type and Number of Instruments
 - 9.2 Frequency of Monitoring
 - 9.3 Critical Instruments
 - 9.4 Review Levels
10. CONSTRUCTION MEASURES
 - 10.1 Mitigation Measures
 - 10.2 Contingency Measures
11. DRAWINGS AND DOCUMENTS
 - 11.1 List of drawings & documents accompanying submission
12. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed		
Name		
	QP(Design)	QP(Design, Geo) (where applicable)
Name of Organisation		
Date		

13. I HAVE REVIEWED THE ABOVE AND AGREE THAT THEY ARE ACCEPTABLE

Signed		
Name		
	Accredited Checker	Specialist Accredited Checker (Geo) (where applicable)
Name of Organisation		
Date		

APPROVAL IN PRINCIPLE – A2-2
(Permanent Earth Retaining or Stabilising Structures)

Contract No/Name of Project: _____

APPLICATION FOR APPROVAL IN PRINCIPLE

1. INTRODUCTION
 - 1.1 Project description and scope
2. SITE DETAILS
 - 2.1 Adjacent structures / buildings
 - 2.2 Adjacent underground services / utilities
 - 2.3 Site constraints (e.g. Narrow road side table)
3. PROPOSED STRUCTURE
 - 3.1 Description of permanent works and type of retaining structure (e.g. cantilever / gravity etc.)
 - 3.2 Basic layout, sections and types of retaining wall (based on height)
 - 3.3 Stability consideration (vertical / lateral)
 - 3.4 Foundation system
 - 3.5 Key design and construction risks and hazards associated with the proposed scheme
4. DESIGN CRITERIA
 - 4.1 Design situation and design life
 - 4.2 Actions
 - a) Permanent actions
 - b) Variable actions
 - c) Soil and water actions
 - d) Actions from road and railway vehicles
 - e) Surcharge
 - f) Actions induced by cranes and machinery (e.g. pulling / pushing etc.)
 - g) Accidental actions
 - h) Any special action not covered above (e.g. future development loads)
 - 4.3 Ultimate limit state and Checks on CDC
 - a) EQU Limit state (e.g. unbalanced loads)
 - b) STR Limit state
 - c) GEO Limit state
 - d) UPL Limit state
 - e) HYD Limit state
 - f) Partial factors for materials and Model factor
 - 4.4 Serviceability limit state
 - a) Allowable settlement and deflection
 - b) Allowable crack width
 - c) Partial factors for materials and Model factor

5. EXISTING CONDITIONS

5.1 Geotechnical conditions

- a) Adequacy of the geological and geotechnical data
- b) Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any proposed changes
- c) If the Geotechnical Design Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations

5.2 Structural conditions

- a) Available data (e.g. As-built information)
- b) Visual inspection reports
- c) If as-built information to be verified due to importance of structures, then method/approach to verify the data (e.g. Foundation verification)
- d) If as-built information is not available, methods to investigate structural elements including foundations (e.g. Investigation of pile toe)

6. STRUCTURAL / GEOTECHNICAL ANALYSIS AND DESIGN

- 6.1 Description and diagram of idealised structure to be used for analysis (e.g. Free-body diagrams)
- 6.2 Assumptions considered in the design
- 6.3 Methods of analysis proposed for the design of structure and foundations
- 6.4 Method of deriving locked-in forces arising from the proposed construction sequence, if necessary
- 6.5 Assumptions intended for calculation of structural element stiffness
- 6.6 Proposed range of soil parameters to be used for geotechnical design
- 6.7 Sensitivity analysis and proposed variation of parameters
- 6.8 Proposal to verify the analysis and countercheck analytical solutions
- 6.9 Materials and strength
 - a) Material characteristic and properties
 - b) Effects of resistance for critical elements including foundations
- 6.10 Durability aspect of design
 - a) Exposure condition, nominal cover, concrete mix design, etc.
 - b) Fire resistance
 - c) Water tightness and water proofing details
- 6.11 Design of critical connections and detailing
- 6.12 List of relevant documents
 - a) List of relevant documents from the TAS
 - b) Additional relevant Standards proposed to be used
 - c) List of relevant documents from Particular Specification
- 6.13 Proposed departures from Standards given in 6.12
- 6.14 Proposed method of dealing with aspects not covered by Standards in 6.12

7. MAINTENANCE AND OPERATIONS

- 7.1 Proposed arrangements for future maintenance and inspection

8. DRAWINGS AND DOCUMENTS
- 8.1 List of drawings & documents accompanying submission

9. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed	_____	_____
Name	_____	_____
	QP(Design)	QP(Design, Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

10. I HAVE REVIEWED THE ABOVE AND AGREE THAT THEY ARE ACCEPTABLE

Signed	_____	_____
Name	_____	_____
	Accredited Checker	Specialist Accredited Checker (Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

**APPROVAL IN PRINCIPLE – A2-3
(Earthworks)**

Contract No/Name of Project: _____

APPLICATION FOR APPROVAL IN PRINCIPLE

1. INTRODUCTION
 - 1.1 Project description and scope
2. SITE DETAILS
 - 2.1 Adjacent structures / buildings
 - 2.2 Adjacent underground services / utilities
 - 2.3 Site constraints (e.g. site boundary / corridor etc.)
3. PROPOSED STRUCTURE
 - 3.1 Description of earthworks and any ancillary structures (e.g. slope cutting / embankment / trench / pit etc.)
 - 3.2 Basic layout, sections and types of earth works (based on geometry /dimensions)
 - 3.3 Ground treatments and purpose (if any)
 - 3.4 Types of stability considerations (e.g. overturning / sliding / bearing failure etc.)
 - 3.5 Proposed Slope protection, Erosion control measures and Drainage system
 - 3.6 Considerations on Environmental / Nature conservation / Heritage aspects
 - 3.7 Key design risks and hazards associated with the proposed earthworks and disposal (e.g. contaminated material / pH ranges etc.)
 - 3.8 Requirement for Environmental Impact Assessment (EIA)
4. DESIGN CRITERIA
 - 4.1 Design situation and design life
 - 4.2 Actions
 - a) Permanent actions
 - b) Variable actions
 - c) Soil and water actions
 - d) Actions from road and railway vehicles
 - e) Surcharge
 - f) Actions induced by cranes and machinery
 - g) Accidental actions
 - h) Any special action not covered above (e.g. future development loads)
 - 4.3 Ultimate limit state and Checks on CDC
 - a) EQU Limit state
 - b) STR Limit state
 - c) GEO Limit state
 - d) UPL Limit state
 - e) HYD Limit state
 - 4.4 Serviceability limit state
 - a) Allowable settlement and deflection
 - b) Allowable crack width

- 4.5 Other Criteria for earthworks
 - a) Material Quality
 - b) Slope cutting
 - c) Compaction requirements
- 5. EXISTING CONDITIONS
 - 5.1 Geotechnical conditions
 - a) Adequacy of the geological and geotechnical data
 - b) Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any proposed changes
 - c) If the Geotechnical Design Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations
 - 5.2 Structural conditions
 - a) Available data (e.g. As-built information)
 - b) Visual inspection reports
 - c) If as-built information to be verified due to importance of structures, then method / approach to verify the data (e.g. Foundation verification)
 - d) If as-built information is not available, methods to investigate structural elements including foundations (e.g. Investigation of pile toe)
 - 5.3 Geographical conditions and land use
- 6. STRUCTURAL / GEOTECHNICAL ANALYSIS AND DESIGN
 - 6.1 Description and diagram of idealised model to be used for analysis
 - 6.2 Assumptions considered in the design
 - 6.3 Methods of analysis proposed for the design
 - 6.4 Proposed range of soil parameters to be used for geotechnical
 - 6.5 Sensitivity analysis and proposed variation of parameters
 - 6.6 Proposal to verify the analysis and countercheck analytical solutions
 - 6.7 Materials and strength
 - a) Material characteristic and properties (including ground treatment, if applicable)
 - b) Effects of resistance for critical elements including foundations
 - 6.8 Durability aspect of design (including for ancillary structures)
 - c) Exposure condition, nominal cover, concrete mix design, etc.
 - d) Water tightness and water proofing details
 - 6.9 Drainage design
 - 6.10 List of relevant documents
 - a) List of relevant documents from the TAS
 - b) Additional relevant Standards proposed to be used
 - c) List of relevant documents from Particular Specification
 - 6.11 Proposed departures from Standards given in 6.10
 - 6.12 Proposed method of dealing with aspects not covered by Standards in 6.10
- 7. MAINTENANCE AND OPERATIONS
 - 7.1 Proposed arrangements for future maintenance and inspection

8. INSTRUMENTATION AND MONITORING

9. DRAWINGS AND DOCUMENTS

9.1 List of drawings & documents accompanying submission

10. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed	_____	_____
Name	_____	_____
	QP(Design)	QP(Design, Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

11. I HAVE REVIEWED THE ABOVE AND AGREE THAT THEY ARE ACCEPTABLE

Signed	_____	_____
Name	_____	_____
	Accredited Checker	Specialist Accredited Checker (Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

APPROVAL IN PRINCIPLE - A3-1
(Vehicular Flyovers / Bridges / Viaducts)

Contract No/Name of Project: _____

APPLICATION FOR APPROVAL IN PRINCIPLE

1. INTRODUCTION
 - 1.1 Project description and scope
2. SITE DETAILS
 - 2.1 Adjacent structures / buildings
 - 2.2 Adjacent services / utilities including diversions
 - 2.3 Site constraints (e.g. Interfacing / traffic / services constraints and obstruction)
3. PROPOSED STRUCTURE
 - 3.1 Description of structure (e.g. types of structures, arrangement, configuration, etc.)
 - 3.2 Basic layout and sections including geometry dimensions and depths
 - 3.3 Minimum headroom provided
 - 3.4 Width of carriageway and notional lane widths
 - 3.5 Road restraint systems type
4. STRUCTURAL SCHEMATIC
 - 4.1 Functional framing
 - 4.2 Articulation arrangements
 - 4.3 Load transfer and load path
 - 4.4 Stability consideration (vertical / lateral)
 - 4.5 Identification of key elements (e.g. Foundations, cantilever/transfer beam, slender columns etc.)
 - 4.6 Design method of construction and sequence of works
 - a) Launching sequence of girders / beams
 - b) Deck slab casting sequence
 - c) Stitching sequence
 - 4.7 Key ancillary support elements
 - 4.8 Key design risks and hazards associated with the proposed scheme
5. DESIGN CRITERIA
 - 5.1 Design situation and design life
 - 5.2 Actions
 - a) Permanent actions
 - b) Road traffic actions and other actions specifically for road bridges
 - c) Rail traffic actions and other actions specifically for rail bridges
 - d) Actions on footways and cycle tracks
 - e) Wind actions
 - f) Thermal actions (temperature uniform and gradient)
 - g) Creep and shrinkage coefficients and effects
 - h) Accidental actions
 - i) Differential settlement of pier support
 - j) Fatigue load models
 - k) Dynamic effects
 - l) Any other action not covered above (e.g. Future noise barrier loads etc.)

- 5.3 Ultimate limit state
 - a) EQU Limit state (e.g. unbalanced loads)
 - b) STR Limit state
 - c) GEO Limit state
 - d) FAT Limit state
 - e) Combination of actions including partial factors, model factors and combination factors as well as all construction stage checks
 - 5.4 Serviceability limit state
 - a) Allowable settlement and deflection
 - b) Allowable stress limit and crack width
 - c) Combination of actions including partial factors and model factors as well as all construction stage checks
 - 5.5 Authorities consulted and any special conditions required
6. EXISTING CONDITIONS
- 6.1 Geotechnical conditions
 - a) Adequacy of the geological and geotechnical data
 - b) Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any proposed changes
 - c) If the Geotechnical Design Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations
 - 6.2 Structural conditions
 - a) Available data (e.g. As-built information)
 - b) Visual inspection reports
 - c) If as-built information to be verified due to importance of structures, then method / approach to verify the data (e.g. Foundation verification)
 - d) If as-built information is not available, methods to investigate structural elements including foundations (e.g. Investigation of pile toe)
7. STRUCTURAL / GEOTECHNICAL ANALYSIS AND DESIGN
- 7.1 Description and diagram of idealised structure to be used for analysis (e.g. Free-body diagrams) with boundary conditions and highlight key combination of actions
 - 7.2 Methods of analysis including the construction sequence proposed for superstructure, substructure, foundations and derivation of movement range for bearings and expansion joints

- 7.3 Assumptions intended for calculation of structural element stiffness
- 7.4 Effects of creep and shrinkage on the proposed structures
- 7.5 Proposed range of soil parameters to be used for geotechnical design
- 7.6 Proposal to verify the analysis and countercheck analytical solutions
- 7.7 Materials and strength
 - a) Material characteristic and properties
- 7.8 Durability aspect of design such as exposure condition, nominal cover, concrete mix design, etc.
- 7.9 Design of critical connections and detailing
- 7.10 List of relevant documents
 - a) List of relevant documents from the Technical Acceptance Schedules (TAS)
 - b) Additional relevant Standards proposed to be used
 - c) List of relevant documents from Particular Specification
- 7.11 Proposed departures from Standards given in 7.10
- 7.12 Proposed method of dealing with aspects not covered by Standards in 7.10

8. MAINTENANCE AND OPERATIONS

- 8.1 Proposed arrangements for future maintenance and inspection
 - a) Access for inspection and repair of structure (e.g. external post-tensioned, drainage, etc.)
 - b) Access for inspection and replacement of movement joint (e.g. bearings, expansion joints, etc.)
 - c) Arrangement to facilitate future maintenance of bearing (e.g. provision of spacing for jacking without scaffolding, provision of inspection catwalk / platform at canal / river crossing, etc.)

9. DRAWINGS AND DOCUMENTS

- 9.1 List of drawings & documents accompanying submission
 - a) Conceptual drawings include location plans, a general arrangement drawing, relevant parts of the Geotechnical Report, documents relating to consultation and any other relevant information
 - b) Typical construction sequence
 - c) Structural detailing and typical connection details for key structural elements
 - d) Articulation plan showing bearings and movement joints arrangement include legend to show the bearing preset direction

10. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed		
Name		
	QP(Design)	QP(Design, Geo) (where applicable)
Name of Organisation		
Date		

11. I HAVE REVIEWED THE ABOVE AND AGREE THAT THEY ARE ACCEPTABLE

Signed	_____	_____
Name	_____	_____
	Accredited Checker	Specialist Accredited Checker (Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

APPROVAL IN PRINCIPLE – A3-2
(Stations / Depots (Bus / Rail) / Integrated Transport Hubs (ITH) / Operation
Control Centre (OCC) / Facility Buildings)

Contract No/Name of Project: _____

APPLICATION FOR APPROVAL IN PRINCIPLE

1. INTRODUCTION
 - 1.1 Project description and scope
2. SITE DETAILS
 - 2.1 Adjacent structures / buildings
 - 2.2 Adjacent underground services / utilities
 - 2.3 Site constraints (e.g. Interfacing / traffic / services constraints and obstruction)
3. PROPOSED STRUCTURE
 - 3.1 Description of structure (e.g. types of structures, arrangement, configuration, etc.)
 - 3.2 Basic layout and sections including geometry dimensions and depths
 - 3.3 Minimum headroom provided
 - 3.4 Vehicular restraint systems type
 - 3.5 Provision for future development, if any
 - 3.6 Provision for strengthening works of existing structure, if any
4. STRUCTURAL SCHEMATIC
 - 4.1 Functional framing
 - 4.2 Load transfer and load path
 - 4.3 Stability consideration (vertical / lateral)
 - 4.4 Identification of key elements (e.g. Foundations, cantilever / transfer beam, slender columns etc.)
 - 4.5 Design method of construction and sequence of works
 - 4.6 Key ancillary support elements
 - 4.7 Key design risks and hazards associated with the proposed scheme
5. DESIGN CRITERIA
 - 5.1 Design situation and design life
 - 5.2 Actions
 - a) Permanent actions
 - b) Variable actions
 - c) Soil and water actions
 - d) Actions from road vehicles
 - e) Surcharge
 - f) Wind and Thermal actions
 - g) Actions induced by cranes and machinery during lifting (e.g. pulling / pushing etc.)
 - h) Accidental actions
 - i) Any special action not covered above (e.g. future development loads)
 - 5.3 Ultimate limit state
 - a) EQU Limit state (e.g. unbalanced loads)
 - b) STR Limit state
 - c) GEO Limit state
 - d) UPL Limit state

- e) HYD Limit state
 - f) FAT Limit state
 - g) Combination of actions including partial factors and model factors as well as all construction stage checks
- 5.4 Serviceability limit state
 - a) Allowable settlement and deflection
 - b) Allowable crack width
 - c) Combination of actions including partial factors and model factors as well as all construction stage checks
- 5.5 Authorities consulted and any special conditions required
- 6. EXISTING CONDITIONS
 - 6.1 Geotechnical conditions
 - a) Adequacy of the geological and geotechnical data
 - b) Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any proposed changes
 - c) If the Geotechnical Design Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations.
 - 6.2 Structural conditions
 - a) Available data (e.g. As-built information)
 - b) Visual inspection reports
 - c) If as-built information to be verified due to importance of structures, then method / approach to verify the data (e.g. Foundation verification)
 - d) If as-built information is not available, methods to investigate structural elements including foundations (e.g. Investigation of pile toe)
- 7. STRUCTURAL / GEOTECHNICAL ANALYSIS AND DESIGN
 - 7.1 Description and diagram of idealised structure to be used for analysis (e.g. Free-body diagrams) with boundary conditions and highlight key combination of actions
 - 7.2 Assumptions considered in the design
 - 7.3 Methods of analysis proposed for the design of structure and foundations
 - 7.4 Method of deriving locked-in forces arising from the proposed construction sequence, if applicable
 - 7.5 Assumptions intended for calculation of structural element stiffness
 - 7.6 Proposed range of soil parameters to be used for geotechnical design
 - 7.7 Sensitivity analysis and proposed variation of parameters
 - 7.8 Proposal to verify the analysis and countercheck analytical solutions
 - 7.9 Materials and strength
 - a) Material characteristic and properties
 - 7.10 Durability aspect of design
 - a) Exposure condition, nominal cover, concrete mix design, etc.
 - b) Fire resistance
 - c) Water tightness and waterproofing details
 - 7.11 Design of critical connections and detailing
 - 7.12 List of relevant documents
 - a) List of relevant documents from the Technical Acceptance Schedules (TAS)
 - b) Additional relevant Standards proposed to be used
 - c) List of relevant documents from Particular Specification
 - 7.13 Proposed departures from Standards given in 7.12
 - 7.14 Proposed method of dealing with aspects not covered by Standards in 7.12

8. MAINTENANCE AND OPERATIONS

8.1 Proposed arrangements for future maintenance and inspection

- a) Access for inspection and repairs (e.g. drainage, steel roof, etc.)
- b) Delivery route and access for equipment
- c) Arrangement to facilitate future replacement of equipment
(e.g. Provision of lifting hooks / points, lighting / ventilation, signages, etc.)
- d) Arrangement to facilitate cleaning and maintenance of external facade

9. DRAWINGS AND DOCUMENTS

9.1 List of drawings & documents accompanying submission

- a) Conceptual drawings include location plans, a general arrangement drawing, relevant parts of the Geotechnical Report, documents relating to consultation and any other relevant information
- b) Typical construction sequence
- c) Structural detailing and typical connection details for key structural elements

10. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed	_____	_____
Name	_____	_____
	QP(Design)	QP(Design, Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

11. I HAVE REVIEWED THE ABOVE AND AGREE THAT THEY ARE ACCEPTABLE

Signed	_____	_____
Name	_____	_____
	Accredited Checker	Specialist Accredited Checker (Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

APPROVAL IN PRINCIPLE – A3-3
(Pedestrian Overhead Bridges (POB) / Elevated Pedestrian Link Bridges)

Contract No/Name of Project: _____

APPLICATION FOR APPROVAL IN PRINCIPLE

1. INTRODUCTION
 - 1.1 Project description and scope
2. SITE DETAILS
 - 2.1 Adjacent structures / buildings
 - 2.2 Adjacent underground services / utilities including diversions
 - 2.3 Site constraints (e.g. Interfacing / traffic / services constraints and obstruction)
3. PROPOSED STRUCTURE
 - 3.1 Description of structure (e.g. types of structures, arrangement, configuration, etc.)
 - 3.2 Basic layout and sections including geometry dimensions and depths
 - 3.3 Minimum headroom provided
 - 3.4 Road restraint systems type
4. STRUCTURAL SCHEMATIC
 - 4.1 Functional framing
 - 4.2 Articulation arrangements
 - 4.3 Load transfer and load path
 - 4.4 Stability consideration (vertical / lateral)
 - 4.5 Identification of key elements (e.g. Foundations, cantilever / transfer beam, slender columns etc.)
 - 4.6 Design method of construction and sequence of works
 - 4.7 Key ancillary support elements
 - 4.8 Key design risks and hazards associated with the proposed scheme
5. DESIGN CRITERIA
 - 5.1 Design situation and design life
 - 5.2 Actions
 - a) Permanent actions
 - b) Variable actions
 - c) Wind actions
 - d) Thermal actions (temperature uniform and gradient)
 - e) Creep and shrinkage coefficients and effects
 - f) Accidental actions
 - g) Dynamic effects
 - h) Any other action not covered above (e.g. Provision for future extension etc.)
 - 5.3 Ultimate limit state
 - a) EQU Limit state (e.g. unbalanced loads)
 - b) STR Limit state
 - c) GEO Limit state
 - d) Combination of actions including partial factors, model factors and combination factors as well as all construction stage checks

- 5.4 Serviceability limit state
 - a) Allowable settlement and deflection
 - b) Allowable stress limit and crack width
 - c) Combination of actions including partial factors and model factors as well as all construction stage checks
 - d) Vibration study
 - 5.5 Authorities consulted and any special conditions required
6. EXISTING CONDITIONS
- 6.1 Geotechnical conditions
 - a) Adequacy of the geological and geotechnical data
 - b) Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any proposed changes
 - c) If the Geotechnical Design Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations
 - 6.2 Structural conditions
 - a) Available data (e.g. As-built information)
 - b) Visual inspection reports
 - c) If as-built information to be verified due to importance of structures, then method / approach to verify the data (e.g. Foundation verification)
 - d) If as-built information is not available, methods to investigate structural elements including foundations (e.g. Investigation of pile toe)
7. STRUCTURAL / GEOTECHNICAL ANALYSIS AND DESIGN
- 7.1 Description and diagram of idealised structure to be used for analysis (e.g. Free-body diagrams) with boundary conditions and highlight key combination of actions
 - 7.2 Methods of analysis including the construction sequence proposed for superstructure, substructure and foundations
 - 7.3 Assumptions intended for calculation of structural element stiffness
 - 7.4 Effects of creep and shrinkage on the proposed structures
 - 7.5 Proposed range of soil parameters to be used for geotechnical design
 - 7.6 Proposal to verify the analysis and countercheck analytical solutions
 - 7.7 Materials and strength
 - a) Material characteristic and properties
 - 7.8 Durability aspect of design such as exposure condition, nominal cover, concrete mix design, etc.
 - 7.9 Design of critical connections and detailing
 - 7.10 List of relevant documents
 - a) List of relevant documents from the Technical Acceptance Schedules (TAS)
 - b) Additional relevant Standards proposed to be used
 - c) List of relevant documents from Particular Specification
 - 7.11 Proposed departures from Standards given in 7.10
 - 7.12 Proposed method of dealing with aspects not covered by Standards in 7.10
8. MAINTENANCE AND OPERATIONS
- 8.1 Proposed arrangements for future maintenance and inspection
 - a) Access for inspection and repairs (e.g. drainage / pipes, etc.)
 - b) Access for inspection and replacement of bearings

9. DRAWINGS AND DOCUMENTS

9.1 List of drawings & documents accompanying submission

- a) Conceptual drawings include location plans, a general arrangement drawing, relevant parts of the Geotechnical Report, documents relating to consultation and any other relevant information
- b) Typical construction sequence
- c) Structural detailing and typical connection details for key structural elements

10. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed _____

Name _____

QP(Design)

Name of Organisation _____

Date _____

11. I HAVE REVIEWED THE ABOVE AND AGREE THAT THEY ARE ACCEPTABLE

Signed _____

Name _____

Accredited Checker

Name of Organisation _____

Date _____

APPROVAL IN PRINCIPLE – A4-1
(Bus Shelters / High & Low Covered Linkways)

Contract No/Name of Project: _____

APPLICATION FOR APPROVAL IN PRINCIPLE

1. INTRODUCTION
 - 1.1 Project description and scope
2. SITE DETAILS
 - 2.1 Adjacent structures / buildings
 - 2.2 Adjacent services / utilities including diversions
 - 2.3 Site constraints (e.g. Interfacing / traffic / services constraints and obstruction)
3. PROPOSED STRUCTURE
 - 3.1 Description of structure (e.g. types of structures, arrangement, configuration, etc.)
 - 3.2 Basic layout and sections including geometry dimensions and depths
 - 3.3 Minimum headroom provided
 - 3.4 Vehicular restraint systems type
4. STRUCTURAL SCHEMATIC
 - 4.1 Functional framing
 - 4.2 Load transfer and load path
 - 4.3 Stability consideration (e.g. vertical / lateral cross bracings, etc.)
 - 4.4 Identification of key elements (e.g. Foundations, cantilever / transfer beam, slender columns etc.)
 - 4.5 Design method of construction and sequence of works (e.g. off-site prefabrication, etc.)
 - 4.6 Key ancillary support elements
 - 4.7 Key design risks and hazards associated with the proposed scheme
5. DESIGN CRITERIA
 - 5.1 Design situation and design life
 - 5.2 Actions
 - a) Permanent actions
 - b) Variable actions
 - c) Wind actions
 - d) Thermal actions
 - e) Accidental actions (e.g. collision loads)
 - f) Any other action not covered above (e.g. provision for future extension)
 - 5.3 Ultimate limit state
 - a) EQU Limit state (e.g. unbalanced loads)
 - b) STR Limit state
 - c) GEO Limit state
 - d) Combination of actions including partial factors, model factors and combination factors as well as all construction stage checks

- 5.4 Serviceability limit state
 - a) Allowable settlement and deflection
 - b) Allowable crack width
 - c) Combination of actions including partial factors and model factors as well as all construction stage checks
 - 5.5 Authorities consulted and any special conditions required
6. EXISTING CONDITIONS
- 6.1 Geotechnical conditions
 - a) Adequacy of the geological and geotechnical data
 - b) Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any proposed changes
 - c) If the Geotechnical Design Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations.
 - 6.2 Structural conditions
 - a) Available data (e.g. As-built information)
 - b) Visual inspection reports
 - c) If as-built information to be verified due to importance of structures, then method / approach to verify the data (e.g. Foundation verification)
 - d) If as-built information is not available, methods to investigate structural elements including foundations (e.g. Investigation of pile toe)
7. STRUCTURAL / GEOTECHNICAL ANALYSIS AND DESIGN
- 7.1 Description and diagram of idealised structure to be used for analysis (e.g. Free-body diagrams) with boundary conditions and highlight key combination of actions
 - 7.2 Methods of analysis proposed for the design of structure and foundations
 - 7.3 Assumptions intended for calculation of structural element stiffness
 - 7.4 Proposed range of soil parameters to be used for geotechnical design
 - 7.5 Proposal to verify the analysis and countercheck analytical solutions
 - 7.6 Materials and strength
 - a) Material characteristic and properties
 - 7.7 Durability aspect of design such as exposure condition, nominal cover, concrete mix design, etc.
 - 7.8 Design of critical connections and detailing (e.g. moment connection/rigid joints, etc.)
 - 7.9 List of relevant documents
 - a) List of relevant documents from the Technical Acceptance Schedules (TAS)
 - b) Additional relevant Standards proposed to be used
 - c) List of relevant documents from Particular Specification
 - 7.10 Proposed departures from Standards given in 7.9
 - 7.11 Proposed method of dealing with aspects not covered by Standards in 7.9
8. MAINTENANCE AND OPERATIONS
- 8.1 Proposed arrangements for future maintenance and inspection
 - a) Access for inspection and repairs

9. DRAWINGS AND DOCUMENTS

9.1 List of drawings & documents accompanying submission

- a) Conceptual drawings include location plans, a general arrangement drawing, relevant parts of the Geotechnical Report, documents relating to consultation and any other relevant information
- b) Typical construction sequence
- c) Structural detailing and typical connection details for key structural elements

10. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed _____

Name _____

QP(Design)

Name of Organisation _____

Date _____

11. I HAVE REVIEWED THE ABOVE AND AGREE THAT THEY ARE ACCEPTABLE

Signed _____

Name _____

Accredited Checker

Name of Organisation _____

Date _____

**APPROVAL IN PRINCIPLE – A5
(Underpinning of Existing Structures)**

Contract No/Name of Project: _____

APPLICATION FOR APPROVAL IN PRINCIPLE

1. INTRODUCTION
 - 1.1 Project description and scope
 - 1.2 Objectives
2. SITE DETAILS
 - 2.1 Adjacent Existing structures / buildings (other than underpinning structures)
 - 2.2 Adjacent underground services / utilities
 - 2.3 Site constraints (e.g. Interfacing / traffic / services constraints and obstruction)
3. EXISTING STRUCTURE AND UNDERPINNING DETAILS
 - 3.1 Description of existing structure (e.g. structural & foundation type, arrangement, etc.)
 - 3.2 Basic underpinning layout and sectional details including geometry dimensions and depths
 - 3.3 Provision for future development, if any
4. STRUCTURAL SCHEMATIC OF UNDERPIN DESIGN DETAILS
 - 4.1 Outline Functional framing of Underpinning Design
 - 4.2 Load transfer and load path of Underpinning Design Considerations
 - 4.3 Stability consideration (vertical / lateral)
 - 4.4 Identification of key elements (e.g. Foundations, cantilever/transfer beam, slender columns etc.)
 - 4.5 Design method of construction and sequence of works
 - 4.6 Key ancillary support elements
 - 4.7 Key design risks and hazards associated with the proposed underpinning scheme
5. DESIGN CRITERIA
 - 5.1 Design situation and design life
 - 5.2 Actions
 - a) Permanent actions
 - b) Variable actions
 - c) Soil and water actions
 - d) Actions from road and railway vehicles
 - e) Surcharge
 - f) Wind and Thermal actions
 - g) Actions induced by cranes and machinery during lifting (e.g. pulling/pushing etc.)
 - h) Accidental actions
 - i) Any special action not covered above (e.g. future development loads)

- 5.3 Ultimate limit state
 - a) EQU Limit state (e.g. unbalanced loads)
 - b) STR Limit state
 - c) GEO Limit state
 - d) UPL Limit state
 - e) HYD Limit state
 - f) Combination of actions including partial factors and model factors as well as all construction stage checks
 - 5.4 Serviceability limit state
 - a) Allowable settlement and deflection
 - b) Allowable crack width
 - c) Combination of actions including partial factors and model factors as well as all construction stage checks
 - 5.5 Authorities consulted and any special conditions required
6. EXISTING CONDITIONS
- 6.1 Geotechnical conditions
 - a) Adequacy of the geological and geotechnical data
 - b) Acceptance of recommendations of the Geotechnical Design Report to be used in the design and reasons for any proposed changes
 - c) If the Geotechnical Design Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations
 - 6.2 Structural conditions
 - a) Available data (e.g. As-built information)
 - b) Visual inspection reports
 - c) If as-built information to be verified due to importance of structures, then method / approach to verify the data (e.g. Foundation verification)
 - d) If as-built information is not available, methods to investigate structural elements including foundations (e.g. Investigation of pile toe)
7. STRUCTURAL / GEOTECHNICAL ANALYSIS AND DESIGN
- 7.1 Description and diagram of idealised structure to be used for analysis (e.g. Free-body diagrams) with boundary conditions and highlight key combination of actions
 - 7.2 Assumptions considered in the design
 - 7.3 Methods of analysis proposed for the design of structural works
 - 7.4 Assumptions intended for calculation of structural element stiffness
 - 7.5 Proposed range of soil parameters to be used for geotechnical design
 - 7.6 Sensitivity analysis and proposed variation of parameters
 - 7.7 Proposal to verify the analysis and countercheck analytical solutions
 - 7.8 Materials and strength
 - a) Material characteristic and properties
 - 7.9 Durability aspect of design
 - a) Exposure condition, nominal cover, concrete mix design, etc.
 - b) Water tightness and waterproofing details
 - 7.10 Design of critical connections and detailing
 - 7.11 List of relevant documents
 - a) List of relevant documents from the Technical Acceptance Schedules (TAS)
 - b) Additional relevant Standards proposed to be used
 - c) List of relevant documents from Particular Specification
 - 7.12 Proposed departures from Standards given in 7.11

7.13 Proposed method of dealing with aspects not covered by Standards in 7.11

8. INSTRUMENTATION AND MONITORING

8.1 Guidance for instrumentation and monitoring of existing structures (e.g. piers / columns / beams etc.)

8.2 Review levels for instrumentation and monitoring

9. DRAWINGS AND DOCUMENTS

9.1 List of drawings & documents accompanying submission

- a) Conceptual drawings include location plans, a general arrangement drawing, relevant parts of the Geotechnical Report, documents relating to consultation and any other relevant information
- b) Typical construction sequence
- c) Structural detailing and typical connection details for key structural elements

10. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed	_____	_____
Name	_____	_____
	QP(Design)	QP(Design, Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

11. I HAVE REVIEWED THE ABOVE AND AGREE THAT THEY ARE ACCEPTABLE

Signed	_____	_____
Name	_____	_____
	Accredited Checker	Specialist Accredited Checker (Geo) (where applicable)
Name of Organisation	_____	_____
Date	_____	_____

Technical Acceptance Schedules (TAS) Related to Design of Permanent / Temporary Structures

LTA CDC	Land Transport Authority Civil Design Criteria
LTA M&W	Land Transport Authority Materials and Workmanship Specification
SS EN 1990	Eurocode : Basis of Structural Design
SS EN 1991	Eurocode 1: Action on Structures
SS EN 1992	Eurocode 2: Design of Concrete Structures
SS EN 1993	Eurocode 3: Design of Steel Structures
SS EN 1994	Eurocode 4: Design of Composite Steel and Concrete Structures
BS EN 1995	Eurocode 5: Design of Timber Structures
SS EN 1997	Eurocode 7: Geotechnical Design
SS EN 1998	Eurocode 8: Design of Structures for Earthquake Resistance
BS EN 1999	Eurocode 9: Design of Aluminium Structures
SS EN 197	Cement
SS EN 206	Concrete – Specification, performance, production and conformity
SS 544	Concrete – Complementary Singapore Standard to SS EN 206
SS 560	Specification for steel for the reinforcement of concrete – Weldable reinforcing steel – Bar, coil and decoiled product.
SS 561	Steel fabric for the reinforcement of concrete

Note:

1. The QP(Design) is required to verify the latest revisions of the above standards and list in the Approval in Principle (AIP) documents any other additional standards for the Authority's acceptance.
2. The QP(Design) is required to verify and use the prevailing Singapore National Annexes and include it in the Approval in Principle (AIP) documents accordingly.

* To delete as appropriate

Name of Structure : _____

- Date _____

CONTRACT CR206

DESIGN AND CHECK CERTIFICATE – C2
***(PERMANENT / TEMPORARY WORKS - #MAJOR STRUCTURE)**
 * To delete as appropriate

Contract No/Name of Project: _____

Name of Structure : _____

1. We certify that reasonable professional skill and care has been used in the preparation of the design and check of the works with a view to securing that:
 - i. It has been designed and checked in accordance with:
 - a. The relevant standards as in Annex (Please state).
 - b. The LTA Civil Design Criteria, M&W Specification and Particular Specification.
 - c. The Approval in Principle dated including the following:
 - d. Prevailing Building Control Act and Regulations.
 - ii. It has been accurately translated into design submission drawings. The unique numbers of these drawings and schedules are:
2.
 - i. The following Departures from Standards and additional criteria given in paragraph 1 are agreed. (State description or None Applicable)
 - ii. It has been directed that the following items shall be dealt with as described. (State description or None Applicable)

Signed _____

Name _____

QP (Design)

QP(Design, Geo)

Name of Organisation _____

Date _____

Signed _____

Name _____

Accredited Checker

Specialist Accredited Checker (Geo)

Name of Organisation _____

Date _____

#Major structure: Building works that are NOT listed in the Fourth Schedule of the Building Control Regulations

**AS-BUILT COMPLIANCE CERTIFICATE – C3
(PERMANENT WORKS - #MINOR STRUCTURE)**

Contract No/Name of Project: _____

Name of Structure : _____

1. We certify that reasonable professional skill and care has been used in the preparation of the as-built drawings with a view to securing that:
 - i. All departures and deviations from the approved drawings have been agreed and captured:
 - a. Major structural amendments comply to the AIP dated _____ and have been resubmitted to relevant Authorities for approval and clearly highlighted with concise descriptions.
 - b. Minor structural amendments (i.e. immaterial changes) are highlighted and concise descriptions of these amendments are shown.
 - ii It has been accurately translated into as-built submission drawings. The unique numbers of these drawings and schedules are:
- 2 We certify that the departures and deviations from the approved drawings will not adversely affect the structural integrity and function of the Structure.

Signed		
Name	QP (Design)	QP(Supervision)
Name of Organisation		
Date		

#Minor structure: Building works that are listed in the Fourth Schedule of the Building Control Regulations

