QBC-ITP | CULVERT CONCRETE PIPE - INSPECTION & TEST PLAN

ITP CODE	CU
REVISION	00

Project	J235 Mary and William Streets Blackstone Traffic Signalisation	**Date Developed**	25/03/2024	**Developed By**	Shaheen Ahmed	**Reviewed By**	Reece Doyle
Process	CU – Culvert, Concrete Pipe	**Contract No.**	22284	**Client**	Ipswich City Council	**Approved By**	Cameron Lochran

Ref No.	Inspection / Test / Approval Point	Inspection / Test Method / Standard / Specification	Stage or Frequency of Sampling	Acceptance Criteria	Method	Level of Inspection	Verification By	Record
1	Define Lot	MRTS50 CL7.1, 7.2	Each Culvert Size	Lot boundaries are defined to allow positive identification of work within the project. **Max lot size: Each Culvert Size**	QBC QA Records	Review	CQR	Verification Checklist Sheet SW
2	Underlying Lots conform. (if applicable)	Lot Register Relevant Lots	Prior to commencement of works	Works cannot commence until underlying lots are conforming.	QBC QA Records	Inspection	CQR	Verification Checklist Sheet SW
3	Submission and Acceptance of Construction Procedure	MRTS03 CL 11.3.1 **HOLD POINT 2**	Prior to commencement of works	Construction of culverts shall not commence until the construction procedure has been submitted and approved by the Administrator. For concrete pipe culverts, refer to Clause 11.3.5 for additional requirements for constructions loads. **MRTS03 CL 11.3.1 MILESTONE & HOLD POINT 2**	QBC QA Records Contractor Notice	**Hold Point**	CQR Administrator	Verification Checklist Sheet SW Hold Point Release
4	Approval of Backfill/ Bedding Materials	MRTS04 CL 19.1 **HOLD POINT 11** ICC Standard Drawing SD11	Prior to commencement of works	Prior to incorporating any Backfill material into the Works, the Contractor shall submit stockpile or source tests results as specified in Appendix A which demonstrate the source meets the specified material requirements. Hold Point 11 Materials to be used for different zones as per SD11: Bedding material (foundation, haunch and overlay) to have the following grading or course, clean, sharp river sand approved by Council's Engineer. AS Sieve Size / % Passing by mass 19.0 / 100 2.36 / 40 – 100 0.425 / 15 – 70 0.075 / 3 – 30	QBC QA Records	**Hold Point**	CQR Administrator	Verification Checklist Sheet SW Hold Point Release
5	Material Compliance	MRTS25 CL6.1.1 **MILESTONE** MRTS25 CL6.1.1 **HOLD POINT 3** MRTS25 CL6.2 MRTS25 CL7 MRTS25 CL8.2 **MILESTONE** MRTS25 CL8.2 **HOLD POINT 4** MRTS25 CL 8.3 **HOLD POINT 5** MRTS25 CL10	14 days prior delivery	Pipes have been manufactured in accordance with MRTS 25 – Manufacture of Precast Concrete Pipes and Culverts The approval certificate shall be submitted to the Administrator two weeks before any pipes are delivered to site. Milestone No pipes shall be delivered to site before the constituent concrete materials and blend of cementitious materials are approved. **MRTS25 CL6.1.1 HOLD POINT 3 & MILESTONE** Reinforcement used in the manufacture of steel-reinforced precast concrete pipes in accordance with this specification, shall comply with the requirements of AS/NZS 4058 and shall be sourced from a Transport and Main Roads registered supplier. MRTS25 CL6.2 MRTS25 CL7 specifies that concrete pipes shall be manufactured in accordance with the Technical Specification, and AS/NZS 4058 with the following amendments: • Specified cover requirements are not applicable to steel nibs or stainless-steel nibs used to maintain cover to circumferential reinforcement, or the ends of longitudinal reinforcement. • Curing of concrete pipes shall be conducted by either wet or steam curing to ensure that all specified performance and durability requirements of this Technical Specification and AS/NZS 4058 are met. If steam curing is used, the rate of temperature rise shall be managed to ensure that no damage or cracking occurs in the pipe, and the maximum enclosure temperature shall not exceed 70°C. MRTS25 CL8 states that the following information shall be provided to the administrator: • Drawing or tabulation showing pipe dimensions, tolerance, and type of joint. No pipes shall be delivered to the site until written acceptance has been obtained from the Administrator. **MRTS25 CL8.2 HOLD POINT 4 & MILESTONE** • With each batch of pipes delivered to the site a delivery docket shall be supplied that provides traceability to a conformance report for the batch. The delivery docket shall also state that the pipes supplied conform to the requirements of AS/NZS 4058 and this Technical Specification. Final acceptance of pipes shall be subject to receipt and acceptance of this report by the Administrator. **MRTS25 CL8.3 HOLD POINT 5** Pipes shall be marked in accordance with AS/NZS 4058. MRTS25 CL10	QBC QA Records	**Hold Point**	CQR	Verification Checklist Sheet SW Hold Point Release

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6	Survey Set-out of installation	MRTS01 CL8 **HOLD POINT 1**	For each culvert	The Contractor shall set out an installation as shown on the Drawings in sufficient detail to identify the location, length, and levels of the proposed installation. Once the initial set out is complete the Administrator will determine the design appropriateness of the set out with regard to the actual site conditions Hold Point 1 The Administrator may direct amendments to the set-out details. Payment for such amendments will be made at appropriate rates in the Schedule of Rates or, where such rates are not deemed by the Administrator to be appropriate, as determined by the Administrator. Installations to be set out in accordance with the above requirements include: a) drainage pipes, culverts, and structures b) landscaping, and c) c) traffic control and lighting ducts, pits, poles, and equipment.	QBC QA Records Administrator surveillance on-site	Hold Point	CQR Administrator	Verification Checklist Sheet SW Hold point release
7	Inspection of Bandage Cover Samples	ICC Standard Drawing SD11 MRTS03 CL11.2 **HOLD POINT 1**	Prior to commencement of works	Unless otherwise specified, joints between lengths of box culverts, tops and sides shall be covered outside by a mortar not less than 150mm in width and a minimum of 20mm thickness. Mortar bands shall be reinforced with chicken wire for a minimum width of 130mm. Approved jointing tape, applied in accordance with the manufacturer's instructions, may be substituted for mortar bands. Alternatively, bandage covers shall be a suitable proprietary product consisting of: a) a synthetic woven or non-woven fabric factory impregnated with a rubberised bitumen, or a neutral petrolatum based compound, or b) plastic or natural rubber bands. Woven or non-woven fabrics shall have the following properties: a) grab tensile strength not less than 300 N (50 mm wide strip) b) thickness not less than 1.25 mm, and c) mass not less than 1.4 kg/m². Samples of the materials to be used as bandage covers shall be made available for inspection by the Administrator prior to commencement of installation. **MRTS03 CL 11.2 HOLD POINT 1**	QBC QA Records Contractor Notice	Inspection or alternatively, **Hold Point 1**	CQR Administrator	Verification Checklist Sheet SW Hold Point Release (alternative)
8	Bottom of Excavations	MRTS04 CL13.3.3.4 MRTS04 CL13.3.3.3 MRTS04 CL13.3.6 MRTS04 CL13.3.7.1 MRTS04 CL13.3.5 MRTS04 CL13.3.8 MRTS04 CL9.4 **HOLD POINT 4**	During excavation of culvert trench	The Contractor shall take all necessary precautions to protect an excavation and all personnel and equipment in or about an excavation, including provision of all necessary temporary Works and equipment. Upon completion of construction within an excavation, all temporary Works shall be removed in such a way as not to damage any finished structure and ensure the finished works meet the requirements of this Technical Specification in all regards. MRTS04 CL13.3.3.3 The material in the bottom of confined excavations shall comply with the following density: Bottom of excavations (other than subgrade) (13.3.3.4, 13.3.6) | All Materials | 95% minimum Where the insitu material does not comply, it shall be compacted to a depth of at least 150 mm in accordance with the requirements of Clause 15. The widths of excavations for culverts shall be the minimum necessary for their construction and placement of backfill against them, provided that nowhere shall such widths be more than those shown on Standard Drawing 11. Culvert inlet/outlet drains shall be constructed from the extremities of end structures to culverts and shall transition smoothly to existing adjacent natural drainage channels or to the boundary of the Site, whichever is closer. MRTS04 CL13.3.7.1 Where dewatering of excavations is required, it shall be carried out in compliance with the requirements of the Environmental Management Plan. Under no circumstances shall water be disposed of into sanitary sewers unless explicit permission to do so is granted by the relevant asset owner. MRTS04 CL13.3.8	QBC QA Records Geotechnical Test	Record **Hold Point 4**	CQR Geotechnical Tester	Verification Checklist Sheet SW Geotechnical Report

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9	Unsuitable Material – if required	MRTS04 CL9.4	For each unsuitable found	Where Unsuitable Material or potentially Unsuitable Material is encountered on the Site, the Contractor shall, before proceeding to remove or cover such material, notify the Administrator, and provide any test results required to justify such a claim. Hold Point 4	QBC QA Records Administrator surveillance on-site	Hold Point 4	CQR Administrator	Verification Checklist Sheet SW Hold point release
10	Compaction of Bottom of excavation	Annexure MRTS03.1 Table 6.1 Table 15.3(b) MRTS04 CL13.3.3.4	For each lot	The material in the bottom of confined excavations shall comply with the density requirements of Clause 15. Where the insitu material does not comply, it shall be compacted to a depth of at least 150 mm in accordance with the requirements of Clause 15. **Min density required is 95%. 1 test per 300m3, min 1 per material.**	Test	Test	CQR	Verification Checklist Sheet SW Test report
11	Placement and compaction of bedding material	ICC SD11 Annexure MRTS03.01 Table 6.1	For each lot	Foundation bedding as per ICC Standard Drawing 11. - 100mm bedding if pipe ID < 1650mm; 150mm bedding if pipe ID =>1650mm Bedding compaction: Non-cohesive material – density index of 70 min, refer AS1289.5.5.1 Sand – compact by flooding and use of vibrators. **Testing (MRTS03.1 Table 6.1):** Stockpile: grading Q103 1 test per 100m3 Linear Shrinkage Q106 1 test per 100m3 - Max LS 6 as per table 19.2.7 MRTS04	QBC QA Records Test	Test	CQR	Verification Checklist Sheet SW Test report
12	Installation of pipes	MRTS03 CL12.3.3 MRTS03 CL12.3.4	Each Lot	Drainage trough components shall be assembled in accordance with the manufacturer's drawings and recommendations as relevant. Where possible, laying of drainage trough components shall commence at the outlet end of the culvert and progress to the inlet end. The ends of components shall be free of any foreign matter at the time of jointing. Spacing between greater than 1 barrel culverts shall be as per Standard Drawing 1359. Components shall be selected and arranged to give best fit. The ends of components shall be free of any foreign matter at the time of jointing. When butt and flush joints are specified, the drainage trough components shall abut one another.	QBC QA Records	Inspection	CQR	Verification Checklist Sheet SW
13	Cutting of Culvert Components	MRTS03 CL12.3.5	Each component requiring cutting	Cutting operations shall provide neat end surfaces. The cut surfaces of reinforced concrete culvert components shall be given two coats of a surface tolerant epoxy. The cut surfaces of steel culvert components shall be given two coats of zinc-rich organic priming paint as specified in AS 3750.9. The coats shall have a combined thickness at least equivalent to the thickness of the galvanised coating. Each coat shall overlap the adjacent uncut surfaces by not less than 25 mm.	QBC QA Records	Inspection	CQR	Verification Checklist Sheet SW
14	Survey of "As-built" Culvert	MRTS03 CL8	For each culvert	**Horizontal Tolerances:** The horizontal alignment of culverts shall not vary from the location specified in the drawings by more than ± 100 mm. **Vertical Tolerances:** The invert heights of culverts shall not vary from those specified by more than ± 10 mm, provided always that nowhere shall the grades of culverts depart from those specified by more than 1% (absolute). Notwithstanding these tolerances, the minimum thickness of cover over culverts shall nowhere be less than as shown on the drawings and shall be nowhere less than the following: a) 100 mm for concrete box culverts, and cast-in-place concrete slab deck culverts and concrete unitary box culverts if deck wearing surfaces are not specified. b) 300 mm for concrete pipe culverts, and c) c) 600 mm or $\frac{\text{Diameter or Span}}{6}$ whichever is the greater for corrugated steel culverts.	QBC QA Records	Survey	CQR Surveyor	Verification Checklist Sheet SW Survey report
15	Approval to Backfill	MRTS03 CL11.3.10 **HOLD POINT 4** MRTS04 CL19.3.3 **HOLD POINT 12**	Prior to commencement of works	Backfilling of culverts shall not commence until all the conformance and As Constructed Survey requirements have been met and notice of such works provided to the Administrator. **MRTS03 CL11.3.10 HOLD POINT 4** Backfill material shall not be placed until culverts, structures, pipes, pits etc. have been completed and inspected, and any specified curing periods have elapsed. **MRTS04 CL19.3.3 HOLD POINT 12**	QBC QA Records	**Hold Point**	Surveyor CQR Administrator	Verification Checklist Sheet SW Hold Point Release Survey Report

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16	Backfilling Layer Thickness	MRTS04 CL19.3.3 MRTS04 CL19.3.4	Each Lot	Where the material is placed on opposite sides of a culvert, structure, pipe, conduit, pit, etc, the difference in level of compacted material on the opposing sides shall not exceed 150 mm, unless shown otherwise on the drawings. Foundation bedding, haunch, side, and overlay zones for concrete pipe culverts shall be constructed as shown on Standard Drawing 1359. MRTS04 CL 19.3.4	QBC QA Records	Inspection	CQR	Verification Checklist Sheet SW
17	Compaction of Backfill Material	ICC SD11 Annexure MRTS 03.01 Table 6.1	1 test per 300m3	Notes from ICC SD11: • Bedding material (foundation, haunch and overlay) to have the following grading or course, clean, sharp river sand approved by Council's Engineer. AS Sieve Size / % Passing by mass: 19.0 / 100; 2.36 / 40 – 100; 0.425 / 15 – 70; 0.075 / 3 – 30 • Backfill to consist of approved subgrade replacement material with a minimum California Bearing Ratio of 15, placed in layers not exceeding 250mm loose and compacted until the dry density is not less than 95% Modified Dry Density. • Selected material from excavations shall be placed in layers not exceeding 250mm loose in depth and shall be compacted to a minimum consolidated of 95% Standard Compaction. • Wingwalls fill/backfill material shall be placed 300mm thick behind wingwalls for the length and height of the wings. • Working loads are those due to fill material and standard highway vehicles as per AS 3725. Construction loads have not been allowed for. Testing as per MRTS03.1: Side & overlay zones: MDR Q140A 1 test per 300m3 or Min 1 per material type	QBC QA Records Geotechnical Test	Record	CQR Geotechnical Tester	Verification Checklist Sheet SW Geotechnical Report
18	Final Inspection	MRTS03 CL11.3.5 **HOLD POINT 3**	Each Lot	At the completion of the pipe installation, including placement and compaction of fill to the final specified fill height, the contractor shall undertake a defect inspection. The following process shall be implemented if a visual inspection cannot be completed due to visibility or access. A CCTV defect inspection with WNCAN report to demonstrate that the completed pipe installation is acceptable to the department and that the pipes are correctly installed and are free of Defect Types 2,3,5, 6 and 7 as defined in MRTS25 *Manufacture of Precast Concrete Pipes* for Steel Reinforced Concrete Pipes and free of cracks and joint damage for Fibre Reinforced Concrete Drainage Pipes. **MRTS03 CL11.3.5 HOLD POINT 3**	QBC QA Records	**Hold Point**	CQR Administrator	Verification Checklist Sheet SW
19	Lot Closed	MRTS50 CL10.1, 11	For this lot	Lot records conform to relevant specifications. Any NCRs have been actioned and closed. **Final Conformance requirements:** • Verification Checklist Sheet SW • Test reports. • Survey conformance report • Hold points released. • CCTV inspection report	QBC QA Records	Review	CQR	Verification Checklist Sheet SW