

		Inspection and Test Plan - Underground Stormwater Drainage						Document # 1145-C200-FUL-QAC-ITP-0017				
								Revision : 02B Date: 01/12/2023				
Client: MRPV Project: Craighieburn Road Upgrade Contract No: CONS-1145		Construction Process: Underground Stormwater Drainage Specifications: Project Specification 1200 and 3030 VicRoads Specifications Sec. 610 (Feb-20), 619 (Dec-17), 701 (May-20), 705 (May-20) Structure / Component: Drainage Pipes, Culverts, Pits and Headwalls Location:				Prepared by: Name: Position: Date :		Reviewed by : Name: Nicola Lodo Quality Manager Date :		Approved by : Name: Date :		
Lot No: ITP-017-AX-LOT-XXX		Lot Details: ITP-017-AX-LOT-XXX - DESC				Lot Size/ Quantity:						
Item No.	Task/Activity Description	Inspection / Controls and Verification Detail					HP/ WP/ AP/ IP/ TP/ SCP	Responsibility Project Engineer Site Engineer Superintendent Surveyor Foreman GPP Coordinator	Checked by:			
		Frequency	Acceptance Criteria	Reference Documents	Inspection / Test Method	Record of conformity			Superintendent	Fulton Hogan	FH's Sub-contractor	Date
1	Preliminary Works (FH Internal)											
1.1	Work pack briefing	Prior to Commencing Work	All personnel on site have been briefed on the relevant work pack to scope of works. (includes subcontractors as/if required) <input type="checkbox"/> Work Pack (WP) _____	WP	Verify	Work pack signed.	HP*	Project Engineer	N/A			
1.2	Lot Map	each/line	Lot is assignend and recorded on lot map				IP	Project Engineer	N/A		N/A	
1.2	Check that current revision drawings are being used	Prior to Commencing Work	Issued For Construction (IFC) and latest available design revision in use (RFI). <input type="checkbox"/> Design Drawings _____ <input type="checkbox"/> RFI Approval Number _____	IFC Project Drawings/ Drawing Register	Verify	Latest revision IFC drawings	HP*	Project Engineer	N/A		N/A	
1.3	Ground Penetration Permit (GPP) issued by GPP Coordinator	Prior to Commencing Work	Current GPP signed and specific to the area where works will be executed. Including walk through of the work area with the site team and GPP Coordinator prior to works. <input type="checkbox"/> GPP No _____	Excavation Permit	Verify	Excavation Permit	HP*	Project Engineer / GPP Coordinator	N/A		N/A	
1.4	Extension/ Modification of exisisting drainage pits	Prior to Commencing Work	If there are any modification required to an existing drainage pit this will require the use of Structural Patch ITP.	1145-C200-FUL-QAC-ITP-0082	Document review	Teambinder Approval, Proof Engineering certificate	HP*	Project Engineer	N/A		N/A	
2	Stormwater Drainage Material Supply & Approvals											
2.1	Drainage Pipes (RCP)	Each Line	<u>Pipe Supply & Box Culverts.</u> <input type="checkbox"/> CRG XX – Dia XX to XX - RCPA <input type="checkbox"/> CRG - XXX - Culverts - XXX <input type="checkbox"/> Other: _____ Documentation as per 701.05 is available in Teambinder Material Approval form	701.04, 701.05	Verify	This ITP	IP	SE	N/A		N/A	

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2.11	Drainage Pipes (StormPro)	Each Line	<u>Pipe Supply</u> <input type="checkbox"/> CRG XX – Dia XX to XX - Supplier Convic <input type="checkbox"/> Other: _____ Documentation as per 701.05 is available in Teambinder Material Approval form	701.04, 701.05	Verify	This ITP	IP	SE	N/A	N/A		
2.12	Drainage Pits	Each Pit	<u>Pit Supply</u> <input type="checkbox"/> CRG XX – Dia XX to XX - AUSPITS/CUBIS <input type="checkbox"/> Other: _____ Documentation as per 701.05 is available in Teambinder Material Approval form	705.07	Verify	This ITP	IP	PE	N/A	N/A		
2.2	Drainage Bedding Material Supply Source / Approval Project Wide	Each Source Material	Bedding & Haunch Material <input type="checkbox"/> CRG XX – 20mm CL 3 wet mix FCR/CC – Holcim <input type="checkbox"/> CRG - XXX - 20 Screenings - XX Supplier <input type="checkbox"/> Other: _____ Material Approved via Teambinder Material Approval Form.	Table 701.091, Table 701.092	Verify	This ITP	IP	SE	N/A	N/A		
2.21	Drainage Bedding Material Supply Source Testing	Each Source Material/ 1 Test per 1000 tonnes	Bedding Materials comply with Table 701.091 and 701.092. RFI-0067 approves the use of Holcim 20mm CL3. 100% passing 19mm. 5%-40% passing 0.075mm. PI <= 20.	Table 701.091, Table 701.092, Cl. 701.29, Table 701.291 1145-FUL-RFI-0067	Test Grading and Plasticity Index	Test Records From Supplier	TP	PE	N/A	N/A		
2.3	Drainage Backfill Material	Each Source Material	Select Backfill; <input type="checkbox"/> CRG XX – 20mm CL3 wet mix CC – Holcim <input type="checkbox"/> CRG - XXX - Type A - Supply XX <input type="checkbox"/> Other: _____ Material Approved via Teambinder Material Approval Form.	Table 701.091, Table 701.092, Table PS3020.051	Verify	This ITP	IP	SE	N/A	N/A		


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		Frequency	Acceptance Criteria	Reference Documents	Inspection / Test Method	Record of conformity			Superintendent	Fulton Hogan	FH's Sub-contractor	Date
2.31	Backfill Material Testing	Each Source Material/ 1 Test per 1000 tonnes	Selected Material "Backfill" material tested at to ensure materials comply with the following: Grading & Plasticity Index- One per 1000 tonnes or part thereof	Table 701.091, Table 701.092, Cl. 701.29, Table 701.291	Test Grading and Plasticity Index	Test Records From Supplier	TP	SE	N/A		N/A	
2.4	Material Inspection (Upon Delivery)	Each Delivery	Material inspection to be raised on ConQA for all precast pits, pipes and culverts. Any existing or new pipes or box culverts that have cracks wider than 0.2mm or are otherwise damaged prior to laying and backfilling must be rejected and removed from the Construction Areas.	ConQA Order Acceptance Form	Verify	Insert ConQA Material Inspection Reference	IP	SE	N/A		N/A	
2.5	Pit Access covers	Each	Pit Access Cover (s) <input type="checkbox"/> CRG XX – Type D - XX Supplier <input type="checkbox"/> CRG - XXX - Type E - Supply XX <input type="checkbox"/> CRG - XXX - Type XX - Supply XX <input type="checkbox"/> Other: _____ Material Approved via Teambinder Material Approval Form.	705.04(b)	Verify	This ITP	IP	SE			N/A	


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			Acceptance Criteria					Project Engineer Site Engineer Superintendent Surveyor Foreman GPP Coordinator	Superintendent	Fulton Hogan	FH's Sub-contractor	Date													
3	Installation of Drainage Pipes and Pits																								
3.1	Drainage Pipes & Pits	Each Line	<u>Final Check for for any damages / cracks prior to installation</u> Any existing or new pipes or box culverts that have cracks wider than 0.2mm or are otherwise damaged prior to laying and backfilling must be rejected and removed from the Construction Areas.	701.31	Visual Inspection Daily drainage checklist	This ITP	IP	Foreman/ Subcontractor	N/A																
3.2	Survey Set Out / Position of pipe/culvert/pits	Each Line	Prior to commencement of excavation for the culverts and stormwater drainage, confirm the set out position & levels with the, <input type="checkbox"/> Superintendent <input type="checkbox"/> Area Foreman/ Supervisor <input type="checkbox"/> Subcontractor	VicRoads Spec. Cl. 701.10 IFC Drawing	Visual Inspection Daily drainage checklist	This ITP	HP	Engineer / Foreman / Subcontractor / Surveyor																	
3.3	Excavation	Each Line & Pit	Ensure trench* is excavated to prepare culvert foundation and specified depth of bedding. (*minium from trench wall or shoring as applicable) Box culverts: - distance between culvert wall and trench wall is between 0.5 - 1.0 x the overall height of the culvert. Pipe culverts: - the width of trench at and below the level of the top of the pipe shall be such that the horizontal clearance from the outside of the pipe to the wall of the trench is greater than >300mm, less than <600mm. Pits: - Clearance from external faces of the pit to each face of the excavation to be not less than 400mm Pipes: <table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th rowspan="2">Pipe Type</th> <th rowspan="2">Nominal Pipe Diameter or Width (mm)</th> <th colspan="2">Horizontal Clearance to Wall of Trench</th> </tr> <tr> <th>Min. (mm)</th> <th>Max. (mm)</th> </tr> <tr> <td>Corrugated Metal Culvert</td> <td style="text-align: center;">All</td> <td style="text-align: center;">300</td> <td style="text-align: center;">1,000</td> </tr> <tr> <td>Other</td> <td style="text-align: center;">All</td> <td style="text-align: center;">300</td> <td style="text-align: center;">600</td> </tr> </table>	Pipe Type	Nominal Pipe Diameter or Width (mm)	Horizontal Clearance to Wall of Trench		Min. (mm)	Max. (mm)	Corrugated Metal Culvert	All	300	1,000	Other	All	300	600	VicRoads Spec. Cl. 701.15 Table 701.151 Cl. 705.05(b)	Visual Inspection Daily drainage checklist	This ITP	IP	Foreman	N/A		
Pipe Type	Nominal Pipe Diameter or Width (mm)	Horizontal Clearance to Wall of Trench																							
		Min. (mm)	Max. (mm)																						
Corrugated Metal Culvert	All	300	1,000																						
Other	All	300	600																						


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3.3	Bedding	Each trench	Bedding material shall be provided and placed for the full width of the trench. The compacted thickness of bedding material following any shaping necessary shall be: - minimum 100mm for pipes of D< 1500mm 'D' is the nominal pipe diameter or culvert width. <u>If bedding is being applied on rock subgrade the minimum thickness shall be 150mm in all instances.</u> <u>The required bedding depth shall be excavated and placed to accommodate the joint collar.</u> Bedding and backfill materials shall be placed and compacted to refusal using hand held mechanical equipment in layers not exceeding 150 mm loose thickness . Once culvert sections are in position, an additional layer of bedding material is placed to a height equal to 30% of the nominal pipe diameter or culvert height.	VicRoads Spec. Cl. 701.16 Cl. 701.20(a)	Visual Inspection Daily drainage checklist	Test Report / This ITP	IP	Foreman	N/A		N/A	
3.4	Laying - Circular Pipe	Each culvert	Rebate and socket ends of pipe sections are positioned facing upstream and are to be fully entered. (Laying from downstream). The lower portion of the pipe shall be in contact with the bedding for the full length of each section. The compacted bedding shall be shaped to accommodate the joint collar and ensure that the pipe is supported along its full length.	VicRoads Spec. Cl. 701.17(b), Table 701.171	Visual Inspection Daily drainage checklist	ITP signed	IP	Foreman	N/A		N/A	


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3.5	Laying - Box Culverts	Each culvert	Consecutive sections of box culverts are firmly placed butted together. The top section matched to the bottom section and no lips over adjoining bottom sections. Contact areas between the top and bottom sections are mortared. Multi-row box culverts laid with sections in each row in contact with the sections in the adjacent rows.	VicRoads Spec. Cl. 701.17(c)	Visual Inspection Daily drainage checklist	ITP signed	IP	Foreman	N/A		N/A	
3.6	Laying - Cutting of RCP/Culverts (If applicable)	Each culvert	When cutting culvert section to length or to create a penetration, cuts to be done by machine to achieve a clean vertical face. Any exposed reinforcement shall be coated with Megapoxy P1 treatment to prevent corrosion.	VicRoads Spec. Cl. 701.17(d) 1145-FUL-AP-0100	Visual Inspection Daily drainage checklist	ITP signed	IP	Foreman	N/A		N/A	
3.7	Jointing Circular Pipe	Each culvert	Rubber Ring Joints (RRJs) jointed with rubber rings which have been kept undisturbed, clean, and free from dirt and other foreign materials and shall be stored undercover if pipes are not to be installed immediately. RRJs assembled and prepared in accordance with the manufacturer's recommendations.	VicRoads Spec. Cl. 701.18	Visual Inspection Daily drainage checklist	Manufacturer's recommendations ITP signed	IP	Foreman	N/A		N/A	
3.8	Survey	Each Lot	At the completion of each drainage run and before commencement of the next line, the location of each run of underground drainage shall be verified by a surveyor prior to backfilling the culverts. This shall be recorded progressively on the Contractor's as constructed drawings. Tolerances that apply: (a) offset of entry pits required to match lines of kerbs or barriers +/-20mm (b) plan location of pits other than offsets to kerb lines or barriers +/-100mm (c) Invert leve of pipes at pits +/-50mm whilst maintaining required drainage grade. (d) Departure from design grade of pipe runs +/-10mm in 10m (+/-0.1%) provided minimum grade is not less than 1:250 (0.4%).	VicRoads Spec. Cl.701.10	Survey Daily drainage checklist	Survey Report	HP*/ SCP	SE	N/A		N/A	

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3.9	Backfilling	Each culvert	Excavations for drainage pits and pipes must be backfilled with (min)Type A material or approved substitutes and, where applicable, pavement material above subgrade level Backfill types HS2 & H2 For Type A The fill must have characteristic moisture content not less than 90% between completion of rolling and the placement of the overlying layer. Culvert Under Area to be Paved: If the pipe haunch zone is within or above the pavement subgrade Where the trench has been excavated from design subgrade level or above, the trench above bedding is to be backfilled with <u>10mPa lean mix concrete to min 150mm above the pipe</u> and above that level with appropriate pavement material. Culvert Under Area not to be Paved: The trench is backfilled with Type A selected backfill material to a level 300mm above the top of the culvert and with ordinary backfill material above that level.	PS3030.06(K)(iii) VicRoads Spec. Cl. 701.19(a) 1145-C201-ACM-CVP-DRG-2122	Visual Inspection Daily drainage checklist	ITP signed	IP	Foreman	N/A		N/A	
3.10	Backfilling with cement stabilised sand (If required)	Each drainage line	Subject to superintendent approval, underground stormwater drains may be backfilled to half the pipe diameter or box culvert height with 3% stabilised sand. Mixture to have a water content sufficient to ensure penetration beneath the pipe or box culvert invert without leaving free surface water.	VicRoads Spec. Cl. 701.19(c)	Visual Inspection Daily drainage checklist	Superintendents Correspondence ITP signed	AP/ HP	Engineer / Superintendent			N/A	
4	Testing and Inspection											
4.1	Bedding Compaction Requirements	3 test per lot. (1 lot consists of one layer of bedding for a culvert length between pits or endwalls) Min. 20% of all lots for each culvert shall be tested.	Bedding assessed for compaction and /or moisture in lots. Bedding compacted to refusal using handheld mechanical equipment. Bedding material which has a swell equal to or greater than 2.5% shall be maintained at a mean moisture ratio of 92% between the completion of rolling and the placement of the overlying layer	VicRoads Spec. Cl. 701.20 (a)	Visual Inspection Daily drainage checklist	Compaction and moisture Test Records ITP signed	TP	Engineer	N/A		N/A	

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4.2	Backfill Compaction and Moisture requirements	3 test per lot. <i>(1 lot consists of one layer of bedding for a culvert length between pits or endwalls)</i>	Backfill as per the approved and selected material : Bedding/Backfill assessed for compaction and or moisture in lots. If backfill has a swell greater to or equal to 2.5% it must have characteristic moisture content not less than 92% between completion of rolling and the placement of the overlying layer -compacted to a mean value of density ratio of not less than 97%. Min. 20% of all lots for each culvert shall be tested (1 test every 750mm).	VicRoads Spec. 701.20 (b)	Site Inspection	Compaction and moisture Test Records ITP signed	TP	Engineer	N/A		N/A	
4.3	Flushing System	Each culvert	Each culvert flushed clean from end to end on completion and maintained in proper working order.	VicRoads Spec. Cl. 701.28	Site Inspection	ITP signed	IP	SE	N/A		N/A	
4.4	Inspection of drainage lines	Each culvert prior to construction of pavement layers	All drainage lines inspected with CCTV cameras, after completion of earthworks to subgrade level and prior to construction of pavement layers. Inspections shall be conducted by an independent testing organisation using CCTV to 0.1mm accuracy and reporting in accordance with WSA 05-2013 (Conduit Inspection Reporting Code of Australia), to verify that the flow of water is not obstructed by waste construction material left inside and to check for visible signs of defects Reports provided to the Superintendent, with a copy of the CCTV and a summary of the location of any defects detected. It is good practise to ensure that each culvert is flushed clean from end to end (i.e., Pit to Pit-including pit) on completion and maintained in proper working order prior to CCTV inspection. Any section of damaged pipe or box culvert which does not comply with Cl 701.31 is to be removed and where approved by the Superintendent, defects are to be repaired using approved procedures	Project Spec. Cl.3030.06 (k) VicRoads Spec. Cl. 701.30 and 701.31 AS/NZS 2566.2 Table 5.6	Site Inspection	Inspection Organisation Inspection report ITP signed	HP	Engineer / Superintendent			N/A	

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4.5	Repairs to Steel reinforced concrete pipes	Each culvert	Submit details of proposed rectification treatments including manufacturer's product specifications and warranties, the area and thickness of repair treatment, detailed repair procedures, and inspection and test plans. No repairs shall be undertaken without the Superintendent's approval of the repair materials and procedures. All repairs shall be inspected using CCTV to verify compliance with the repair specifications.	VicRoads Spec. Cl. 701.31	Site Inspection	ITP signed	HP	Engineer	N/A		N/A	
4.6	Flushing System	Each culvert	Each culvert flushed clean from end to end on completion and maintained in proper working order.	VicRoads Spec. Cl. 701.28	Site Inspection	ITP signed	IP	Engineer	N/A		N/A	
5	Close Out (TBC)											
5.1	Lot Map	each/line	Lot is assignend and recorded on lot map				IP	Project Engineer	N/A		N/A	
5.2	As build/ Redline	each/line	Changes to the design related to the lot have been recorded and transferred to the asbuild/ red line mark up				IP	Senior Project Engineer	N/A		N/A	

Notes
Final Inspection
 The signature below verifies that this ITP has been completed in accordance with the FH's Quality system Procedures and verifies lot compliance with specifications.

Print Name: _____

Position: _____

Signature: _____

Date: / /

 Work Completed On: _____

Legend		
HP	Hold Point	Work shall not proceed past the HP until released by the Superintendent
HP*	FH Hold Point	Work shall not proceed past the HP* until released by FH
AP	Approval Point	Written or verbal approval given by the Superintendent
	IP	Inspection point
	TP	Test Point
	SCP	Survey conformance point
	WP	Witness Point