Fulton Hogan	Inspection and Test Plan – Stormwater Drainage	Doc ID: R11-DRA-ITP	
Client: Iluka Resources Limited		**Prepared By: Simon Welsh**	**Date: 15/10/2024**
Project: Public Roads Upgrade		**Reviewed By: Joshua Kliemnt**	**Date: 11/11//2024**
Construction Process: Stormwater Drainage		**Approved By: Simon Jaworksi**	**Date: 11/11//2024**
Specifications: ETS100, 101, 102			
Structure / Component:			

Item No.	Task/Activity Description	Inspection/Test					Type	Responsibility	Checked/Verified by (initial/Date):			
		Frequency	Acceptance Criteria	Reference Documents	Inspection / Test Method	Record of conformity			TfNSW	Fulton Hogan	PV	Date
1	Preliminaries											
2	Check location of underground and above ground utilities	Per Area	▪ Before You Dig contacted ▪ Excavation Permit is obtained	WHSMP		Verification Checklist	IP	Site Engineer				
3	Check the type, size and class of pipes and other drainage structures to be laid Size: ……. Class:……	Per Delivery	Supplied items are: ▪ To correct spec, class, size and quantity ▪ Defect free, safely and securely stored ▪ Markings have been made as required ▪ Delivered 7 days after casting and concrete has reached specified 28 day strength	R11.2		Verification Checklist	IP	Site Engineer				
4	Supply of precast concrete members subject to traffic and/ or earth pressure loading, and water containing structures with capacity greater than 25,000 Litres	Per Type	Submitted design and manufacturing documentations to the Project Verifier for precast concrete structures which subject to traffic loads and/or earth pressure and water retaining structures with a capacity in excess of 25,000 litres.	R11.2.4.1		Hold Point	HP	Site Engineer		HP		
5	Incorporation into the works any supplied, manufactured drainage product.	Per Lot	Submit a Certificate of Conformity to the Project Verifier 7 days prior to incorporating into the works	R11.2.6		Hold Point	HP	Site Engineer		HP		
6	Verify conformance of BH (bedding & haunch) materials Material Conformance Lot:….	G:1/ 50m³ PI:/100m³	Grading limits as per Table 6 in AS 3725 except that ⩽12% passing 75µm & PI < 6	R11 3.1.1 R11/L Q6 8.1.1	T201 T109	NATA Test Report	TP	Site Engineer				
7	Verify conformance of SO (side & overlay) materials Material Conformance Lot:….	G:1/ 50m³ PI:/100m³	Max size 53mm, grading within limits in Table 7 of AS 3725 and PI >2 and < 12	R11 3.1.2 R11/L Q6 8.1.1	T201 T109 AS 3725	NATA Test Report	TP	Site Engineer				
8	Verify conformance of material Adjacent to Weepholes	Per Delivery	Broken stone or river gravel of max size 53mm and < 5% passing 9.5mm sieve	R11 3.2 R11/L	T201	NATA Test Report	TP	Site Engineer				

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9	Subsurface drainage pipes	Per Delivery	Provide certificate of compliance accompanied by NATA certified test results in accordance with TfNSW 3552 not more than 6 months old	R11.4.4.5 TfNSW 3552	T1505 T1506	Certificate of Conformity	IP	Site Engineer				
10	Inspect supplied items upon delivery	Per Delivery	Supplied items are to correct spec, class, size and undamaged Steel Reinforced Pipes as per CL3.3 & 3.4 of AS4058 Fibre Reinforced Pipe as per CL9 & 10 AS4139	QMP		Receiving Inspection Checklist	IP	Site Engineer				
11	Trenching and Excavation											
12	Construction of each drainage system	Per Lot	Set out the stormwater drainage systems as shown on the drawings in sufficient detail to identify: ▪ the locations, lengths and levels at outlets and inlets of pipes and box culvert structures; ▪ the locations and levels of gully pits, junction boxes, energy dissipaters, and inlet and outlet structures; ▪ the locations and levels of the ends of wing walls and headwalls; and ▪ the locations and levels of open drains. Notify PV that set out of drainage system has been completed.	R11.4.1.1		Hold Point	HP	Surveyor		HP		
			If set out is within 5 metres of an environmental sensitive area notify Environmental Manager	G36.4.12		Hold Point	HP	Surveyor			HP	

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<table>
<tr><th rowspan="2">Item No.</th><th rowspan="2">Task/Activity Description</th><th colspan="5">Inspection/Test</th><th rowspan="2">Type</th><th rowspan="2">Responsibility</th><th colspan="4">Checked/Verified by (initial/Date):</th></tr>
<tr><th>Frequency</th><th>Acceptance Criteria</th><th>Reference Documents</th><th>Inspection / Test Method</th><th>Record of conformity</th><th>TfNSW</th><th>Fulton Hogan</th><th>PV</th><th>Date</th></tr>
<tr><td>13</td><td>Excavate trench to the underside of bedding to correct width</td><td>Per Lot</td><td>▪ Width and depth of pipe trench as per AS 3725 and standard drawings, refer to right table
▪ For other structures, the clear width between structure wall & face of excavation is ≥ 300mm or 1/3 height of excavation face, whichever is greater
▪ Trenches > 1.5m deep are either shored or benched
▪ The excavation is ≤ 50mm beyond the specified width and depths of the trench
▪ For pipes under embankments
- “Embankment Condition”: embankment is constructed to a height ⩾ 0.7 times the external dia of the pipe above the top of the bed zone, and for a min lateral distance past the boundary of the trench of 2.5 times the external dia of the pipe
- “Trench Condition”: Trenches done after the construct of the embankment to the level of the underside of the Selected Material Zone</td><td colspan="5"><table>
<tr><th colspan="2">Pipe Size (mm)</th><th colspan="3">Minimum Depth (mm)</th><th colspan="4">Minimum Distance (mm)</th><th colspan="2">Single CLSM</th><th>Multiple CLSM</th></tr>
<tr><th rowspan="2">Nominal Internal Diameter</th><th rowspan="2">Outside Diameter at Collar</th><th>Bed</th><th>Haunch</th><th>Side</th><th colspan="2">Single</th><th colspan="2">Multiple</th><th rowspan="2">lc</th><th rowspan="2">lc†</th></tr>
<tr><th>x</th><th>y</th><th>z-y</th><th>lc</th><th>(Centreline separation)</th><th>lc†</th><th>(Centreline separation)</th></tr>
<tr><td>375</td><td>543</td><td>100</td><td>165</td><td>110</td><td>400</td><td>700</td><td>450</td><td>1000</td><td>130</td><td>150</td></tr>
<tr><td>450</td><td>647</td><td>100</td><td>195</td><td>130</td><td>400</td><td>800</td><td>450</td><td>1100</td><td>130</td><td>160</td></tr>
<tr><td>525</td><td>736</td><td>100</td><td>220</td><td>145</td><td>400</td><td>800</td><td>450</td><td>1200</td><td>140</td><td>170</td></tr>
<tr><td>600</td><td>831</td><td>100</td><td>250</td><td>165</td><td>400</td><td>900</td><td>500</td><td>1300</td><td>140</td><td>180</td></tr>
<tr><td>675</td><td>926</td><td>100</td><td>280</td><td>185</td><td>400</td><td>900</td><td>500</td><td>1400</td><td>150</td><td>190</td></tr>
<tr><td>750</td><td>1017</td><td>100</td><td>305</td><td>205</td><td>450</td><td>1000</td><td>500</td><td>1500</td><td>150</td><td>200</td></tr>
<tr><td>825</td><td>1086</td><td>100</td><td>325</td><td>215</td><td>450</td><td>1000</td><td>500</td><td>1600</td><td>150</td><td>200</td></tr>
<tr><td>900</td><td>1197</td><td>100</td><td>360</td><td>240</td><td>450</td><td>1100</td><td>500</td><td>1700</td><td>160</td><td>210</td></tr>
<tr><td>1050</td><td>1391</td><td>100</td><td>415</td><td>280</td><td>450</td><td>1200</td><td>500</td><td>1900</td><td>160</td><td>220</td></tr>
<tr><td>1200</td><td>1543</td><td>100</td><td>465</td><td>310</td><td>450</td><td>1200</td><td>550</td><td>2100</td><td>170</td><td>230</td></tr>
<tr><td>1350</td><td>1708</td><td>150</td><td>510</td><td>340</td><td>450</td><td>1300</td><td>550</td><td>2300</td><td>170</td><td>240</td></tr>
<tr><td>1500</td><td>1937</td><td>150</td><td>580</td><td>385</td><td>450</td><td>1500</td><td>600</td><td>2500</td><td>190</td><td>280</td></tr>
<tr><td>1650</td><td>2089</td><td>150</td><td>625</td><td>420</td><td>450</td><td>1500</td><td>600</td><td>2700</td><td>190</td><td>280</td></tr>
<tr><td>1800</td><td>2267</td><td>150</td><td>680</td><td>365</td><td>450</td><td>1600</td><td>600</td><td>2900</td><td>200</td><td>290</td></tr>
<tr><td>2100</td><td>2360</td><td>150</td><td>710</td><td>470</td><td>450</td><td>1800</td><td>600</td><td>3200</td><td>200</td><td>290</td></tr>
</table>
R11.4.3
MD.R240-01</td><td></td><td>Verification Checklist</td><td>IP</td><td>Site Foreman</td><td></td><td></td><td></td><td></td></tr>
<tr><td>14</td><td>Foundation Compaction</td><td>Q6/L</td><td>Foundation to be compacted to 95%. (Standard compaction)</td><td>R11.4.9.2
R11.4.9.3
Q6 8.1.1</td><td>T166</td><td>Test Report</td><td>TP</td><td>Site Engineer</td><td></td><td></td><td></td><td></td></tr>
<tr><td>15</td><td>Excavation for pipe installation and other drainage structures</td><td>Per Lot</td><td>Notify the Project Verifier of the anticipated date of completion of excavation and preparation of foundations.

Not later than 24 hours, but not earlier than 5 working days.</td><td>R11.4.3</td><td></td><td>Witness Point</td><td>WP</td><td>Site Engineer</td><td></td><td>WP</td><td></td><td></td></tr>
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			GDR to provide Geo-report to state that the foundation is suitable or need further treatment									
16	Remove & replace unsuitable materials, if directed by PV	Where required Q6/L	Replace with materials from cuttings or conforming material to full depth in 150mm layers and compact to 95% Standard Compaction	R11.4.3 Q6 8.1.1	T166	Test Report	TP	Site Engineer				
17	Replacement of inadequate foundation material.	Where required	Notification to the Project Verifier that inadequate foundation material has been excavated to the extent required.	R11.4.3.3		Witness Point	WP	Site Engineer		WP		
18	**Placement of Pipes**											
19	Place Bedding	Q6/L	▪ Bedding placed to a thickness of 100mm for pipes up to 1200mm dia pipes and 150mm for pipes greater than 120mm ▪ Bedding compacted to 95%	R11 R240-01		Verification Checklist	IP	Site Engineer				
20	Install pipes in accordance to manufacturer's instructions and design documentations	Per Lot	▪ Correct size and class of pipe installed ▪ Pipes laid from inlet to outlet with socket laid upstream ▪ Pipe support are Type HS3 conforming to AS3725 and MD R240-01 ▪ Pipe ends cleaned and rubber rings correctly installed ▪ Where grade exceed 20%: anchor blocks provided at 3m spacing max., at bends, junctions and where shown on drawings ▪ 100mm dia Subsurface drainage installed at the discharge end of pipes 3m long, laid beside & 100mm above invert level of drainage pipe ▪ All joints have rubber rings fitted and pipes butting against each other. ▪ Connection to pits in accordance with MD R220-43	R11.4.4 R240-01 R220-43		Verification Checklist	IP	Site Engineer				

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21	Pit/headwall to pipe connection	Per connection	▪ Pit to pipe connections are to be flush along the pit wall, with minimal protrusions or depressions.	CMS 7.8		Verification Checklist	IP	Site Engineer				
22	Verify that completed pipeline against survey marks	▪ Per Lot	▪ Completed pipeline is inline and within ±200mm of location (plan) ▪ Invert level are within 20mm of the design level at any point ▪ To be checked at each pit and headwall	R11.5.1 Table R11.4		Survey Report	SC	Surveyor				
23	Construction of Drainage Structures (Other Than Pipes and Box Culverts)											
24	Construction of drainage structures other than pipes and box culverts.	Per Structure	The notification is to be at least 7 days prior to the date of installation work.	R11.4.7.2		Witness Point	WP	Site Engineer		WP		
25	Place bedding layer underneath pit, or plain concrete blinding to headwalls. Ensure correct survey tools have been used to transfer levels, i.e. dumpy level	Per Structure	The bedding materials consists either of: For Precast Pits 50mm layer DGB20 or CLSM; For other than precast a 50mm blinding layer	R11.4.7.2		Verification Checklist	IP	Site Foreman				
26	Install precast drainage structures as specified on design documentations	Per Structure	▪ Installed within 14days after installation of associated pipes, box culverts or open drains ▪ Where drainage structure abuts a structure or concrete pavement, a 10mm wide filler complying with TfNSW 3204 is installed as an isolation joint ▪ Subsoil drainage pipe connected to downstream headwalls/pits ▪ Lifting holes are sealed ▪ Structure is level and plumb	R11.4.7		Verification Checklist	IP	Site Foreman				

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27	Install Cast In place drainage structures (incl. headwalls and curtain walls) as shown on design documentations R53-GCW Lot No:_____	Per Structure	▪ Constructed as per R53-GCW-ITP ▪ Backfilled after 14 days of placing the concrete or when the 28 day compressive strength is achieved, whichever achieved earlier ▪ Insitu curtain walls at the outer edge of the aprons are only for pipes between 300-1200mm diameter	R11.4.7 R11.4.7.3		R53-GCW Lots	IP	Site Foreman				
28	Verify that the finished drainage structures are within tolerance, check pipe gaps over joints are within allowance	Per Structure	▪ Within ± 200 mm longitudinally ▪ Within ± 20mm laterally ▪ Within ± 20mm of design invert level	R11.5 Table R11.4		Survey Report	SU	Site Engineer				
29	Install rung ladders if pits are > 600mm deep	Per Pit	▪ Top of uppermost rung < 600mm below the top of the pit. ▪ Top of Bottom Rung is within 300 to 500mm above the invert of the pit. ▪ Rung spacing is 300±50mm	R11.4.7.4		Verification Checklist	IP	Site Engineer				
30	Patch grout around pipes recesses as required	Per Structure	▪ Cementitious grout is placed evenly covering the entire recess of the pipe-pit connections if any	DRA-CMS		Verification Checklist	IP	Site Foreman				
31	Install weepholes in headwalls and wingwalls, if provided	Per Structure	▪ Material placed to height ⩾ 450mm above the bottom of the weephole over a plan area ⩾ 600mm along the wall by 300mm out from the wall (Located centrally of the weephole) ▪ Enclosed it with geotextile filter fabric	R11.4.8 R63		Verification Checklist	IP	Site Foreman				
32	Place scour protection / dissipator, if required	Per Outlet Structure	▪ Scour protection and installation of dissipater completed as details specified in design documentations	Design DWGS		Verification Checklist	IP	Site Foreman				
33	**Backfilling**											
34	Place and spread haunch, side zone, overlay and backfill, compact and test to specified densities	Per Lot Q6/L	▪ Backfill placed in 150mm layers and compact to 95% std compaction (102% if within SMZ) ▪ Testing frequency refer to Q6/L3.1 (every layer if within SMZ) ▪ If stabilised sand used, the materials been vibrated to obtain complete placement & compaction of	R11.4.9.1 TfNSW Q6 Annexure Q/L Q6 8.1.1	T166 T120 T147	Test Report	TP	Site Engineer				

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			material under & around pipe and the placed stabilised materials are firm a day after placement. Working time to be noted. ▪ Stabilised sand not exempt from T166 in accordance with R11 ▪ Working times of stabilised sand should be considered (T147)									
35	CCTV Inspection	Per Line	▪ CCTV inspection of installed drainage completed after backfill of drainage line but before placement of pavements ▪ Video footage and report in accordance with WSA05-2008	R11.5.2		CCTV Report	IP	Site Engineer				
36	Moving heavy construction plant or vehicles over pipe or box culvert structures.	Per Location	Provide a certificate and verification of protective measures.	R11.4.11		Hold Point	HP	Site Engineer		HP		
37	Covering up of work subject to a conformity verification survey.	Per Lot	Survey Report verifying conformity.	G71.5.6.6	Survey	Hold Point	SU	Surveyor		HP		

Legend:

HP	Hold Point	Work shall not proceed past the HP until released by the Project Verifier	**IP**	Inspection point	Formal Inspection to be done and recorded
HP*	FH Hold Point	Work shall not proceed past the HP* until released by Fulton Hogan	**TP**	Test Point	Product compliance test to be undertaken and recorded/reported
WP	Witness Point	An inspection which must be witnessed by the Project Verifier	**SU**	Survey conformance point	A qualified surveyor to check product/section/structure and report
AP	Approval Point	Written or verbal approval given by the Project Verifier	**SC**	Survey Check	

Notes