



CLIENT:	Watercare Services Limited	INSPECTION AND TEST PLAN FOR: WORK DESCRIPTION: Twin Rising Main Installation Open Trench Technique CONTRACTOR NAME: GAJV SUBCONTRACTOR/S NAME: SEIPP	ITP No:	GAJV-ITP-00028_8.0
CONTRACT No. #	6661		JOB/ITP TITLE:	TWIN RISING MAINS INSTALLATION
CONTRACT:	Central Interceptor		PACKAGE No:	CON-DPCIN-84-0006.03-10
WORKPLACE NAME / ADDRESS:	Mangere Pump Station		CHAINAGE (if any):	56 – 661
DATE:	28/10/2021		WORK AREA:	Twin Rising Main
ENGINEERS NAME:	Callum Langford		RELATD CEP No:	GAJV-CEP-00167, GAJV-CEP-00174
			SWMS No (if any):	GAJV-SWMS-0009

The purpose of this Inspection and Test Plan is for identifying and tracking stages of completion and product traceability during all phases of construction.

ISSUED FOR CONSTRUCTION

Packages: - Discrete components or work areas.

Inspection and Test Plan: A sequential work method statement capturing quality related requirements that provide evidence of conformance to specifications.

Inspection Check Sheet: A document detailing specific criteria to be checked and recorded, often developed to meet testing requirements of standards and / or technical specifications.

Punch List / Defects List: A list of minor rectification type tasks which need to complete to satisfy the term of the contract.

Surveillance: Ongoing monitoring

Hold Point: A notice of the event must be provided and shall not proceed with the work without the client or its representative being present unless authority to proceed has been provided by the client in writing. Signature required

Witness Point: A notice of the event must be provided. If the client representative is not present at the designated time and place, work may proceed.

LEGEND:	W = WITNESS POINT	H = HOLD POINT	S= SURVEILLANCE	GAJV = GHELLA ABERGELDIE JOINT VENTURE	S/C = SUBCONTRACTOR	WSL = ENGINEER REPRESENTATIVE
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ACTIVITY No. #	DESCRIPTION	RESPONSIBILITY	REQUIREMENTS / REFERENCE	CONFORMANCE CRITERIA	METHOD	FREQUENCY/PROCESS HELD	HOLD/WITNESS REQUIREMENTS		RECORDS OR CHECKLISTS
							TYPE	ATTENDANCE REQUIRED	
1.0 Preliminaries									
1.1	Design Drawings	GAJV	Ensure the latest IFC drawings are used and available onsite	Sighting of drawings	Retain Drawings	Before project execution	H	GAJV	DWG register with the drawing revision used
1.2	Check - CEP, SWMS, TMP and ESCP in place and signed off by personnel	GAJV	Ensure the latest IFC Plans are used and available onsite	Sighting of plans	Retain Plans	Before project execution	H	GAJV	Plan register with the revision used
2.0 Materials (approval)									
2.1	Pipe delivery inspection	GAJV	Watercare Standard Specification 203.7 , 203.12, 225.9, AS2033, AS 4130, AS 4131	Free from defects and meet the requirements of Tables in specification 225.9	Visual Inspection	Within 2 working days of delivery	H	GAJV	This ITP signed, delivery dockets, pipe inspection check sheet GAJV inspection release certificate required.
2.2	Flange Connections	GAJV	Watercare Standard Specification 225.8.1	Flanged connections to conform to BS EN 1092 PN16 with any necessary modifications to suit the polyethylene pipe and any connections to adjoining pipework	Visual Inspection	Before project execution	W	GAJV	Pipe inspection check sheet, Material Certs
2.3	PE Stub Flanges	GAJV	Watercare Standard Specification 225.8.1	Conform to Table 3 of the latest revision of ISO 9624	Visual Inspection	Before project execution	W	GAJV	Pipe inspection check sheet, Material Certs
2.4	Backing ring	GAJV	Watercare Standard Specification 225.8.1	Mild steel or stainless-steel backing flanges shall be used on all flanged joint. Stainless steel backing flanges, bolts, nuts, and washers made from 316 stainless steel shall be utilised.	Visual Inspection	Before project execution	H	GAJV	Material Certs
2.5	Bolts and Nuts and Washers	GAJV	Watercare Material Supply Standard	Bolts and nuts for large flanges shall be manufactured to AS/NZS1251 316 stainless steel class 80 Washers shall be manufactured from 316 stainless steel	Visual Inspection	All mechanical joints	W	GAJV	Material Certs



2.6	M/4 AP40 Base	GA-JV	CI-CIVIL 2013350.219	<div>Minimum sampling rate: Sand Equivalent: >= 40 Clay Index: <= 3 Plasticity Index: <= 5 Broken face content: >= 70% Particle size distribution for AP40</div> <table><tr><th>Test Sieve Aperture</th><th>Maximum and minimum allowable percentage weight passing</th></tr><tr><td></td><td>AP40 (Max size 40mm)</td></tr><tr><td>37.5mm</td><td>100</td></tr><tr><td>19mm</td><td>66-81</td></tr><tr><td>9.5mm</td><td>43-57</td></tr><tr><td>4.75mm</td><td>28-43</td></tr><tr><td>2.36mm</td><td>19-33</td></tr><tr><td>1.18mm</td><td>12-25</td></tr><tr><td>600um</td><td>7-19</td></tr><tr><td>300um</td><td>3-15</td></tr><tr><td>150um</td><td>0-10</td></tr><tr><td>75um</td><td>0-7</td></tr></table> <div>Particle Size distribution shape control:</div> <table><tr><th>Fractions</th><th>Maximum and minimum allowable percentage weight of material within the given fraction</th></tr><tr><td></td><td>AP40 (Max size 40mm)</td></tr><tr><td>19mm – 4.75mm</td><td>28 - 48</td></tr><tr><td>9.5mm – 2.36mm</td><td>14 – 34</td></tr><tr><td>4.47mm – 1.18mm</td><td>7 – 27</td></tr><tr><td>2.36mm – 600um</td><td>6 – 22</td></tr><tr><td>1.18mm – 300um</td><td>5 – 19</td></tr><tr><td>600um – 150um</td><td>2 - 14</td></tr></table>	Test Sieve Aperture	Maximum and minimum allowable percentage weight passing		AP40 (Max size 40mm)	37.5mm	100	19mm	66-81	9.5mm	43-57	4.75mm	28-43	2.36mm	19-33	1.18mm	12-25	600um	7-19	300um	3-15	150um	0-10	75um	0-7	Fractions	Maximum and minimum allowable percentage weight of material within the given fraction		AP40 (Max size 40mm)	19mm – 4.75mm	28 - 48	9.5mm – 2.36mm	14 – 34	4.47mm – 1.18mm	7 – 27	2.36mm – 600um	6 – 22	1.18mm – 300um	5 – 19	600um – 150um	2 - 14	Test sand equivalent with sand equivalent test. Test Clay Index or Plasticity Index with either clay index test or plasticity index test. Test Broken Face Content with broken face test. Test Particle size distribution with wet sieving test. If any test fails, go back to production of new aggregate and repeat tests.	Before project execution	H	Watercare	Materials Data Record Sheet, Delivery Dockets
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2.7	AC14 M10	GA-JV	CI-CIVIL 2013350.219 (Temporary works), however the asphalt is permanent	<div>Mix Design Requirements: Dense Graded Asphalt:</div> <table><tr><th>Sieve Size (mm)</th><th>Nix Designation</th></tr><tr><td></td><td>AC14</td></tr><tr><td></td><td>Percentage Passing Sieve Size (By Mass)</td></tr><tr><td>37.5</td><td>-</td></tr><tr><td>26.5</td><td>-</td></tr><tr><td>19.0</td><td>100</td></tr><tr><td>13.2</td><td>90 – 100</td></tr><tr><td>9.5</td><td>72 – 83</td></tr><tr><td>6.7</td><td>54 – 71</td></tr><tr><td>4.75</td><td>43 – 61</td></tr><tr><td>2.36</td><td>28 – 45</td></tr><tr><td>1.18</td><td>22 – 40</td></tr><tr><td>0.600</td><td>13 – 27</td></tr><tr><td>0.300</td><td>9 – 20</td></tr><tr><td>0.150</td><td>6 – 13</td></tr><tr><td>0.075</td><td>4 – 7</td></tr><tr><td>Minimum Layer Thickness (mm)</td><td>55</td></tr><tr><td>Binder Content (% by mass)</td><td>4.0 – 6.0</td></tr></table>	Sieve Size (mm)	Nix Designation		AC14		Percentage Passing Sieve Size (By Mass)	37.5	-	26.5	-	19.0	100	13.2	90 – 100	9.5	72 – 83	6.7	54 – 71	4.75	43 – 61	2.36	28 – 45	1.18	22 – 40	0.600	13 – 27	0.300	9 – 20	0.150	6 – 13	0.075	4 – 7	Minimum Layer Thickness (mm)	55	Binder Content (% by mass)	4.0 – 6.0	Asphalt mixes shall be designed with a target combined aggregate particle size distribution (including filler) and binder content complying with the relevant limits given. The following tests performed: The particle size distribution, The total binder content, The RAP content (if used), The maximum specific gravity and density of the compact mix, The air voids at laboratory design compaction level.	Before project execution	H	Watercare	Materials Data Record Sheet				
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2.8	Bedding Material	GA-JV	2012034.055 WSL 225, WSL 225P CG-P	Bedding shall be DM 7/3.	Material Approval	Before project execution	H	WSL	Materials Data Record Sheet
2.9	Lightweight Sand	GA-JV	2012034.113	Lightweight sand to be installed between Ch 557 to 663 Lightweight sand to be used in lieu of cement stabilized sand	Material Approval	Before project execution	H	GAJV	Materials Data Record Sheet
2.10	F2 Sand	GA-JV	2012034.113	F2 sand to be installed between Ch 557 to 663	Material Approval	Before project execution	H	GAJV	Materials Data Record Sheet
3.0 Construction									
3.1	Survey and Set out	GA-JV	Drawings	Survey and set out to be as per drawings.	Visual Inspection	As required	W	GAJV	N/A
3.2	Undercut procedure and design	S/C	Drawings	If 12kpa to 50kpa use 2012034.054 If 50kpa plus use 2012034.055 If less than 12kpa, excavation to be undercut up to 1750mm below pipe invert or until 12kpa strength is found. This is to be backfilled with DM 7/3.	Shear Vane	Every 4m after CH412 (each trench shield installation).	W	Watercare	Scala or shear vane records.
3.3	Trench Bedding	S/C	WSL 225.22, drawings WSL 225.22P	Bedding shall be DM 7/3. Minimum bedding depth shall be 400mm below pipe invert, max 1750mm (depending on ground conditions), 200mm cover, and 350mm surround. Bedding to be installed to correct gradient as per drawings. Gradient changes across various chainages across the pipeline. Bedding to be 90% in vegetation Bedding to be 95% in road works	NDM test	1 test per 2 layers per 100 linear meters of the pipeline	H	GAJV	IANZ NDM Results
3.4	Trench Backfill	S/C	Watercare Standard Specification 225.23 And 225.23P Drawings CG-P	As per DWGs in 2012034 Set - Backfill in vegetation to be as per drawing compacted to 90% Backfilling of trench through trafficable areas within the Mangere Wastewater Treatment Plant shall be compacted in layers to achieve 95%MDD (industry Standard) Clegg calibration. Lightweight Sand to be 95% compacted F2 Sand to be 95% compacted	NDM test	1 test per 2 layers per 100 linear meters of the pipeline	W	GAJV	IANZ NDM Results
3.5	Geogrid and Geotextile install	S/C	2012034 Set Manufactures instruction	A29 bidim filtration class 4 and strength class C to be included showing minimum 500mm overlap. Geo grid to either have bodkin installed or cable tied	Visual Inspection	Trench length	W	GAJV	Install Checklist
3.6	Backfilling around existing services	S/C	WSL CG C3.1.5, C3.1.6, C3.1.7	Minimum vertical and horizontal separation as per Watercare design standards, and utility specific requirements. Refer to CG -3.1.5 and CG -3.1.6 for minimum clearances	Compaction Test	Each service crossing trench	W	GAJV	Clegg sheet or NDM. (for polystyrene install visual inspection required)
3.7	Trace wire and warning tape installation	S/C	WSL CG C3.1.7 and Drawings	Install tracer wire at trench extremities as per drawings Warning tape to be cream coloured 100mm width and installed 450mm above top of pipe	Visual Inspection	Trench length	W	GAJV	Install Checklist
3.8	Flanged Joints	S/C	Watercare Standard Specification 225.11.2	Nuts shall be oiled before tightening. The Contractor shall detail flange tightening procedure and torque values in their WMS. Stainless steel backing plates shall be used on all flanged joints unless specified otherwise in the Particular clauses.	Torque wrench	Each mechanical Joint	W	Watercare	Checklist signed

INSPECTION TEST PLAN



3.9	Compaction of AP40	GA-JV	CI-CIVIL 2013350.219	MDD = 95%	Nuclear Densometer	5 tests every 1000m2	W	Watercare	Nuclear Densometer Test Results
3.10	Compaction of AC14	GA-JV	Auckland Transport Code of Practice 2013	MDD >= 98%	Core sample	Each new batch	W	Watercare	Core Sample Test Results
3.11	Beam test	GA-JV	Auckland Transport Code of Practice 2013	Not more than 5% of the deflections exceed 1mm. None to exceed 1.5mm	Benkelman Beam test	10m staggered intervals	W	Watercare	Benkleman Beam Test
4.0 Construction: (Testing to be done after final install)									
4.1	CCTV Inspection PRE		Watercare Standard Specification 225.11.3 and 225.11.4	A CCTV inspection shall be carried out of any welded pipe string. The video record shall be delivered to the Engineer for inspection and approval prior to the in-ground installation	CCTV Camera	Prior to backfilling pipe/sections of pipe	W	Watercare	Video Record
4.2	CCTV Inspection Post		Watercare Standard Specification 225.11.5 and 225.11.6 Watercare Standard Specification 225.12 And 225.12P Watercare Standard Specification 225.18 And 225.18P	Following the in-ground installation of the pipeline, it shall be CCTV inspected prior to water pressure testing. The video record shall be delivered to the Engineer for inspection and approval prior to final testing. The video data shall be in colour, be presented in an approved format and be recorded on DVD medial. The video of each inspection record shall clearly identify the pipe string and running chainage by means of a digital overlay on the video image. It shall also include the following information: a) The day, date and time of the inspection; b) Camera orientation; c) Inclinator reading; and d) Appropriate references to related surveys. The quality of the video picture shall be such that the condition of the pipe surface is readily apparent and any defects or obstructions are clearly visible. The CCTV camera shall proceed at a height corresponding to the centreline of the pipeline ± 10% of the pipes internal diameter. The speed of the camera shall not exceed 0.2 m/sec. The camera shall be a pan and tilt type with w zoom capability. The camera shall be set to record immediately before entering the pipe and shall be kept running until the end of the inspection.	CCTV Camera	Prior to final testing	H	Watercare	Video Record
4.3	Pressure pipelines Final Testing – exceeding 400m and greater than 315mm			The pipeline shall be filled with water 24 hours before commencement of the test. The main shall be pressurised to 1.25 times the MAOP. Loading Time (tL) shall not be less than 50 minutes. The Contractor shall record pressures in the main throughout the test by means of a data-logger. The data-logger shall have a current certificate of calibration, and shall be capable of recoding pressures in increments of 5 kPa or less. A calibrated test gauge shall also be installed to monitor mains pressures and to check the data-log results. Where the test is abandoned for any reason, the main shall to be left to recover at static pressure before re-pressurising	Hydrostatic test, Visual Inspection	Entire pipeline	H	Watercare	This ITP signed, Record Sheet. Procedure
5.0 Post Construction:									
5.1	As built records	GA-JV	Watercare Standard Specification 225.31	As built records - containing a list of materials used in the pipeline and their relevant material test certificates, and a copy of the joint welding data for all the welded joints, indexed to recognisable features on the Drawings	Survey Drawings	General	H	Watercare	As built Records



5.2	Final Submission Via Aconex	GA-JV	-	All QA documents to be placed in appropriate packages to be submitted	Aconnex Mail	After Construction	H	Watercare	Aconex Request
5.3									
5.4									
5.5									

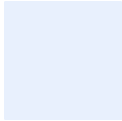
ITEM	QA DOCUMENT CHECKLIST	TICK APPROPRIATE BOX	COMMENTS	ITEM	QA DOCUMENT CHECKLIST	TICK APPROPRIATE BOX	COMMENTS
1	Completed Inspection and Test Plan	<input type="checkbox"/>		12	Check sheets Completed and signed	<input type="checkbox"/>	
2	Material Delivery Dockets (if applicable)	<input type="checkbox"/>		13	Independent Reviewer Report	<input type="checkbox"/>	
3	Incoming Material Inspection Checklist	<input type="checkbox"/>		14	Operation and Maintenance Manuals (if applicable)	<input type="checkbox"/>	
4	All Aconex Mails Closed-Out - Related to Lots	<input type="checkbox"/>		15	Warranties / Guarantees (if applicable)	<input type="checkbox"/>	
5	Conformance Certificates (if applicable)	<input type="checkbox"/>		16	Producer Statements	<input type="checkbox"/>	
6	Test Reports	<input type="checkbox"/>		17	Compliance Statement	<input type="checkbox"/>	
7	Engineers Red-Line mark ups	<input type="checkbox"/>		18	Relevant RFIs -	<input type="checkbox"/>	
8	As Built Survey	<input type="checkbox"/>		19	Instructions -	<input type="checkbox"/>	
9	Photos	<input type="checkbox"/>		20	Factory Acceptance Test (if applicable)	<input type="checkbox"/>	
10	Geotechnical Site Inspection Report (if applicable)	<input type="checkbox"/>		21	Other -	<input type="checkbox"/>	
11	QA Engineer Site Inspection Report	<input type="checkbox"/>		22	Other -	<input type="checkbox"/>	

CONFORMANCE / VERIFICATION STATEMENT

This closed lot conforms in all respects with the standards and requirements specified in the Contract Documents. The lot verification records are complete, and any non-conformances have been closed out in accordance with the Projects requirements.

Construction Lot checked by the Senior Project Engineer responsible for the works	PRINT NAME	Click or tap here to enter text.	SIGNATURE	<div></div>	DATE	Click or tap to enter a date.
Construction Lot verified and closed by Quality Management Representative	PRINT NAME	Click or tap here to enter text.	SIGNATURE	<div></div>	DATE	Click or tap to enter a date.



Independent Verification Review (if required) by:	PRINT NAME	Click or tap here to enter text.	SIGNATURE		DATE	Click or tap to enter a date.
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