

QA/QC Templates
For
General Civil
Construction Standard

No. CG

Ver.1

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C1. Site roading

C1.8 QA/QC template

Quality control shall be demonstrated to meet the testing frequency within the production tolerances as set out in NZTA M10.

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Asphalt grading	DG7 grade, NZTA M10, Table 3.2			
2	Binder content	Quality control sheet supplied in compliance with Table 1 of TM6003 (Explanatory notes to NZTA M1)			
3	Maximum specific gravity	Within limitations set by Table 9.2 of NZTA M10			
			Sign-off		

C2. Earthworks

C2.21 QA/QC template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Services located	Mark-outs and plans			
2	Clearing and establishment	As consented, accepted construction plan			
3	Topsoil	Identified, graded, stored			
4	Geotechnical investigation	Recorded, surveyed, uploaded to AGD, restored			
5	WorksafeNZ notification	Notifiable works – response from Worksafe NZ			
6	Excavation	Material classification, test records and quantity records			
		Temporary support design PS1 / PS2			
		Line and level correct (survey), clear of debris and defects			
7	Backfill	Temporary support removal plan			
		Backfill material grading			
		Plastic index <30. NATA/IANZ test lab results			
		Compaction test. NZS 4402, Test 5.1.2 and 5.1.4 – NATA/IANZ test lab results			
		Compaction test location records			
8	Reinstatement	Topsoil replaced to 100mm depth, clear of stones and debris, 90% grass cover			

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
		Controlling authority(ies) sign-off			
9	Surplus material removed	Site inspected. Tip facility records provided			
			Sign-off		

C3. Pipe and duct laying

C3.1.7 QA/QC template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Storage and handling	Pipe ends capped, Stacked safely, less than 3 high, pipe ends clear			
2	Pipe inspection	Free from damage. Pipe lining cracks restored (as applicable to pipe material)			
3	Trench installation	Warning strip installed			
4	Traceability	Non-metallic pipe with tracer wire, continuity test certified			
5	Position	Requirements of C3.1.1			
6	Pipe through structures	Protective wrapping 150mm beyond each face			
7	Material outer protection, wrapping, joint inspection	Coating or wrapping completed as required for the specific material.			
8	Separation	Parallel according to table C3-1			
9	Vertical crossings	Min. 150mm, other services load protected			
10	CCTV	CCTV inspection – Reviewed for defects. Lining repairs completed.			
11	Deflection check	Pipe tested for deflection after backfill and compaction to AS/NZS2566. Rigid pipe test at manufacture and compared to installation			
12	Testing & disinfection	Testing requirements for pressure, non-pressure pipe, or sleeve as appropriate. Refer to Section 10			
			Sign-off		

C3.2 Pipe jacking, boring or tunnelling and shaft sinking

C3.2.9 QA/QC template

This template is in addition to C3.1.7

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Work method statement	Accepted to include best practice and regulatory requirements as enforced by Worksafe NZ			
2	Tunnel machine suitability	Evaluation against expected soil conditions			
3	Worksafe NZ notification	Worksafe NZ certification			
4	Tracking system accuracy check	Verification to accuracy tolerance per Section C3.1.1			
5	Construction daily records	Section C3.2.8			
6	Grouting plan	Quantity calculation comparison to actual measured			
7	Jacking pit/ shaft pit construction	CPEng, PS1 and PS4 to meet selected machine requirements			
			Sign-off		

C3.3 Horizontal directional drilling (HDD)

C3.2.6 QA/QC template

This template is in addition to C3.1.7

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Work method statement	Accepted to include best practice and regulatory requirements as enforced by Worksafe NZ			
2	HDD plant suitability	Evaluation against expected soil conditions			
3	Worksafe NZ notification	Worksafe NZ certification			
4	Construction daily records	Section C3.3.7			
5	Pipe load force calculations				
6	Drill fluid mix	Evaluate against ground conditions.			
7	Tracking system accuracy check	Calibration			
8	Bore plan				
9	Pilot bore drill logs	Drilling rate			
10	Pilot bore accuracy verification	Within allowable tolerance Section C3.1.1			
11	Drill fluid ongoing tests	Test records			
12	Back ream rate calculation	Data logged ream rate corresponds to calculation			
13	Pull back force data log results	Conforms with calculation in item 5			

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
14	Pipe pull visual inspection	Damage <10% gouge depth			
15	Grout results	Measured values compared to calculated quantity.			
			Sign-off		

C3.4 Installation of polyethylene pipe

C3.4.4 QA/QC templates

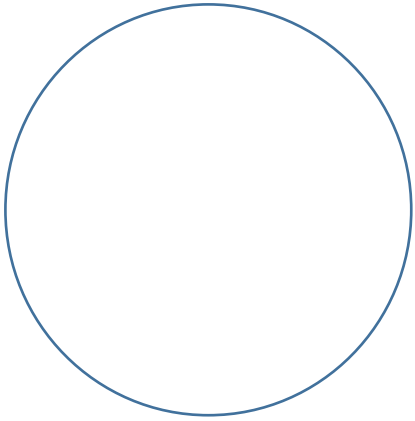
This template is in addition to C3.1.7

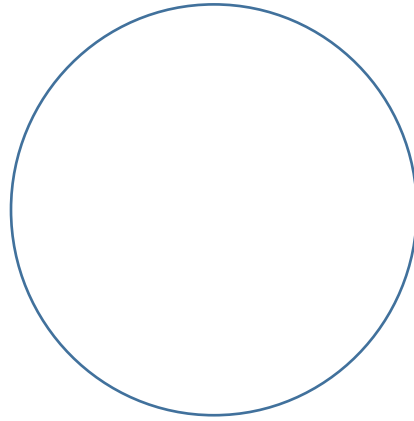
Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Work Method Statement	Document provided and accepted			
2	Pipe inspected	No visual damage, eccentricity and dimensions to AS/NZS 4130			
3	Welding machine calibration	Calibration certification current			
4	Training & competency certification of operators	NZQA recognised qualification. Current experience in pipe size and type to be welded.			
5	Pre-qualification weld test results	All welds ductile. NATA/IANZ accredited laboratory test to ISO 13953/4/6, ISO 21751			
6	Welding data Logging	Excel format with required data			
7	Tent/ shelter over welding	Site inspections			
8	Pipe ends sealed during welding	Site inspections			
9	Construction weld test results	Ductile. NATA/IANZ accredited laboratory test to ISO 13953/4/6			
10	Clean working space, no mud or standing water on trench floor	Site inspection			
Butt weld specific					
11	Butt Weld parameters	Calculated by pipe size and type			
12	Heater plate manual readings (4 per day)	Daily checks completed – forms supplied			
13	Weld beads inspected (butt welding)	Tolerances to POP003			

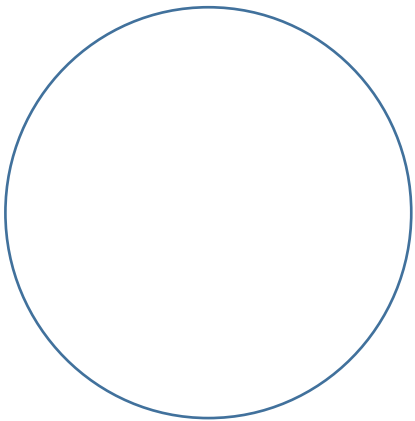
Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
Electro-fusion joint specific					
14	Pipe surface preparation	Using mechanical peeling tool (no hand-scraping) >0.2mm < 0.5mm material removed			
			Sign-off		

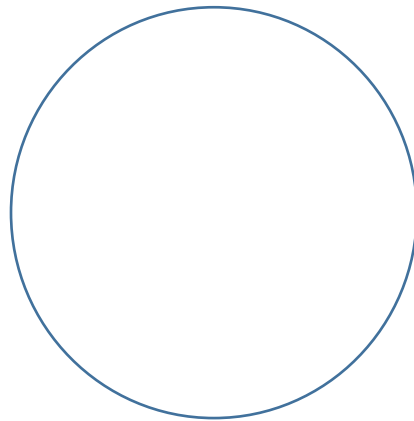
Daily Heater Plate Temperature QA Check Sheet

Contract No. _____ Date: _____ Welder: _____

Time		
Pipe Size		
		
Show position of pipe and temperature check locations		
Temperature at Position °C		
1	2	
3	4	

Time		
Pipe Size		
		
Show position of pipe and temperature check locations		
Temperature at Position °C		
1	2	
3	4	

Time		
Pipe Size		
		
Show position of pipe and temperature check locations		
Temperature at Position °C		
1	2	
3	4	

Time		
Pipe Size		
		
Show position of pipe and temperature check locations		
Temperature at Position °C		
1	2	
3	4	

C3.6 Installation of welded steel pipelines

C3.6.5 QA/QC templates

This template is in addition to C3.1.7

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Socket deflection	Within limitations of table C3.6.2-1 (measure/survey)			
2	Weld band, socket and spigot joint test	Nitrogen/air test pipe ≥700mm test record			
3	Corrosion protection	3 layer overlap (67% per lap)			
		Pull test as per AWWA C209			
		Visual inspection			
		DCVG survey test results			
4	Components for use with potable water	AS/NZS4020 compliant			
			Sign-off		

C3.7 Installation of PVC pipelines

C3.7.2 QA/QC template

This template is in addition to C3.1.7

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Socket preparation	Pipe bevelled and free of burrs			
2	Socket witness marks	Joints drawn fully home			
			Sign-off		

C3.8 Installation of Ductile Iron (DI) pipe

C3.7.2 QA/QC template

This template is in addition to C3.1.7

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Socket preparation	Pipe bevelled and free of burrs			
2	Socket witness marks	Joints drawn fully home			
3	Corrosion protection	Holiday testing for coating defects. Defect repaired			
			Sign-off		

C3.9 Concrete and Ceramic pipes (Wastewater only)

C3.9.8 QA/QC Template

This template is in addition to C3.1.7

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Pipe inspection	Free from damage. Seals stored appropriately			
2	Pipe cutting	6mm tolerance			
3	Pipe laying	Bedding type as specified (per section). Type H2 normative if not specified			
		Laying on curve – under approval and to the required standard method			
4	Joints	Fully drawn, inspected for defects			
		Mechanical joints wrapped to manufacturer requirements			
5	CCTV	CCTV inspection – Reviewed for defects			
6	Testing & disinfection	Testing requirements for pressure or non-pressure pipe as appropriate			
			Sign-off		

C3.10 Pipe structural lining

C3.10.8 Record keeping

For mortar lining the following template shall be used:

Structure information			
Contractor		Installation site identifier	
Asset ID		Address	
Access location			
Grout mix			
Date		Time	
Manufacturer batch number			
Mix composition		Mix Volume	

C3.10.9 QA/QC Template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	CCTV - start	Records evaluated against design stage records			
2	Pipe cleaning	AS/NZS 1516 preparation for lining.			
3	Product compliance	Watercare material standards			
4	Mortar application records	Min. 10mm, ± 1.5 mm.			
5	Testing	Samples to AS 1012 part 24, tensile bond strength (mortar lining)			
		Pressure testing and weld samples as per the general civil standard			
6	CCTV – final	U3 finish. No visible slumping or cracking			
			Sign-off		

C4. Concrete

C4.1 Construction of reinforced concrete structures

C4.1.9 QA/QC template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Concrete construction plan	Including delivery scheduling plan to meet timeframes			
2	Confirm required concrete strength	As specified or minimum required from this standard			
3	Reinforcing inspection	According to specific drawings			
		Deformed bar SEISMIC 500E. Test certification of steel required			
		Plain bar grade 300. Test certification of steel required			
		Welding 10x dia. from bends			
4	Formwork	Cover requirement met, Tables C4.1.1 -1/2			
5	Concrete plant certification	Certification graded ready mixed concrete plant to NZS3104 (High grade or special grade)			
6	Vibration	Witnessed to comply with requirements of NZS3109, any laitance replaced			
7	Test reports	Supply source			
		Mix identification and compressive strength			
		Location of structure			
		Batch number			

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
		Time and date			
		Time prepared			
		Slump 0.5x values of table 9.1, NZS 3109			
		7 day test			
		28 day test			
8	Construction and contraction joints	Inspected as per drawings			
9	Surface finish	Table C4.1.6-1			
10	Testing tanks and reservoirs	Complete test to Section 10.5.4			
			Sign-off		

C4.2 Construction of enclosed chambers, manholes and small structures

C4.2.4 QA/QC template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Set-out	Line and level in accordance with specific drawings			
2	Foundation	Inspected, sound/firm			
3	Concrete	Records: Min 25 MPa or higher as specified			
4	Penetrations	All cast in place			
5	Vertical	Survey			
6	Infiltration	Applicable test per Section 10.5.2			
7	Roof slab/Lid	HN-HO-72 certified			
			Sign-off		

C4.4 Shotcreting

C4.4.6 QA/QC template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Experienced operator	Demonstrated to be suitable for task			
2	Trial	5 samples tested per test panel at 7 days and 28 days. NATA/IANZ laboratory results complying with NZS 3109			
3	Site preparation	Inspected to be clean , cleared of debris, loose soil, sandblasted etc.			
		Contact surfaces dampened			
4	Placement	Ground wires in place/similar to gauge thickness			
		Probe for voids			
5	Joints	Per drawings			
6	Testing	Test results of cores comply (NATA/IANZ lab tested, NZS3109)			
		Ultrasonic/impact hammer test of finished area - no voids and thickness meeting as specified.			
			Sign-off		

C4.5 Formwork

C4.6.3 QA/QC template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Concrete defects	Finished concrete inspected for defects by structural engineer			
2	Methodology	Conformed to performance requirements			
3	Surface repair	Surface inspected - clean and free of loose debris or contaminants			
4	Product	Accepted for compliance with performance requirements of concrete			
5	Repair test	Accepted methodology. Strength test by NATA/IANZ laboratory			
6	Certification	Producer statements			
			Sign-off		

C4.7 Rehabilitation of wastewater pipe and structures with cement mortar

C4.7.4 Record keeping

The record form shall be completed per component that is being rehabilitated or in the case of pipelines between access points, batches or shifts.

Structure information			
Contractor		Installation site identifier	
Asset ID		Address	
Access location			
Grout mix			
Date		Time	
Manufacturer batch number			
Mix composition		Mix Volume	

C4.7.5 QA/QC Template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	CCTV - start	Records evaluated against design stage records			
2	Pipe cleaning	HB84-2006 guidelines			
3	Product compliance	Accepted material			
4	Mortar application records	Min. 25mm, ±1.5mm.			
5	Testing	Samples to AS 1012 part 24, tensile bond strength			
6	CCTV – final	U3 finish. No visible slumping or cracking			
			Sign-off		

C5. Painting

C5.7 QA/QC template

Paint inspection record						
Project:						
Engineer witness:						
Contractor:				Sign-off		
Inspector/supervisor:				Sign-off		
Coating specification reference:						
Items inspected						
		Substrate	Coat 1	Coat 2	Coat 3	Coat 4
Climate Data	Date/Time					
	% RH					
	Air Temp					
	Dew Point					
	Surface Temp					
Surface Preparation	Date/Time					
	Cleanliness					
	Profile					
Paint/ Application	Type					
	Date/Time					
	Batch Number					
	Mixing					
	Thinning					
Coating Inspection	Date/Time					
	W.F.T					
		Number				
		Min				
	D.F.T	Max				
		Average				
		Std Dev				
	Holiday					
	Appearance					
Comments:						

C6. Demolition and abandonment

C6.5 QA/QC template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Preparation	Facility plans and specifications			
		Utility service plans and mark-outs			
		Pre-condition survey			
2	Site management	Demolition plan			
3	Abandonment	Methodology and product approval			
4	Material removal	Appropriate tip site docketts			
			Sign-off		

C7. Masonry

C7.8 QA/QC template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Qualification	Registered mason(s)			
2	Material inspection	Block without defects/unbroken			
3	Joints	10mm even mitre			
4	Reinforcing	As per drawings and min Grade 300 for links, stirrups and ties.			
5	Test mortar	Min. 3x successive samples at start (min 1 per day). NZS 4210 Appendix 2			
6	Grout spaces cleaned	Visual inspection			
7	All cores filled	Visual inspection			
			Sign-off		

C8. Plumbing

C8.2 QA/QC template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Qualifications	Registered as authorised			
2	Pipework inspected	Pipe wrapping Dissimilar materials isolated Directional change with sweep bends			
3	Test	Gravity – leakage test for non-pressurised pipes. Water – pressure tested for plumbing works (see section 10). No leaks			
4	System flushed	Water running clear			
5	Certificate of Code Compliance	As per the Building Act 2004.			
			Sign-off		

C9. Carpentry

C9.8 QA/QC template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Material storage	Dry, not exposed to elements			
2	Timber type	H3.1 to NZS3602 (H4 where fixed to concrete); MSG10 to AS/NZS1748 for floor and roof framing			
3	Fasteners	No plated.			
4	Measure wood moisture content	General 16%-20% Heated functional area <10%			
5	Inspect framing	Irregularities less than 6mm in 3m Framing fixed to concrete H4 grade			
6	Cutting and jointing	Within limits of workmanship requirements.			
			Sign-off		

C10. Metal roofing

C10.5 QA/QC template

Quality / Control		Measurement	Certification		
			Document supplied	Site supervisor witness	Engineer witness
1	Material per drawings	Gauge as specified. Material certified to NZS 3604			
2	Material inspected for defects	No bends, no dents & scratches <1% of total area.			
3	Installer certified				
4	Joints inspected	Dissimilar material isolated, weather tight			
5	Guarantee provided	5 year certification			
			Sign-off		

Section 10: DCVG testing: Logging of defects and repairs

Defect Number	Metreage (m)	GPS Coords	Description of location	IR (mv)	%IR	(I)nspected/ (R)epaired/ (N)ot Repaired	Description of defect	Likelihood of shielding (H)igh (M)edium (L)ow	Photo Number/ Name	Date Inspected / Repaired	DCVG Survey	