

AREA ACCEPTANCE CERTIFICATE			A-01A		
Asset Description			Project No.		
Location					
System					
Layout Drawing					
			PASS	N/A	COMMENTS
1	Confirm all floor surfaces and gratings are as per design		☐	☐	
2	Confirm all handrails are complete and correctly installed as per design drawings		☐	☐	
3	Confirm all ladders, complete with safety hoops and safety bars are correctly installed as per design drawings		☐	☐	
4	Confirm all doors and windows are installed correctly as per design drawings and specifications		☐	☐	
5	Confirm all internal wall and floor finishing's are correct to design specification and free from damage		☐	☐	
6	Confirm all furniture and fittings including sanitary fixtures are installed as per design and free from damage		☐	☐	
7	Confirm all painting / passive fire protection is correct to design drawings and free from damage		☐	☐	
8	Confirm special equipment is installed as per design drawings and specifications		☐	☐	
9	Confirm all wall penetrations are closed and as per design		☐	☐	
10	Fireproofing material applied according to specification		☐	☐	
11	Insulating material and thickness in accordance with specification. Vapour barriers installed where required		☐	☐	
12	Confirm all walkways are correctly identified, have suitable surface friction, and are free from obstructions and tripping hazards		☐	☐	
13	Confirm area is clean and free of all debris		☐	☐	
Comments:					
	COMPLETED BY: (Construction)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged on ITP		
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

LV ELECTRICAL AND INSTRUMENT CABLES			E-01A		
Asset Description		Project No.			
Tag Number		Site & Process Area			
Manufacturer		Termination Drawing			
Model		Cable Route Drawing			
Serial		Layout Drawing			
			PASS	N/A	Comments
1	Cable is the correct type and size as per cable schedule and is a single length i.e. no joints.		☐	☐	
2	Cable glands are the correct type and size and installed correctly. Confirm at least 50mm straight cable before gland, and cable is not under tension.		☐	☐	
3	On single core cables ensure non-magnetic gland plates and insulated glands are fitted.		☐	☐	
4	Check cable supports, cleating and banding are to specification. Confirm any unarmoured cables are in conduit or cable support, and all covers are correctly installed with all bolts tight and in place.		☐	☐	
5	Check bending radius and twist is within manufacturers recommendations along the whole length of cable run.		☐	☐	
6	Check cable markers are correct at transits and at each end of the cable.		☐	☐	
7	Confirm cable route and segregation are to design and specifications. Confirm communication cables have at least 300mm segregation from power cables.		☐	☐	
8	Confirm where instrument cable cross over power cables they are at right angles.		☐	☐	
9	Confirm ELV and LV sources are not used in the same cable.		☐	☐	
10	Confirm cable trenching is as per design, correct depth and backfill, and warning markers as per specification, and cable tape installed on the length of the cable as per regulations.		☐	☐	
11	Confirm trenches have a minimum of 75mm bedding material and 300mm width.		☐	☐	
12	Ensure IP sealing washers, earth tags and bonding are fitted to glands, where applicable.		☐	☐	
13	Check earth tag and bonding are correct to design requirements.		☐	☐	
14	Inspect stress relief system and ensure termination is correct to manufacturers specification.		☐	☐	
15	Confirm conductor continuity / phasing is correct.		☐	☐	
16	With all cores disconnected test insulation resistance values for core to core, core to earth and core to screen. Minimum value: 100MΩ Record results in table below. (Test volts = 1000V for power cables = 250 / 500V for instrument and control cables)		☐	☐	
17	Confirm terminations and core markings are correct and as per Watercare General Electrical Construction Standard section 12. Confirm cable ends are sealed with heat shrink.		☐	☐	
18	Measure earth loop resistance (power cable only). Results must be equal or better than those stated in AS/NZS 3000 e.g Table 8.1		Ω		
19	Confirm spare cores are correctly identified, terminated & earthed.		☐	☐	

Defects	Reason	Actions
Defects reason and actions:		

CABLE TEST RECORD

Test Equipment

	COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP
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SIGNATURE			
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DATE			
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HV CABLES				E-02A		
Asset Description			Project No.			
Tag Number			Site & Process Area			
Manufacturer			Termination Drawing			
Model			Cable Route Drawing			
Serial			Layout Drawing			
				PASS	N/A	Comments
1	Cable is the correct type and size as per cable schedule and installed as per the requirements of the Watercare General Electrical Construction Standard. Confirm there are no joints in the cable.			☐	☐	
2	Cable glands are the correct type and size and installed correctly. Confirm at least 50mm straight cable before gland, and cable is not under tension.			☐	☐	
3	On single core cables ensure non-magnetic gland plates and insulated glands are fitted.			☐	☐	
4	Check cable supports, cleating and banding are to specification.			☐	☐	
5	Check bending radius and twist is within manufacturers recommendations along the whole length of cable run.			☐	☐	
6	Check cable markers are correct at transits and at each end.			☐	☐	
7	Confirm cable route and segregation are to design and specifications.			☐	☐	
8	Confirm cable trenching is as per design, correct depth and backfill, and warning markers as per specification, and cable markers installed at each change in direction.			☐	☐	
9	Ensure IP sealing washers, earth tags and bonding are fitted to glands, where applicable.			☐	☐	
10	Check earth tag and bonding are correct to design requirements.			☐	☐	
11	Inspect stress relief system and ensure termination is correct to manufacturers specification.			☐	☐	
12	Confirm conductor continuity / phasing is correct.			☐	☐	
13	Complete Insulation Resistance Test (before pressure test): 5kV Megger (Min value 100 MΩ) L1 – L2+L3+E MΩ L2 – L1+L3+E MΩ L3 – L1+L2+E MΩ			☐	☐	
14	Complete pressure Test: record leakage current. Test Voltage: 15kV DC / Test Duration 15 mins L1 – L2+L3+E mA L2 – L1+L3+E mA L3 – L1+L2+E mA			☐	☐	
15	Confirm core markings and terminations are correct.			☐	☐	
16	Record torque settings and bolt size: End 'A' Nm mm End 'B' Nm mm			☐	☐	
17	Confirm mechanical protection is to specification, and all covers are correctly			☐	☐	

	installed with all bolts tight and in place.			
18	Measure earth loop resistance, including gland body to earth path. (max 0.5Ω)	Ω		
19	Confirm All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents	☐	☐	
Defects reason and actions:				
Test Equipment				
Make:		Model:		Serial No:
				Cal Expiry Date:
	COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY				
SIGNATURE				
PRINT NAME				
DATE				

LV Switchboard – FAT & Installation Completion			E-03A		
Asset Description		Project No.			
Location		System			
Tag Number		Manufacturer			
Layout Drawing		Model			
SLD Drawing		Serial number			
Note Switchboards must adhere to section 13.13.4 of the Material Supply Standard the Electrical and section 3 of the Electrical Design Standard. Note for HV Switchboards ITRs must be supplied by the manufacturer and or competent consultant			PASS	N/A	Comment
Factory Acceptance Test					
1	Record the following rating information: Volts _____ Amps _____ Form Factor _____ MVA _____ Secs _____		☐	☐	
2	Confirm that the switchboard is practically complete and sight Manufacturers FAT and Quality documents		☐	☐	
3	Visually inspect the switchboard and cubicles for adherence to IFC layout and dimensional drawings. Note exceptions or changes in comments a) Layout is as per the construction drawings b) Mounting of equipment is suitable and accessible c) Steel work is free from defects and panel is true and square d) External and Internal paintwork is of correct colour and free from defects e) Door handles/latches/doors operate smoothly and correctly f) Gland plates are of the correct material and thickness g) Door Seals are fixed in place and continuous h) Galvanised plinth as per standard		☐	☐	
4	Check each MCC Cell or Feeder Cell is wired as per the appropriate IFC drawings a). Circuit checks of a sample of or typical MMC starter cell		☐	☐	
5	Verify each MCC Cell or Feeder Cell against the IFC SLD. Rating, Tag Name. a) Crimp lugs and pin terminals of the correct type and size fitted to all terminations b) Terminal barriers are placed correctly and end stops fitted c) Terminal numbers and wiring labels are fitted and correct d) Circuit Breakers have their correct rating e) Fuses if fitted have the correct type and rating f) Indication lamps are the correct colour g) Push buttons re the correct colour h) Wiring colours are correct i) All equipment and ducting are mounted square and true		☐	☐	
6	Check the switchboard against each relevant item of the WSL Material Supply standard Section 13.13.4 and Design Standard section 3 Append these sections with sign off to this FAT document, note any exceptions		☐	☐	
7	Check all cubicle doors can be fully opened without obstruction as per the noted WSL standards ie 120 deg		☐	☐	
8	Check earthing is correct and conforms to drawings. Site Main Earth Bar		☐	☐	
9	Site Main Neutral Bar, Site MEN Link if applicable		☐	☐	

10	Ensure that phasing testing has been done by the switchboard manufacturer. ie Tests have been done to ensure that R,W,B is correct throughout the entire switchboard.	☐	☐	
11	Megger test each main busbar section to ensure > 500M Ohm to earth with all relevant control, sensing, coils or devices that are normally in service but would compromise the IR test disconnected. Or check Switchboard manufacturers have completed and documented this test	☐	☐	
12	Confirm the main busbars are fully rated over their whole length for the current and short circuit rating indicated in the single line diagram. Confirm the droppers are rated for the full short circuit rating shown in the single line drawing.	☐	☐	
13	Confirm all equipment carries the correct circuit identification.	☐	☐	
14	Check busbar phase identification and phasing is maintained. If colour coding or labelling is employed	☐	☐	
15	If a main switchboard with an incomer rated at 80A or higher confirm a power meter is installed.	☐	☐	
17	If a main switchboard confirm that three phase surge protection is installed including a surge diverter which complies with ANSI/IEEE C62.41.2 Cat A, Cat B, Cat C standards. The diverter shall provide auxiliary digital outputs connected to the site PLC/DCS to indicate the status of the unit. The surge diverter unit shall be maintainable by way of replaceable cartridges.	☐	☐	
18	Confirm revenue meeting compartment is compliant with the relevant Supplier specifications. ie Vector have minimum height and size requirements	☐	☐	
19	Ensure all busbars are encapsulated as per design requirements and confirm all 'live' parts are shrouded. Eg clear Perspex shielding behind maintainable areas when inspection panels removed.	☐	☐	
20	Check all bolts are correct and that none are missing, and gaskets and seals are not damaged. Ensure all spare cable entries are plugged.	☐	☐	
21	Confirm function of each MCC Cell and associated I/O back to RTU, PLC if fitted within the SWBD. Eg confirm as far as practically possible functionality of E Stops, Lights, Push Buttons, Start Stop Circuits etc	☐	☐	
22	Confirm the operation of any Automatic Transfer Switch (ATS) for Mains to Generator transfer. Check 4 pole on Generator, 3 pole on Mains	☐	☐	
23	Mechanical Interlocks, check all circuit breaker mechanical interlocks operate correctly and it is not possible to operate the interlocked device, ie MCC Cell, Interlocked breakers etc	☐	☐	
24	Confirm the operation of any Phase Rotation indicator associated with the correct identification of the incoming supplies to the installation.	☐	☐	
25	Confirm the operation of any Phase Failure Relays associated with the incoming supplies and main outgoing bus.	☐	☐	
26	Check that motor heating controls have been fitted for motors greater than 10KW as per the Material Supply Standard. Note some pumps stations also employ motor heating on motors smaller than 10KW	☐	☐	
27	It is a WSL requirement for the supply of any 3 wire schematic, or manufacturer internal wiring schematics to be provided with the switchboard. A consultant's SLD is not acceptable as a substitution for a switchboard internal wiring schematic.	☐	☐	
FAT ATS Check Sheet				
1	With no supplies present Check Mechanical Interlock works for each breaker when it is in the closed position, other breaker cannot close	☐	☐	

2	With Normal and Replacement Supply available disable Normal supply voltage to force a changeover to Replacement supply	☐	☐	
3	Record setting for Mains Fail delay	☐	☐	
4	Record Setting for Dead Bus delay	☐	☐	
5	Ensure Replacement Supply available check voltage indication and phase rotation using SWBD meter	☐	☐	
6	Re-check Mechanical Interlock attempt to close Incomer (Ensure electrically if it did close no out of phase condition would exist)	☐	☐	
7	Reinstate Normal Supply voltage to the ATS	☐	☐	
8	Record setting for Main detection delay	☐	☐	
9	Observe successful transition from Replacement to Normal Supply	☐	☐	
10	Ensure a dead bus time was observed during transition	☐	☐	
11	Check Voltage indication and Phase Rotation on Normal Supply	☐	☐	
12	Again, check mechanical interlock that it is not possible to close the Replacement supply breaker	☐	☐	
ACB Checks				
1	ACBS are to be of the with-drawable type, check freedom of movement to all positions service, test, racked out positions	☐	☐	
2	Check ACB trip unit is as specified and confirm it has been configured as per the protection design report.	☐	☐	
3	Check the operation of manual spring charge and if fitted electrical spring charge and manual trip functions	☐	☐	
4	Check any feedback wiring ie ACB tripped, open, closed signals	☐	☐	
5	Check any control wiring ie remote open, close etc	☐	☐	
6	Site the SWBD manufacturer IR and OHM tests for the ACB	☐	☐	
Site Installation Checks				
1	Switch room environment is weatherproof, clean, secure, ventilated	☐	☐	
2	Floor is level, sealed, capable of bearing full equipment load.	☐	☐	
3	Working space, clearances, and escape paths as per AS/NZS3000 Section 2.9	☐	☐	
4	Cable Supports, trays, trenches are installed. Trench lids are sectionalised such that they can be removed easily by two men and have T bar slots or flush lifting handles.	☐	☐	
5	Earth grid/bonding system tested and ready for connection	☐	☐	
6	Switchboard modules aligned and bolted securely	☐	☐	
7	Cable gland plates fitted: cables installed and approved glands/lugs	☐	☐	
8	Cable bending radii and separation observed	☐	☐	
9	Busbar joints torqued and shrouded	☐	☐	
10	Internal segregation maintained (Form 4 construction)	☐	☐	
11	Hinges, door locks and removable panels checked for access and safety	☐	☐	
12	ACBs installed, racked in/out smoothly: interlocks functioning	☐	☐	
13	Control wiring installed per wiring schematics	☐	☐	
14	Terminal strips clearly labelled CTs and VTs installed with polarity marked	☐	☐	
15	Earth and Neutral bar continuity verified	☐	☐	

[illegible]

Defects reason and actions:

Test Equipment

Make:	Model:	Serial No:	Cal Expiry Date:

SWBD FAT Sign off Section

	COMPLETED BY: (Construction)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP
COMPANY			
SIGNATURE			
PRINT NAME			
DATE			

SWBD Installation Sign off Section

	COMPLETED BY: (Construction)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP
COMPANY			
SIGNATURE			
PRINT NAME			
DATE			

Notes Excerpt from the Material Supply Standard

Material Supply Standard 13.13.4

General requirements

- a. All switchboards shall comply with section 13.13.1.
- b. Switchboards are as defined in AS/NZS 3000.
- c. A complete set of drawings must be provided for mechanical and electrical construction in accordance with Watercare's CAD manual. Preference is that Watercare's drawings are not duplicated by the manufacturer but shall instead be 'As Built' on completion of construction. Documents expected to be submitted for approval shall include the following as a minimum:
 - Single line diagrams (WSL drawing preferred)
 - Three line diagrams (where deemed necessary)
 - Schematics (WSL drawings preferred)
 - General arrangements (internal, external, front, section etc.)
 - Labelling diagrams
 - Equipment schedules
- d. All switchboards shall be manufactured to the latest version of AS/NZS 61439 form 4a. The only exceptions are the following:
 - Switchboards may be constructed to AS/NZS 61439 Form 2 and 3 but only if explicitly approved in writing by Watercare.
 - Small, simple, standalone (i.e. separate from a main switchboard), wall mounted switchboards, rated not more than 100Amps i.e. lighting and small power DBs or process DBs, may be constructed to AS/NZS 61439 Form 2.
- e. The switchboard shall allow for future addition of vertical sections.
- f. Removable end plates shall be provided to cover the horizontal power bus and horizontal wire way openings on each end of the switchboard.
- g. Wire ways shall be provided to allow cable access into each cell.
- h. No terminations shall be located in the wire way(s), except for neutral and earth connection bars.
- i. All switchboard equipment, wiring and components, nuts and bolts, shall be accessible from the front. Bus bars shall be accessible from the back unless otherwise specified.
- j. Allowance shall be made for design specified ventilation and heat dissipation.
- k. The switchboards shall be formed of corrosion resistant sheet metal to give a uniform appearance with no sharp corners, buckling or distortion.
- l. Framing, panels and sections screwed or bolted together using machine threaded fixings.
- m. Nuts and bolts shall be cadmium-plated, stainless steel or nylon as appropriate for the specified operating environment.
- n. The switchboard shall be supplied with a hot dipped galvanised plinth, which shall be manufactured from parallel flange mild steel channel 100 x 50, drilled front to back, with four 51mm diameter lifting holes. All lifting and fixing holes shall be pre-drilled prior to galvanising.
- o. Access to all cells and wire ways shall be via hinged vertically mounted lockable doors. Minimum door swing shall be 120°. Switchboard doors shall be individually earth bonded to the switchboard frame with insulated flexible copper braid. Earth bonding through the door hinges only is not acceptable.
- p. A minimum of two hinges shall be used for each panel or door. Where a panel or door is 1200 mm high or greater, a minimum of three hinges shall be used.
- q. The doors for all switchboards located in access controlled switchrooms shall be lockable as follows:
 - Through the use of a lock that requires a tool to open it e.g. quarter turn triangle, square, double bit or slotted.
 - Through the use of a key. If a key is used it shall be:
 - a. Lock barrel -Type CLF85-144 (16 mm barrel length)
 - a. Key: No. 144 (the standard electrical industry key number)
 - b.
- a. The lock unit shall be fitted at mid-height
- r. **Blank**
- s. Outdoor switchboards shall be key access only. The key access requirement shall be confirmed with Watercare

- t. Additional latches or closers are to be operable without the use of a tool or key.
- u. In the case of double doors, 900 mm high or greater, a three-point engagement mechanism shall be operated by the handle being turned through 90 degrees. The three engagement points are to be located at the top, the centre and the bottom of the panel or door.
- v. The switchboard colour shall be as follows unless otherwise approved:
 - External surfaces – RAL 7032, RAL 7035 or Oxyplast Almond
 - Interior gear plates – Gloss white
- w. Refer to the electrical design standard for minimum seismic resilience requirements.

Switchboard electrical requirements:

- a. Busbars shall be of high-grade copper and carry a standards mark.
- b. Busbars shall be treated against the corrosive effects of hydrogen sulphide and sulphur dioxide by means of electrolytic tinning. The busbars shall be naturally cooled and be identified by heat resistant appropriately coloured PVC sleeves (red, white, blue etc.).
- c. The neutral busbar shall be the same cross-sectional area as the phase busbars.
- d. The busbars shall be of uniform cross section throughout their vertical or horizontal run. Tapered busbars are not acceptable.
- e. A tinned bare copper earth (BCE) bar rated for the short circuit duty of the switchboard shall run throughout the length of the board. All non-current carrying metal parts shall be earthed by connecting to this bar
- f. A BCE with a minimum size of 5x35mm shall be installed vertically in each wire way and pre-drilled with suitable holes.
- g. Main horizontal busbars and vertical droppers shall be enclosed in a separate compartment with screwed covers or doors. The connection to droppers shall be through the insulating barriers.
- h. Openings for future busbar extension and panel wiring shall be provided at both ends
- i. The switchboard main earth and neutral connection points shall be easily accessible to allow for testing after installation.
- j. All main switchboards shall be fitted with a suitably sized marked MEN link installed in an easily accessible position.
- k. A 36-way 63A brass tunnel bar is to be fitted to allow easy connection of the instrument earth wires (mounted in the control cubicle section).
- l. Exposed terminals for voltages above extra low voltage shall be IP2X via manufacture or transparent, colourless shrouding (i.e. all 110/230/415 Vac connections). The switchboard shall be arranged so that no live conductors are exposed under conditions of maintenance. All phase conductor busbars that are accessible via a door shall be fitted with easily removable transparent, colourless shrouding to protect against accidental contact by personnel. The intention of this clause is to provide accidental touch protection during fault finding.
- m. Provision shall be made to adequately support all incoming and outgoing cables against mechanical stress.
- n. Removable split aluminium gland plates (minimum thickness 5mm) shall be provided at each switchboard cable entry point. PVC gland plates are not acceptable.
- o. The main incoming section and larger motor cable wire ways will require a 6mm aluminium gland plate. The mounting frame shall be rigid enough to prevent deflection of the gland plate.
- p. A wire way shall be supplied to allow cable access into each cell. Only Earth and Neutral connections shall take place in the wire way.
- q. A neutral connection point shall be fitted in each wire way (sized at 0.5 times the rated current of the main busbars). The connection point shall allow easy conversion to a full neutral bar if required by Watercare.
- r. Switchboard cell main isolators shall be mechanically interlocked such that the switchboard cell door cannot normally be opened when the isolator is in the 'on' position. It shall be possible to defeat the interlock and open the door with the isolator on, only with the use of a special tool and only when the isolator is not padlocked off.
- s. All switchboard cell main isolators / circuit breakers shall be of the extended handle, rotary type and lockable in the off position with a padlock. They shall be capable of interrupting the full prospective short circuit current of the board at rated voltage and frequency. Circuit breaker co-ordination shall be Type 2.
- t. Any isolator / switch rated above 63A shall not be mounted on the switchboard door. Any wiring looms connected to the cubicle doors shall have a gooseneck and sufficient slack to allow the doors to open easily and fully without placing any undue strain on the wiring.
- u. A wire way shall be provided across the top of the switchboard to allow the interconnection of cables between cells.

- v. Power and CT secondary wiring shall have a minimum cross sectional area of 2.5mm² and be of stranded flexible copper high temperature PVC panel wire, unless otherwise specified. Matching terminals and shorting links shall be provided for all CT secondary circuits.
- w. Control wiring shall be stranded flexible copper high temperature PVC panel wire of minimum 0.75 mm² matching the current requirement.
- x. Control wiring connected to the DCS/PLC I/O module terminations shall be minimum 0.5mm². The wiring must be terminated in rail mounted terminal blocks mounted in the same cubicle.
- y. Within cubicles, control and power wiring shall be enclosed in separate slotted PVC ducting. Cable ducting shall be sized for a minimum of 50% spare capacity. Wiring not enclosed in ducts shall be loomed together neatly. Cable ties at 150mm centres shall be used. For looming, adhesive tape is not acceptable.
- z. The distance between cable ducting and equipment shall be minimum 35mm to allow wire termination.
- aa. Refer to the EC standard, Section 12 for labelling, colour coding and identification.
- bb. Equipment shall be identified in accordance with the labels on the design drawings. All major fixed components within the switchboard including switches, relays and circuit breakers shall be labelled.
- cc. Indicator lamps shall be high intensity LED type. Refer to EC specification section 12 for push buttons and lamp indication colours.
- dd. Both ends of each wire shall be identified with a Grafoplast system of ferrules, crimp pins and markers.
- ee. Switchboards shall be provided with labels detailing the following information (Refer section 12):
 - Plant asset number (tag name)
 - Manufacturer's name
 - Switchboard's form factor, serial number and the year of manufacture
 - Applicable standards
 - Degree of protection
 - Rated operating voltage
 - Rated frequency
 - Main busbar continuous current rating
 - Main busbar short circuit capacity
- ff.
 - a.
 - gg. Equipment in the switchboard other than door mounted control switches, indicators and meters shall be mounted on removable gear plates fixed to the frame of the switchboard. Wherever possible equipment shall be DIN rail mounted on the gear plate.
 - hh. DC power supplies and batteries shall be mounted in the PLC control cubicle. Batteries shall be mounted with seismic restraints. The mounting shall also allow easy removal and checking of the batteries while still connected to the supply.
 - ii. One 60Watt heater shall be fitted at the bottom of each wire way controlled via a thermostat situated as close as practical to the top of that wire way. The thermostat shall be located in a position that will not impede cable installation. Wire way heaters are not required for switchboards located within temperature controlled switchrooms.
 - jj. Main switchboards with an incoming isolator greater than 80A shall have a power meter installed with an RS485 Modbus, Modbus TCP, or Ethernet IP adaptor module as specified on the drawings.
 - kk. The main switchboard shall have 3 phase surge protection installed. This shall comprise a surge diverter which complies with ANSI/IEEE C62.41.2 Cat A, Cat B, Cat C standards.
 - ll. The Switchboard shall have an internal arc withstand as per the rating defined on the single line drawing. All switchboards with a rating ≥ 800 Amps shall have increased security against the occurrence for the effects of internal arcing faults in compliance with AS/NZS 61439.1, Appendix ZC. The switchboard shall be type tested in accordance with IEC TR 61641.

Generator connections for indoor switchboards

- a. The generator connection enclosure shall be mounted external to the switchroom. The location shall be adjacent to the permanent generator/temporary generator laydown area.
- b. The generator connection enclosure shall be IP66 rated, 316 stainless steel with a lockable hinged panel at the bottom for the generator cable entry, refer to standard enclosure drawings.
- c. A split rubber barrier shall be fitted over the generator cable entry point to provide touch protection.
- d. Connection stabs for the three-phases, neutral and earth shall be provided in the generator connection enclosure.
- e. Cabling shall be provided to connect the generator connection to the main switchboard generator circuit breaker or changeover switch.
- f. A mechanical interlock shall be provided between the main incomer and changeover switch.
- g. A suitable generator cable entry point into buildings must be approved by a suitably qualified civil engineer.

Outdoor switchboards

- a. Outdoor switchboards shall be housed in a pillar box arrangement constructed of powder coated marine grade aluminium (colour = BS 5252 weight and group colour "12 - B29") or 316 stainless steel
- b. All doors shall have wind stays to keep the door(s) in a fixed position when open.
- c. A flush mounted lock shall be provided keyed to Watercare requirements.
- d. The pillar box shall include a pedestal for mounting the switchboard and a gland plate to separate the switchboard from the pedestal. All cables shall enter the pillar box from the bottom.
- e. IP ratings for this equipment are as follows:
 - Switchboards not requiring vents for equipment cooling shall have a minimum IP65 rating.
 - Switchboards requiring vents for equipment cooling shall have a minimum IP55 rating.

DISTRIBUTION BOARDS, CONTROL PANELS and JUNCTION BOXES					E-04A		
Asset Description				Project No.			
Location				System			
Tag Number				Manufacturer			
Layout Drawing				Model			
SLD Drawing				Serial number			
					PAS S	N/A	COMMENTS
1	Record the following rating information: Volts _____ Amps _____ Phases _____ Number of Circuits _____			☐	☐		
2	Verify nameplate details against datasheet.			☐	☐		
3	Visually inspect all equipment for internal and external damage (including paintwork) and cleanliness. Inspect the DB for alignment and secure mountings and fixing.			☐	☐		
4	Confirm the installation complies with the Watercare General Electrical Construction Standard, IP rating 65 (or higher) and Ex certification is suitable for location and location is correct to layout drawing.			☐	☐		
5	Confirm circuit identification is as per distribution schedule, terminals correct type and identified.			☐	☐		
6	Confirm MCB's and RCDs installed as per design and rating / curve correct.			☐	☐		
7	Check earthing is correct and conforms to design specifications.			☐	☐		
8	Measure the earth bar resistance to general earth (max value 0.1Ω).			Ω			
9	Confirm all glands are tight and all spare cable entries are plugged and IP washers installed.			☐	☐		
10	Check all doors can be fully opened without obstruction, padlocking facilities are satisfactory and all bolts are correct.			☐	☐		
11	Confirm space heater is correct to drawings (if installed).			☐	☐		
12	Check gaskets and seals are not damaged and drain and breather plugs are installed.			☐	☐		
13	Confirm main isolator functions correctly.			☐	☐		
14	Confirm phasing is correct.			☐	☐		
15	Record DB insulation resistance test results: 1kV megger (min 10 mΩ)			☐	☐		
	L1–L2, L3, N, E	L2–L1, L3, N, E	L3–L1, L3, N, E	N – E			
	MΩ .	MΩ	MΩ	MΩ			
16	Confirm All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents			☐	☐		
Defects reason and action:							
Test Equipment							
Make:		Model:		Serial No:		Cal Expiry Date:	

	COMPLETED BY: (Construction)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged on ITP
COMPANY			
SIGNATURE			
PRINT NAME			
DATE			

ELECTRIC MOTORS					E-05A		
Asset Description				Project No.			
Location				Site & Process Area			
Tag Number				Manufacturer			
Layout Drawing				Model			
SLD Drawing				Serial number			
Schematic Drawing				Insulation Class			
				PASS	N/A	Comments	
1	Record the following rating information: Volts FLC Amps Frequency Power Phases			☐	☐		
2	Verify nameplate details against datasheet			☐	☐		
3	Confirm equipment identification is correct and adequate			☐	☐		
4	Visually inspect equipment for external damage (including paintwork)			☐	☐		
5	Confirm the feed CB is suitable for the motor size, one CB per motor.			☐	☐		
6	Check equipment fixings and mountings are secure, vibration mounts fitted and correct			☐	☐		
7	Verify equipment IP rating and certification is suitable for location and spare cable entries are correctly plugged			☐	☐		
8	Check earthing is correct and conforms to design specifications. Confirm an earth terminal has been provided within the main motor terminal enclosure			☐	☐		
9	If an anti-condensation heater is installed confirm: - The heaters are wired to a separate terminal block within the motor terminal box. - A miniature circuit breaker or fuse is be connected to the load side circuit of the motor isolator/breaker, allowing the heater to be isolated with the motor. - VSD anti-condensation heating (dc injection) shall not be used in place of heaters			☐	☐		
10	Test and record motor to earth continuity (max. value 0.5Ω)			Ω			
11	Check terminal box gaskets and seals are not damaged, check all bolts are correct and that none are missing			☐	☐		
12	Confirm Insulation resistance is greater than 1.5MΩ			☐	☐		
13	Check all connections are correct, secure and cable identifications are correct and fitted e.g. (D.O.L./Star Delta)			☐	☐		
14	Check that fan is free and cover secure			☐	☐		
15	Rotate shaft and confirm freedom of movement check uncoupled motor rotates freely			☐	☐		
16	Confirm All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents			☐	☐		
Defects reason and actions:							
Test Equipment							
Make:		Model:		Serial No:		Cal Expiry Date:	

	COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP
COMPANY			
SIGNATURE			
PRINT NAME			
DATE			

CHARGERS, BATTERIES and UPS					E-06A		
Asset Description				Project No.			
Location				Site & Process Area			
Tag Number				Manufacturer / Model			
Layout Drawing				Serial number			
SLD Drawing				Schematic Drawing			
					PASS	N/A	Comments
1	Record the following rating information:						
	Volts	Amps	Frequency	Power	☐	☐	
	A/Hr						
2	Verify nameplate details against datasheet.				☐	☐	
3	Confirm equipment identification is correct and adequate including associated equipment.				☐	☐	
4	Visually inspect equipment for external damage (including paintwork).				☐	☐	
5	Check equipment fixings and mountings are secure. Check all bolts are correct and that none are missing, and gaskets and seals are not damaged.				☐	☐	
6	Check all doors can be fully opened without obstruction. Confirm clear access and not located below water or chemical lines.				☐	☐	
7	Check earthing is correct and conforms to design specifications				☐	☐	
8	Check all connections are correct, secure and cable identifications are correct and fitted.				☐	☐	
9	Confirm terminal insulation shrouds fitted.				☐	☐	
10	Type, size and rating of protection devices and fuses are correct.				☐	☐	
11	Confirm number and type of batteries in accordance with approved drawings.				☐	☐	
12	Check all battery terminations and links are secure, clean and protected by approved compound.				☐	☐	
13	Confirm all battery links and cables are installed for correct polarity.				☐	☐	
14	Confirm electrolyte levels are correct. Ensure containment of electrolyte under tilt conditions.				☐	☐	
15	Check main battery isolator, and outgoing circuits. Confirm ratings are suitable and to design.				☐	☐	
16	Confirm spare cable entries are correctly plugged.				☐	☐	
17	Carry out Insulation Resistance test on main AC (disconnect electronics).				☐	☐	
18	Neutral to earth connection confirmed at one location				☐	☐	
19	Test and record charger to earth continuity (max. value 0.5Ω)				Ω		
20	Confirm All prescribed electrical work (PEW) undertaken has been tested in accordance with the Electrical Safety Regulations, attach all relevant documents				☐	☐	
Defects reason and actions:							
Test Equipment							
Make:		Model:		Serial No:		Cal Expiry Date:	

	COMPLETED BY: (Construction)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer)
COMPANY			
SIGNATURE			
PRINT NAME			
DATE			

GENERATOR / ALTERNATOR					E-07A		
Asset Description				Project No.			
Location				System			
Tag Number				Manufacturer			
Layout Drawing				Model			
SLD Drawing				Serial number			
Schematic Drawing				Insulation Class			
					PASS	N/A	Comments
1	Record the following rating information: Volts Amps Frequency Power PF				☐	☐	
2	Verify nameplate details against datasheet				☐	☐	
3	Confirm equipment identification is correct and adequate				☐	☐	
4	Visually inspect equipment for external damage (including paintwork)				☐	☐	
5	Check equipment fixings and mountings are secure, vibration mounts fitted and correct				☐	☐	
6	Check earthing is correct and conforms to design specifications				☐	☐	
7	Test and record motor to earth continuity (max. value 0.5Ω)				Ω		
8	Ensure direction of rotation is clearly marked				☐	☐	
9	Confirm equipment is suitable for area classification				☐	☐	
10	Check terminal box gaskets and seals are not damaged				☐	☐	
11	Installation of non-magnetic gland plate / insulated glands where applicable				☐	☐	
12	Confirm spare cable entries are correctly plugged, all bolts are correct and that none are missing				☐	☐	
13	All connections correct, secure and cable identifications are correct and fitted				☐	☐	
14	Confirm anti-condensation heaters are fitted				☐	☐	
15	Check air ventilation ducts are clear				☐	☐	
16	Confirm All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents				☐	☐	
Defects reason and action:							
Test Equipment							
Make:		Model:		Serial No:		Cal Expiry Date:	
		COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY							
SIGNATURE							
PRINT NAME							
DATE							

POWER TRANSFORMER					E-08A		
Asset Description				Project No.			
Location				System			
Tag Number				Manufacturer			
Layout Drawing				Model			
SLD Drawing				Serial number			
Schematic Drawing				Insulation Class			
					PASS	N/A	Comments
1	Record the following rating information: Primary Volts Amps Frequency Power Fault Level Secondary Volts Tap Range Vector Group				☐	☐	
2	Verify nameplate details against datasheet, equipment identification is correct and adequate				☐	☐	
3	Visually inspect equipment for external and internal damage (including paint) and cleanliness				☐	☐	
4	Check equipment fixings and mountings are secure and correct				☐	☐	
5	Confirm cooling / air ventilation is adequate and intakes / outlets are clear of obstructions				☐	☐	
6	Check earthing is correct and conforms to design specifications				☐	☐	
7	Test and record earth continuity (max. value 0.5Ω)				Ω		
8	Confirm equipment is suitable for area classification				☐	☐	
9	Check terminal box gaskets and seals are not damaged				☐	☐	
10	Confirm spare cable entries are correctly plugged, all bolts are correct and that none are missing				☐	☐	
11	Check connections are correct, secure and cable and terminal identifications are correct and fitted				☐	☐	
12	Confirm anti-condensation heaters are fitted (if applicable)				☐	☐	
13	Check HV/MV/LV connections torque settings are to manufacturers recommended torque settings (record results)				☐	☐	
14	Confirm tap changer operates correctly over design range				☐	☐	
15	Confirm auxiliary equipment in accordance with approved vendor drawings				☐	☐	
16	Confirm pressure relief device fitted				☐	☐	
17	Check oil levels, Sample oil and test where applicable				☐	☐	
18	Confirm All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents				☐	☐	
Defects reason and actions:							
Test Equipment							
Make:		Model:		Serial No:		Cal Expiry Date:	

	COMPLETED BY: (Construction)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP
COMPANY			
SIGNATURE			
PRINT NAME			
DATE			

ELECTRIC HEATER						E-09A		
Asset Description				Project No.				
Location				System				
Tag Number				Manufacturer				
Layout Drawing				Model				
SLD Drawing				Serial number				
Schematic Drawing								
						PASS	N/A	Comment
1	Record the following rating information: Volts Amps Frequency Power Phases					☐	☐	
2	Verify nameplate details against datasheet, equipment identification is correct and adequate					☐	☐	
3	Visually inspect equipment for external and internal damage (including paint) and cleanliness					☐	☐	
4	Check equipment fixings and mountings are secure and correct					☐	☐	
5	Confirm location is correct to layout drawings					☐	☐	
6	Check earthing is correct and conforms to design specifications					☐	☐	
7	Test and record motor to earth continuity (max. value 0.5Ω)					Ω		
8	Confirm equipment is suitable for area classification					☐	☐	
9	Check terminal box / enclosure gaskets and seals are not damaged					☐	☐	
10	Confirm spare cable entries are correctly plugged, all bolts are correct and that none are missing					☐	☐	
11	Check connections are correct, secure and cable and terminal identifications are correct					☐	☐	
12	Test continuity of all internal cable cores and heater elements					☐	☐	
13	Perform heater Insulation Resistance tests and record the results in comment section (min. value 10 MΩ, * Note: disconnect any electronic equipment prior to test)					☐	☐	
14	Confirm All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents					☐	☐	
Defects reason and actions:								
Test Equipment								
Make:			Model:		Serial No:		Cal Expiry Date:	
		COMPLETED BY: (Construction)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP		
COMPANY								
SIGNATURE								
PRINT NAME								
DATE								

SOCKET OUTLET CIRCUITS				E-10A		
Asset Description			Project No.			
Location			System			
Tag Number			Manufacturer			
Layout Drawing			Model			
SLD Drawing			Schematic Drawing			
				PASS	N/A	Comments
1	Record the following rating information: Volts Amps Phases		☐		☐	
2	Verify equipment identification is correct and adequate, confirm correct number of outlets and locations		☐		☐	
3	Visually inspect equipment for external and internal damage and cleanliness		☐		☐	
4	Check equipment fixings and mountings are secure and correct		☐		☐	
5	Confirm location is correct to layout drawings		☐		☐	
6	Check earthing is correct and conforms to design specifications		☐		☐	
7	Confirm all outlets are correctly identified with tag number and circuit		☐		☐	
8	Confirm equipment is suitable for area classification		☐		☐	
9	Confirm spare cable entries are correctly plugged, all bolts are correct and that none are missing		☐		☐	
10	Check connections are correct, secure and cable and terminal identifications are correct		☐		☐	
11	Confirm MCB and RCD of circuit is correct, and DB is correctly labelled, and circuits identified		☐		☐	
12	Confirm distribution board circuit number is in accordance with approved drawings		☐		☐	
13	Carry out Insulation Resistance test on circuit (min value 10 MΩ @ 500V)		☐		☐	
14	Test and record earth continuity (max. value 0.5Ω)				Ω	
15	Confirm All prescribed electrical work (PEW) undertaken has been tested in accordance with the Electrical Safety Regulations, attach all relevant documents		☐		☐	
Defects reason and actions:						
Test Equipment						
Make:		Model:		Serial No:		Cal Expiry Date:
	COMPLETED BY: (Construction)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY						
SIGNATURE						
PRINT NAME						
DATE						

LIGHTING CIRCUITS				E-11A		
Asset			Project No.			
Location			System			
Tag Number			Manufacturer			
Layout Drawing			Model			
SLD Drawing			Schematic Drawing			
				PASS	N/A	Comments
1	Record the following rating information: Volts Amps Number of light fittings on circuit			☐	☐	
2	Verify equipment identification is correct and adequate, confirm correct number of lights and locations			☐	☐	
3	Visually inspect equipment for external and internal damage and cleanliness			☐	☐	
4	Check equipment fixings and mountings are secure and correct			☐	☐	
5	Confirm location is correct to layout drawings			☐	☐	
6	Check earthing is correct and conforms to design specifications			☐	☐	
7	Confirm all light fittings and switches are correctly identified with tag number and circuit			☐	☐	
8	Confirm equipment is suitable for area classification			☐	☐	
9	Confirm spare cable entries are correctly plugged, all bolts are correct and that none are missing			☐	☐	
10	Check connections are correct, secure and cable and terminal identifications are correct			☐	☐	
11	Confirm MCB / RCD of circuit is correct and correctly labelled, and circuits identified			☐	☐	
12	Confirm distribution board circuit number is in accordance with approved drawings			☐	☐	
13	Confirm all Lamps correct size.			☐	☐	
14	Carry out Insulation Resistance test on circuit (min value 10 MΩ @ 500V)			☐	☐	
15	Test and record earth continuity (max. value 0.5Ω)			Ω		
21	Confirm All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents			☐	☐	
Defects reason and actions:						
Test Equipment						
Make:		Model:		Serial No:		Cal Expiry Date:
COMPLETED BY: (Construction)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP		
COMPANY						
SIGNATURE						
PRINT NAME						
DATE						

MISCELLANEOUS EQUIPMENT				E-12A	
Asset Description		Project No.			
Location		System			
Tag Number		Manufacturer			
Layout Drawing		Model			
SLD Drawing		Schematic Drawing			
			PASS	N/A	Comments
1	Record the following rating information: Volts Amps Power		☐	☐	
2	Verify equipment identification is correct and adequate.		☐	☐	
3	Visually inspect equipment for external and internal damage and cleanliness		☐	☐	
4	Check equipment fixings and mountings are secure and correct		☐	☐	
5	Confirm location is correct to layout drawings		☐	☐	
6	Confirm equipment is installed as per the manufacture's recommendations and design		☐	☐	
7	Check earthing is correct and conforms to design specifications		☐	☐	
8	All equipment and auxiliaries are correctly identified with tag number and circuit		☐	☐	
9	Confirm equipment is suitable for area classification including IP rating		☐	☐	
10	Confirm spare cable entries are correctly plugged, all bolts are correct and that none are missing		☐	☐	
11	Check connections are correct, secure and cable and terminal identifications are correct		☐	☐	
12	Confirm MCB / Fuse rating of circuit is correct and DB is correctly labelled, and circuits identified		☐	☐	
13	Distribution board circuit number is in accordance with approved drawings		☐	☐	
14	Carry out Insulation Resistance tests		☐	☐	
15	Test and record earth continuity (max. value 0.5Ω)		Ω		
16	Confirm All prescribed electrical work (PEW) undertaken has been tested in accordance with the Electrical Safety Regulations, attach all relevant documents		☐	☐	
Defects reason and actions:					
Test Equipment					
Make:	Model:	Serial No:	Cal Expiry Date:		
	COMPLETED BY: (Construction)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP		
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

EARTHING			E-13A	
Asset Description		Project No.		
Location		System		
Tag Number		Manufacturer		
Layout Drawing		Model		
SLD Drawing		Schematic Drawing		
			PASS	N/A
			Comments	
1	Confirm earthing assembly is correct and conforms to design specifications		☐	☐
2	Verify equipment identification is correct and adequate		☐	☐
3	Visually inspect equipment for external and internal damage and cleanliness		☐	☐
4	Check earth bar fixings and mountings are secure and correct		☐	☐
5	Confirm location is correct to layout drawings		☐	☐
6	Confirm that all bolts / lugs are of correct size and secure		☐	☐
7	Perform ductor tests on earth bar assembly with cables disconnected and record the results (max. value 0.1 Ω)		Ω	
8	Check connections are greased, secure and cable and terminal identifications are correct		☐	☐
9	For IS equipment ensure that a separate insulated earth bar is installed in accordance with design specifications		☐	☐
10	Confirm all cable sizes are correct to design specifications		☐	☐
11	Confirm equipment is bonded to the main earth		☐	☐
12	Confirm All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents		☐	☐
Defects reason and actions:				
Test Equipment				
Make:	Model:	Serial No:	Cal Expiry Date:	
	COMPLETED BY: (Construction)	REVIEWD BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY				
SIGNATURE				
PRINT NAME				
DATE				

CABLE RACKING / TRAY / CONDUIT / TRANSITS				E-14A	
Asset Description				Project No.	
Location				System	
Tag Number				Manufacturer	
Layout Drawing				Model	
SLD Drawing				Schematic Drawing	
				PASS	N/A
				COMMENTS	
1	Confirm installation is in accordance with design drawings.			☐	☐
2	Confirm separation maintained between rack systems (HV/MV – LV 600mm).			☐	☐
3	Confirm primary & secondary support adequate, Brackets are spaced at minimum 300mm.			☐	☐
4	Confirm rack / tray material is to correct specification. Heavy duty aluminium.			☐	☐
5	All bolts / nuts are fitted, tight and all rough edges and burrs have removed.			☐	☐
6	Confirm deflection is limited to 25mm per 6m.			☐	☐
7	Carry out earth path resistance test on rack / tray and record the results (max. value 0.5Ω)			Ω	
8	Confirm rack / tray is not a hazard to personnel, blocking access or preventing removal of equipment			☐	☐
9	Confirm rack / tray bonding conforms to design specification			☐	☐
10	Confirm insulation spacers are fitted where applicable			☐	☐
11	Confirm protective kick plates installed where applicable			☐	☐
12	Confirm rack identification is correct to specification			☐	☐
13	Confirm transit frames are correctly installed & packed			☐	☐
14	Confirm transit identification is correct			☐	☐
15	Confirm rack to transit alignment correct			☐	☐
16	Confirm Conduit saddles spaced at minimum of 1000mm. Confirm appropriate anchors used, wood or fibre plugs are not acceptable.			☐	☐
17	Confirm Conduit expansion joints provided at minimum 25m intervals and boxing provided at minimum 40m intervals.			☐	☐
18	Confirm All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents			☐	☐
Defects reason and action:					
Test Equipment					
Make:		Model:		Serial No:	
				Cal Expiry Date:	
COMPLETED BY: (Construction)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) A1If flagged on ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

HAZARDOUS AREA CERTIFIED EQUIPMENT			E-15A		
Asset Description		Project No.			
Location		System			
Tag Number		Manufacturer			
Layout Drawing		Model			
SLD Drawing		Serial Number			
NOTE: These checks are to be completed by a suitably qualified electrical person			PASS	N/A	Comments
1	Record the following: Area Hazardous classification: Equipment Ex Classification: Equipment Certifying Authority: Equipment Cert Number:	☐	☐		
2	Confirm the sites Ex register (Verification Dossier) has been updated with the details of this equipment	☐	☐		
3	Confirm apparatus is appropriate for the area classification	☐	☐		
4	Confirm temperature classification is correct for area	☐	☐		
5	Confirm apparatus group or sub-group is correct	☐	☐		
6	Confirm correct circuit identification	☐	☐		
7	Confirm integrity of enclosure	☐	☐		
8	Confirm cable entries and stoppers are complete and appropriate & tight	☐	☐		
9	Confirm electrical connections are tight	☐	☐		
10	Confirm that earthing and bonding is satisfactory	☐	☐		
11	Confirm for correct rating of apparatus and components	☐	☐		
12	Confirm apparatus and wiring systems are not damaged	☐	☐		
13	Confirm that environmental protection is adequate	☐	☐		
14	Confirm there are no unauthorised modifications	☐	☐		
15	Confirm all bolts / screws present and tight & correct type	☐	☐		
16	Confirm special installation requirements as identified on certificate (suffix 'x') met	☐	☐		
17	Confirm that stopper and cable boxes are correctly filled if applicable	☐	☐		
18	Confirm, if applicable, that conduit runs / fittings are tight and free from corrosion	☐	☐		
Ex 'd' Enclosure					
1	Confirm apparatus is clean and corrosion free	☐	☐		
2	Confirm flame path is free from dirt, paint and corrosion	☐	☐		
3	Confirm flame path is not damaged	☐	☐		
4	Clean all blind holes of dirt and grease prior to assembly	☐	☐		
5	Confirm spigots are correctly fitted and not damaged	☐	☐		
6	Approved grease has been applied to flange faces, flame path, spigots and bolts, etc.	☐	☐		
7	Confirm flange joint weatherproofing is correct	☐	☐		
8	Confirm adjacent steelwork / equipment does not obstruct flame path (Gas group IIA = 10mm, IIB = 30mm, IIC = 40mm)	☐	☐		
9	If sight glasses / indicators are fitted check for damage	☐	☐		

Ex 'e' Increased Safety				
1	Confirm enclosure gasket is in good condition and IP rating maintained	☐	☐	
2	Check terminals are approved and as supplied by manufacturer	☐	☐	
3	Check creepage and clearance distances are maintained	☐	☐	
4	Confirm terminal links are installed correct to manufacturers design	☐	☐	
5	Confirm lamp ratings are correct	☐	☐	
6	Confirm motor gaps / running clearances are satisfactory	☐	☐	
7	Confirm electrical protection is satisfactory.	☐	☐	
8	Check for deterioration of encapsulation materials	☐	☐	
9	Confirm spare cores terminated & earthed	☐	☐	
Ex 'n' (zone 2 only)				
1	Carry out checks as per Ex 'e' requirements	☐	☐	
2	Confirm motor fans and couplings are free to rotate with sufficient clearance	☐	☐	
3	Confirm minimum IP rating > than IP 54	☐	☐	
Ex 's' Special Equipment				
1	Carry out checks as per Ex 'e' requirements	☐	☐	
2	Check any special requirements as per certificate are adhered to (i.e.: fuses sizes etc.)	☐	☐	
Ex 'p' Pressurised Enclosure				
1	Confirm enclosure and associated ducting, piping are mechanical sound and free from defects	☐	☐	
2	Conform pressure / flow indicators, alarm and interlocks function correctly	☐	☐	
Ex 'I' Intrinsically Safe				
1	Confirm system installation complies with relevant certification requirements	☐	☐	
2	Confirm field mounted equipment, cables and JB's are identified as IS circuits	☐	☐	
3	Confirm fuses and lamps are of correct type / rating as per certification requirement	☐	☐	
4	Confirm earthing is correct to project specifications	☐	☐	
5	Cable screens are earthed in accordance with project procedures specifications	☐	☐	
6	Confirm diode safety barriers are correct type / rating and earthed correctly	☐	☐	
7	Confirm wiring separation from non-IS circuits is maintained throughout circuit	☐	☐	
Defects reason and action:				
Test Equipment				
Make:	Model:	Serial No:	Cal Expiry Date:	
	COMPLETED BY: (Construction)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY				
SIGNATURE				
PRINT NAME				
DATE				

CONTACTOR STARTER / FUSED SWITCH					E-16A		
Asset Description				Project No.			
Location				System			
Tag Number				Manufacturer			
Layout Drawing				Model			
SLD Drawing				Schematic Drawing			
					PASS	N/A	COMMENTS
1	Record the following rating information: Volts Amps Phases Circuit no. Switchboard			☐	☐		
2	Equipment Clean and free from mechanical damage and installed as per the manufacture's recommendations			☐	☐		
3	Isolator is lockable in the OPEN position			☐	☐		
4	Isolator is interlocked with the door			☐	☐		
5	Isolator and Auxiliary switches operate correctly			☐	☐		
6	Plug in starter withdrawal unit operates correctly			☐	☐		
7	Plug in starter alignment of main and auxiliary plugs correct			☐	☐		
8	Internal wiring secure and clear of door and withdrawal unit			☐	☐		
9	Door earthed Correctly			☐	☐		
10	All control switches, pushbuttons and lamps correct			☐	☐		
11	All Ammeters and scales correct			☐	☐		
12	All Flash Barriers correct			☐	☐		
13	Confirm All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents			☐	☐		
Defects reason and actions:							
Test Equipment							
Make:		Model:		Serial No:		Cal Expiry Date:	
		COMPLETED BY: (Construction)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged on ITP	
COMPANY							
SIGNATURE							
PRINT NAME							
DATE							

CIRCUIT BREAKER INSTALLATION				E-17A		
Asset Description		Project No.				
Location		System				
Tag Number		Manufacturer				
Layout Drawing		Model				
SLD Drawing		Serial Number				
Schematic Drawing						
				PASS	N/A	Comments
1	Record the following rating information: Volts Amps Phases Circuit no. Switchboard			☐	☐	
2	Equipment Clean and free from mechanical damage and installed as per the manufacture's recommendations			☐	☐	
3	Confirm equipment identification is correct and adequate			☐	☐	
4	Circuit breaker clean & free from mechanical damage			☐	☐	
5	All transit packaging removed			☐	☐	
6	Busbar connection between fixed / moving parts of CB aligned & complete			☐	☐	
7	Main plug and socket connector alignment connection correct			☐	☐	
8	Secondary plug and socket connector alignment connection correct			☐	☐	
9	Busbar shutter operation correct			☐	☐	
10	Busbar padlocking operation correct			☐	☐	
11	Circuit breaker close and trip mechanism operating manually			☐	☐	
12	Internal wiring neat and correct			☐	☐	
13	Confirm All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents			☐	☐	
Defects reason and actions:						
Test Equipment						
Make:	Model:	Serial No:	Cal Expiry Date:			
COMPLETED BY: (Construction)						
REVIEWED BY: (Project Engineer)						
WITNESSED BY: (Commissioning Engineer) If flagged in ITP						
COMPANY						
SIGNATURE						
PRINT NAME						
DATE						

BUS DUCTING INSTALLATION				E-18A		
Asset Description		Project No.				
Location		System				
Tag Number		Manufacturer				
Layout Drawing		Model				
SLD Drawing		Serial Number				
Schematic Drawing						
				PASS	N/A	Comments
1	Record the following rating information: Volts Amps Phases Power Switchboard			☐	☐	
2	Equipment Clean, free from mechanical damage and installed to manufacture's recommendations			☐	☐	
3	Confirm support system adequate & complete			☐	☐	
4	Insulators installed as per manufactures recommendations and free from dust and debris			☐	☐	
5	Confirm all interconnecting sections fitted			☐	☐	
6	Confirm penetration integrity suitable for fire rating of bulkhead			☐	☐	
7	Confirm movement & expansion catered for all terminations			☐	☐	
8	Terminations at equipment per manufacture's recommendations at both ends			☐	☐	
9	Confirm encapsulation of joints is complete			☐	☐	
10	Torque settings of busbar split joint bolts are correct as per manufacturers schedule: bolt size: mm torque: Nm			☐	☐	
11	Confirm bus ducting clear of obstructions			☐	☐	
12	Confirm earth bonding correct & complete			☐	☐	
13	Confirm Bus-bar continuity test completed			☐	☐	
14	Complete ductor test (ohms) and record results			☐	☐	
15	Complete insulation resistance test (megohms) and record results			☐	☐	
16	All prescribed electrical work (PEW) undertaken has be tested in accordance with the Electrical Safety Regulations, attach all relevant documents			☐	☐	
Defects reason and action:						
Test Equipment						
Make:		Model:		Serial No:		Cal Expiry Date:
	COMPLETED BY: (Construction)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY						
SIGNATURE						
PRINT NAME						
DATE						

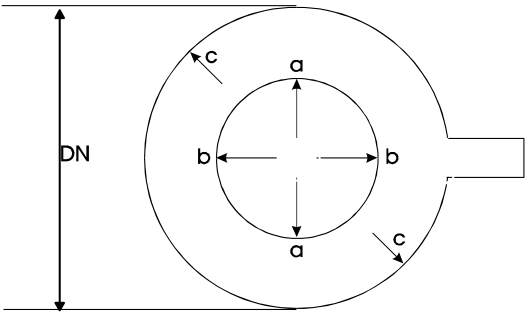
Cathodic Protection			E-19A		
Asset Description		Project No.			
Location		System			
Tag Number		P&ID			
Layout Drawing		Schematic Drawing			
			PASS	N/A	Comments
Isolating / Insulating Joints					
1	Confirm Insulating joints have a lightning arrestor installed across the insulated joint to protect the joint.		☐	☐	
2	If a polarisation cell, PCR or equivalent is specified confirm a lightning arrestor has been installed as well.		☐	☐	
3	Where the insulating joints are adjacent to a valve, confirm the arrestor has been connected to the outside pipe flanges, not to the valve body.		☐	☐	
Cathodic protection power supplies (TR's)					
4	Confirm TRs have been mounted on a concrete plinth that complies with the concrete structure requirements in Watercare's general civil construction standard and the following: - Extend beyond the side of the TR cabinet by a minimum of 100mm - Concrete thickness of minimum 150mm and have 12mm reinforcing at mid-level of the plinth - Sloped from the centre of the plinth to 1:100 – if the TR base is an open frame - Sloped from the side of the TR cabinet of 1:100 – if the TR base is enclosed and sealed against water ingress - Provided with minimum 4x 50NB uPVC penetrations for earth peg and cables		☐	☐	
Impressed current anode ground beds					
5	Confirm Impressed current anodes have individual cables brought up to a junction box from all anodes		☐	☐	
6	Confirm Impressed current anodes are located as per the drawings		☐	☐	
Sacrificial anode ground beds					
7	Confirm anodes have been supplied and installed packaged in gypsum bentonite backfill in a calico bag		☐	☐	
8	Confirm the backfill was well wetted prior to backfill		☐	☐	
9	Confirm individual cables from all anodes have been brought up to a junction box		☐	☐	
10	Confirm the junction box has been designed to allow easy access to cable terminals. Terminals shall be brass or stainless-steel bolts and/or bus bars, except where mounted in instrumentation control boxes with DIN rail mounts.		☐	☐	
11	Confirm anodes installed in the pipe trench have been installed in the bottom corner of the trench resting on native soil. Where anodes are installed outside the trench it shall be in native soil		☐	☐	
12	Confirm Anodes have not been laid on scoria, bedding sand or other free draining material.		☐	☐	
13	The anode bed may be connected temporarily to ensure operation. Following the check, the anode bed must be disconnected until pre-commissioning has been completed or as otherwise specified by Watercare.		☐	☐	
Permanent buried reference cells					
14	Confirm the cells have been installed as per the drawings		☐	☐	
15	Confirm the cells have been supplied and installed in packaged in gypsum bentonite		☐	☐	

	backfill in a calico bag			
16	Confirm the cells Backfill was thoroughly wetted prior to backfill	☐	☐	
Continuity bonding				
17	Confirm un-welded joints within buried cathodically protected sections of pipeline have been bridged with a continuity bond cable. b) The bond cable shall be: - As short as practicable to reduce voltage drop - Located such that there are no mechanical joints between the connection point and the pipe being bonded	☐	☐	
Test points				
18	If the test point is surrounded by pavement Confirm a drop tube or soil access box has been provided. b) Drop tubes shall be installed with minimum 300mm native soil in the base. In cases where native soil is too hard to be compacted in the tube or too free draining to enable contact, the fill shall be: - For corrosion coupons: Washed sand - Buried references and other installations: 50% gypsum / 50% bentonite mix c) Fill shall not be scoria, gravel or a similar free draining material.	☐	☐	
19	Confirm test points terminating in a test station have two cables connected separately to the structure and terminated separately in the test station, one for potential monitoring the other as a bond cable, regardless of whether bonding is required.	☐	☐	
20	Confirm Interference test points have been installed as close as practicable to the crossing point of two services in an accessible location.	☐	☐	
22	Confirm that where the test station is 3m or more from the crossing a permanent zinc reference has been installed mid-way between the protected pipe and the crossing service, ensuring that the cell is no closer than 100mm from either.	☐	☐	
Corrosion coupons and electrical resistance probes				
23	Confirm the test station foot has been buried in the pipe trench in the same bedding and surround material as the pipe, facing down towards the pipe invert.	☐	☐	
24	Wherever practicable a drop tube shall be provided. Configuration options in order of preference are: i. Single unit with probe foot directly below test station, with a drop tube in the test station connected to the foot ii. Probe foot with drop tube and flush access box buried separately near test station iii. Probe foot buried with permanent zinc reference (supplied with the probe) and no drop tube	☐	☐	
Cabling and connections				
25	Confirm that cables have been installed as continuous single length cables without splices or joints.	☐	☐	
26	Confirm cables have been installed in conduit.	☐	☐	
27	Confirm cable continuity has been tested. (Buried cable connections shall be tested prior to recoating connections and backfilling).	☐	☐	
	Unless shown otherwise in the specific drawings, cable colours shall be:			
	Cable use	Colour		
	Protected pipes in the main CP system	Black		
	Other Watercare pipework (protected or not)	White		
	Customer or foreign pipes or structures	Blue		
	Permanent references	Yellow		

	Sacrificial anodes	Red (may be TPS inner layer)			
	Impressed anodes	Red or Black			
	Continuity cabling for CP	Black			
	Earthing	Green/Yellow			
	The following minimum conductor sizes shall apply:				
	Conductor	Size			
	Potential monitoring (no current)	4mm2			
	Test point bond cables (impressed systems)	16mm2			
	Test point bond cables (sacrificial systems)	6mm2			
	Continuity bond cables (not for earthing)	16mm2			
	Anode junction box to TR or test station	16mm2			
	Impressed current anodes (individual)	16mm2			
	Sacrificial anodes (individual)	6mm2			
28	Confirm continuity bond cables are as short as practicable to avoid unnecessary voltage drop in the cable. Bond cables for earthing purposes shall comply with relevant regulations.		☐	☐	
Equipment labelling and identification specific to cathodic protection					
29	Confirm Labels comply with the general requirements in section 12 of the Watercare General Electrical Construction Standard. Equipment to be labelled are: • Insulating flanges • Test stations • Junction boxes • TRs		☐	☐	
Defects reason and action:					
Test Equipment					
Make:		Model:	Serial No:	Cal Expiry Date:	
	COMPLETED BY: (Construction)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP		
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

INSTRUMENT INSTALLATION				I-01A	
Asset Description				Project No.	
Tag Number				Site	
Manufacturer				Process Area	
Model				Loop drawing Ref	
Serial number					
		OK	N/A	Comments	
1	Asset tag in place and correct to P&ID	☐	☐		
2	Instrument checked, and all data correct against data sheet	☐	☐		
3	Instrument condition satisfactory, free from damage	☐	☐		
4	Instrument installed correctly to all relevant layout, termination, loop and hook-up drawings	☐	☐		
5	Instrument accessible for maintenance, clear of obstructions	☐	☐		
6	Instrument correctly mounted, secure, orientation correct, elevated correct and free from vibration and heat. Any local indicators are clearly visible	☐	☐		
7	Process connections correct	☐	☐		
8	Pneumatic connections correct	☐	☐		
9	Hydraulic connections correct	☐	☐		
10	Electrical connections correct	Ω			
11	Test and record earth continuity (max. value 0.1 Ω)	☐	☐		
12	Spare connections suitably plugged / capped	☐	☐		
13	EOL resistor fitted (if applicable). Record resistor value:	☐	☐		
14	Instrument Tag No. fixed. Label visible. Label and Tag meet project standards	☐	☐		
15	Calibration certificate valid and attached to this check sheet				
Defects reason and action:					
COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

CONTROL VALVE/ACTUATOR INSTALLATION			I-02A	
Asset Description		Project No.		
Tag Number		Site		
Manufacturer		Process Area		
Model		Loop Drawing Ref		
Serial Number				
			OK	N/A
			Comments	
Valve				
1	Valve checked, and all data correct against data sheet	☐	☐	
2	Valve condition satisfactory, complete and free from any mechanical damage	☐	☐	
3	Body and Trim material correct to data sheet	☐	☐	
4	Leakage class correct to data sheet	☐	☐	
5	Valve sizing correct to data sheet	☐	☐	
6	Instrument installed correctly to all relevant layout, termination, loop and hook-up drawings	☐	☐	
7	Confirm valve has been installed in the correct direction of flow	☐	☐	
Actuator				
1	Failure action as per data sheet (Open, Close or Last)	☐	☐	
2	Working pressure correct	☐	☐	
3	Fluid type correct	☐	☐	
4	Hydraulic connections correct (if any)	☐	☐	
5	Pneumatic connections correct (if any), air regulator as per data sheet.	☐	☐	
6	Electrical connections correct	☐	☐	
7	Hand wheel operation correct (if any)	☐	☐	
8	Check earthing is correct and conforms to design specifications	☐	☐	
9	Test and record earth continuity (max. value 0.1Ω)	Ω		
Comments:				
Test Equipment				
Make:	Model:	Serial No:	Cal Expiry Date:	
	COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)	WITNESSED BY (Commissioning Engineer) If Flagged in ITP	
COMPANY				
SIGNATURE				
PRINT NAME				
DATE				

ORIFICE PLATE INSPECTION			I-03A	
Asset Description			Project No.	
Tag Number			System	
Manufacturer			Process Area	
Model			Loop Drawing Ref	
Serial Number				
			OK	N/A
			Comments	
1	Confirm device conforms to the data sheet		☐	☐
2	Confirm upstream orifice markings: a) the word 'upstream' b) the Tag No. c) the ANSI flange class, followed by RF d) the nominal size of DN (mm) e) the measured orifice diameter 'd' (mm)		☐	☐
3	Confirm concentricity DN a-a is within 0.1 mm for DN < 200 mm or within 0.2 mm for DN >= 200 mm (FE only)		☐	☐
4	Confirm difference between any two measurements of plate thickness is within 0.001 x DN (in mm) (FE only)		☐	☐
5	Confirm plate flatness along any diameter is within 0.001 x pipe ID		☐	☐
6	Confirm that the surface finish of the throat and plate are free from visible scratches and indentations		☐	☐
7	Confirm throat edges are sharp and free from burrs		☐	☐
8	Check there is no light reflected from the corners of square edged plates		☐	☐
9	Confirm that the location and size of the bleed hole (where applicable) conforms to standard drawings / data sheet		☐	☐
10	Measure and record diameter of orifice at upstream face on the vertical (a) and horizontal (b) axes and (c) for overall diameter (a) _____ (b) _____ (c) _____		☐	☐
				
11	Confirm orifice plate is not damaged and shows no signs of corrosion		☐	☐
Comments:				
Test Equipment				
Make:		Model:	Serial No:	Cal Expiry Date:

	COMPLETED BY: (Contractor)	Reviewed By: (Project Engineer)	REVIEWED BY: (Commissioning Engineer) If flagged in ITP
COMPANY			
SIGNATURE			
PRINT NAME			
DATE			

INSTRUMENT TUBING INSTALLATION					I-04A	
Asset Description				Project No.		
Tag Number				Site		
Manufacturer				Process Area		
Model				P&ID Drawing Loop drawing Ref		
Serial number				Loop Drawing Ref		
					PASS	N/A
					COMMENTS	
1	Instrument tubing installed and supported correctly			☐	☐	
2	Tubing materials correct, and tubing has no sign of damage or welding spots			☐	☐	
3	Confirm all tubing is blown clear and dry prior to test. All dirt and cutting debris removed from tubing			☐	☐	
4	All instrument tube fittings and isolation valves are correctly installed as per relevant drawings			☐	☐	
5	All instruments that cannot be subjected to the pressure test should be removed from the pressure test			☐	☐	
7	Record Pressure Test Parameters (Use soapy water test to check that the joints are leak free).			☐	☐	
	Service	Test Specification	Test Pressure	Test Medium	Soak Duration	
	Impulse Line - (Non-Hydraulic)	1.5 x Design Pressure	kPa		min (≥ 10)	
	Hydraulic Line - (Impulse and Signal)	1.5 x Design Pressure	kPa		min (≥ 15)	
	Signal Line - (Vacuum or Atmospheric)	Fixed Pressure	150 kPa		min (≥ 10)	
	Signal Line - (Non-Hydraulic Lines)	Max Operating Pressure	kPa		min (≥ 10)	
8	Hydraulic lines flushed to NAS specification 1638 Class 7			☐	☐	
9	Hydraulic lines depressurised and capped after test			☐	☐	
10	Tubing cleaned and drained, and blown dry			☐	☐	
11	Tubing is correctly re-connected			☐	☐	
Defects reason and actions:						
Test Equipment						
Make:		Model:		Serial No:		Cal Expiry Date:
COMPLETED BY: (Construction)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged on ITP		
COMPANY						
SIGNATURE						
PRINT NAME						
DATE						

INSTRUMENT CALIBRATION							I-05A		
Asset Description					Project No.				
Tag Number					Site				
Manufacturer					Process Area				
Model					Loop drawing Ref				
Serial number									
							PASS	N/A	COMMENTS
1	Confirm all Instrument data correct as per project data sheet						☐	☐	
2	Instrument Checked for Damage						☐	☐	
3	Instrument Tag Number Attached to Instrument						☐	☐	
4	Confirm all Electrical and process connections correct						☐	☐	
5	Input Range:		Output Range:				☐	☐	
6	Confirm calibration is current and calibration sticker attached to Instrument						☐	☐	
7	Attach vendor calibration certificate, or complete calibration and record results below						☐	☐	
Calibration (using certified test equipment)									
Analogue Instruments									
Range	0%	25%	50%	75%	100%	75%	50%	25%	0%
Input (Engineering value)									
Output (mA/ Digital)									
Digital Instruments									
Switch / Relay		Set Point		Rising / Falling			Switch Contact		
							NO / NC		
							NO / NC		
							NO / NC		
							NO / NC		
Defects reason and actions:									
Test Equipment									
Make:		Model:		Serial No:			Cal Expiry Date:		
		COMPLETED BY: (Construction)		REVIEWED BY: (Project Engineer)			WITNESSED BY: (Commissioning Engineer) If flagged on ITP		
COMPANY									
SIGNATURE									
PRINT NAME									
DATE									

INSTRUMENT / UCP PANEL INSTALLATION			I-06A	
Asset Description		Project No.		
Tag Number		Site		
Manufacturer		Process Area		
Model		Loop drawing Ref		
Serial number				
			PASS	N/A
			COMMENTS	
1	Confirm nameplate details and internal/external tagging is as per datasheet and drawings		☐	☐
2	Confirm all external and internal equipment is undamaged (including paintwork/lamps switches)		☐	☐
3	Confirm panel external /internal fittings and mountings are secure and to design		☐	☐
4	Confirm panel alignment is correct and location correct to equipment layout drawings		☐	☐
5	Confirm anti-condensate heater is correct type and rating (if fitted)		☐	☐
6	Confirm that all doors/removable sides are free from obstruction and are accessible		☐	☐
7	Confirm gaskets and seals are not damaged, confirm IP rating is suitable for location		☐	☐
8	Confirm all bolts are correct and that none are missing		☐	☐
9	Confirm that panel instrument and electrical earthing is correct to project earthing specifications		☐	☐
10	Test and record earth continuity (max. value 0.1Ω)		Ω	
11	Confirm internal panel equipment PSU's, MCB's, Fuses, Barriers etc are correct type and rating		☐	☐
12	Confirm all internal panel equipment is installed and secure as per panel internal G.A. Drawings		☐	☐
13	Confirm all internal connections are correct, secure and cable identifications are correct		☐	☐
14	Confirm all Intrinsically Safe and AC/DC wiring /terminal segregation is correct and clearly identified.		☐	☐
15	Confirm that any pneumatic/ hydraulic connections are correct (include "Purge" apparatus).		☐	☐
16	Confirm electro-mechanical relays/breakers secure and free from damage		☐	☐
17	Confirm solid state electronics secure and free from damage		☐	☐
Defects reason and actions:				
Test Equipment				
Make:	Model:	Serial No:	Cal Expiry Date:	

	COMPLETED BY: (Construction)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged on ITP
COMPANY			
SIGNATURE			
PRINT NAME			
DATE			

MISC. PROCESS ANALYSERS INSTALLATION				I-07A	
Asset Description				Project No.	
Tag Number				Site	
Manufacturer				Process Area	
Model				Loop drawing Ref	
Serial number					
				PASS	N/A
				COMMENTS	
1	Analyser checked, and all data correct against project /vendor data sheet			☐	☐
2	Analyser condition satisfactory, complete and free from any mechanical damage			☐	☐
3	Analyser cabling and electrical connections are complete and installed correctly			☐	☐
4	Analyser EX and IP ratings are correct / maintained for installed area classification			☐	☐
6	Sampling system filters, strainers, coalesces and contaminant traps installed correctly			☐	☐
7	External sample dryers installed as per Hook up drawings			☐	☐
8	Sample probe installed correctly with respect to process termination point			☐	☐
9	Loop inlets / outlets connected at correct process termination point			☐	☐
10	Sample conditioning carrier gas system installed correctly as per Hook up drawings			☐	☐
11	Sample line electric heat tracing installed correctly			☐	☐
12	Sample line pump(s) installed correctly as per Hook up drawings			☐	☐
13	Instrument air supply installed correctly as per Hook up drawings			☐	☐
14	Potable water supply installed correctly as per Hook up drawings			☐	☐
15	System drains, and vents discharge termination point correct as per Hook up drawings			☐	☐
16	Actuated sample stream switching valves installed as per Hook up drawings			☐	☐
17	Analyser enclosure cooling / circulation / HVAC fans installed and wired correctly			☐	☐
18	Analyser enclosure anti-condensation heater system installed and wired correctly			☐	☐
19	Analyser oven / enclosure heaters system operable installed and wired correctly			☐	☐
20	Confirm the electrical earthing is correct to project earthing specifications			☐	☐
21	Test and record earth continuity (max. value 0.5Ω)			Ω	
Defects reason and actions:					
Test Equipment					
Make:		Model:		Serial No:	
				Cal Expiry Date:	
COMPLETED BY: (Construction)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged on ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

FIRE SUPPRESSION SYSTEM INSTALLATION				I-08A	
Asset Description			Project No.		
Tag Number			Site		
Manufacturer			Process Area		
Model			Loop drawing Ref		
Serial number					
			PASS	N/A	COMMENTS
1	Equipment checked, and all data correct against data sheet		☐	☐	
2	Ensure the equipment has been installed in line with the FPANZ Code of Practice for Gaseous Fire Suppression Systems – COP 01		☐	☐	
3	Equipment condition satisfactory, complete and free from any mechanical damage		☐	☐	
4	Equipment installed correctly to all relevant layout, termination, loop and hook-up drawings		☐	☐	
5	Equipment correctly mounted, secure, orientation correct, elevated correct and free from vibration, accessible for maintenance and clear of any obstructions. Any local indicators are clearly visible		☐	☐	
6	Equipment Tag Labels visible. Label and Tag meet project standards		☐	☐	
7	Confirm the number and capacity of equipment CO2 / N2 / Air bottles is correct as per design		☐	☐	
8	Confirm all nozzles are clear and un-obstructed, confirm spray path and coverage is as per design		☐	☐	
9	Confirm all pipework and tubing has been pressure tested and is free of debris		☐	☐	
10	Confirm all pipework is suitably installed with adequate supports and protection		☐	☐	
11	Confirm all pressure vessels have been commissioned and are within certification		☐	☐	
12	Confirm all actuating devices, solenoids etc have been commissioned		☐	☐	
13	Confirm any Frangible or heat activated bulbs are of the correct rating		☐	☐	
14	Confirm equipment Earthing / Bonding is correct to project specification		☐	☐	
15	Test and record earth continuity (max. value 0.5Ω)		Ω		
Defects reason and actions:					
Test Equipment					
Make:		Model:	Serial No:		Cal Expiry Date:
COMPLETED BY: (Construction)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged on ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

HVAC DUCTWORK INSTALLATION			H-01A	
Asset		Project No.		
Location		System		
Tag Number		Manufacturer		
Layout Drawing		Model		
D&ID Drawing		Serial number		
ISO Drawing		Data Sheet		
			PASS	N/A
			Comments	
1	Ductwork complete, satisfactory and in accordance with design drawings and location correct		☐	☐
2	Confirm the installation is as per design, i.e. drain points, valving, instruments, dampers, louvers, screens etc		☐	☐
3	Protective coating satisfactory, Insulation correctly applied and undamaged		☐	☐
4	Confirm flanges secure, sealed and bolts tight, Joints and sealants correct, flexible joints correctly installed and sealed, and duct work internally cleaned		☐	☐
5	Confirm stiffening and turning vanes correctly installed		☐	☐
6	Confirm access door location clearly identified, fastened and sealed		☐	☐
7	Ensure all related equipment checklists are complete		☐	☐
8	Confirm anti-vibration and resilient supports secure and in accordance with manufacturer's instructions		☐	☐
9	Confirm instrument insertions are sealed		☐	☐
10	Confirm supports adequate and correctly installed		☐	☐
11	Pressure/leakage test complete, blanking plates removed, and joints resealed		☐	☐
12	Confirm duct identification labels correctly fitted		☐	☐
13	Confirm test points adequate		☐	☐
14	Earth bonding complete		☐	☐
15	Test and record earth continuity (max. value 0.5Ω)		Ω	
16	Air inlets/outlets have bird/insect mesh securely fitted where applicable		☐	☐
17	All grills, louvers, attenuators, filters, diffuser and associated dampers are installed, functional and in the open position.		☐	☐
Defects reason and actions:				
Test Equipment				
Make:	Model:	Serial No:	Cal Expiry Date:	
	COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY				
SIGNATURE				
PRINT NAME				
DATE				

DAMPER INSTALLATION				H-02A	
Asset Description				Project No.	
Location				System	
Tag Number				Manufacturer	
Layout Drawing				Model	
D&ID Drawing				Serial number	
ISO Drawing				Data Sheet	
				PASS	N/A
				Comments	
1	Check that the damper is undamaged, clean and installed in accordance with drawings and specifications. Confirm fire rating is as per design (if applicable)			☐	☐
2	Check that damper blades are sealing, and clearance is satisfactory and that the blades are within the casing when damper is fully open			☐	☐
3	Check access is available to damper internals and for maintenance			☐	☐
4	Confirm the bulkhead penetration integrity is correct			☐	☐
5	Confirm dissimilar metal isolation is achieved			☐	☐
6	Confirm nameplate in readable location, record details			☐	☐
7	Confirm airflow direction correct			☐	☐
8	Confirm flanges are sealed and bolted correctly, and gaskets are in accordance with specifications and correctly fitted			☐	☐
9	Local external indication is fitted and satisfactory			☐	☐
10	Locking quadrant is fitted and satisfactory			☐	☐
11	Confirm damper blades move satisfactorily			☐	☐
12	Confirm tension spring, or counterbalance weight fitted.			☐	☐
13	Confirm earthing conforms to design requirements			☐	☐
14	Damper controls are as per design, record failure position (OPEN/CLOSED):			☐	☐
15	Confirm air supply tubing pressure checks completed			☐	☐
16	Confirm fire detection device is operational and commissioned (fusible loop, frangible bulb, fire wire etc)			☐	☐
17	Confirm auxiliary devices (solenoids, limit switches) have been commissioned and loop tested			☐	☐
Observations/Comments/Defects:					
Test Equipment					
Make:		Model:		Serial No:	
COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

AIR HANDLING UNIT INSTALLATION				H-03A	
Asset			Project No.		
Location			System		
Tag Number			Manufacturer		
Layout Drawing			Model		
D&ID Drawing			Serial number		
ISO Drawing			Data Sheet		
			PASS	N/A	Comments
1	Confirm the air handling unit and components are undamaged and installed in accordance with approved drawings, specification and manufacture recommendations		☐	☐	
2	Confirm mounting supports, frames and bolts are correctly installed and tight		☐	☐	
3	Confirm there is sufficient space for withdrawal purposes and adequate access for maintenance		☐	☐	
4	Confirm drip tray and drain pipes installed and functional		☐	☐	
5	Confirm compressor and drive complete		☐	☐	
6	Confirm anti-condensation heater fitted (where required)		☐	☐	
7	Confirm all valves are operational and greased		☐	☐	
8	Confirm piping connections are complete and the unit is internally clean and free of debris		☐	☐	
9	Confirm where required, refrigeration line complete and supported, sight glass fitted		☐	☐	
10	Confirm surface coating and insulation is complete and to the correct specification		☐	☐	
11	Confirm inspection doors and hatches correctly installed and lock operable, gaskets are undamaged. Confirm flanges secure and bolts tight		☐	☐	
12	Confirm name plate details correct and readable		☐	☐	
13	Confirm applicable check lists completed for: a) Heating and cooling coils b) Humidifiers c) Auxiliary instruments and remote controls and indications		☐	☐	
14	Confirm dissimilar metals isolation achieved		☐	☐	
15	Confirm flow direction correctly indicated		☐	☐	
16	Confirm earth bonding correct		☐	☐	
Defects reason and actions:					
Test Equipment					
Make:		Model:	Serial No:		Cal Expiry Date:
COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					

SIGNATURE			
PRINT NAME			
DATE			

BELT DRIVEN FAN INSTALLATION				H-04A	
Asset			Project No.		
Location			System		
Tag Number			Manufacturer		
Layout Drawing			Model		
D&ID Drawing			Serial number		
Termination Drawing			Data Sheet		
			PASS	N/A	Comments
1	Confirm the fan unit and components are undamaged and installed in accordance with approved drawings, specification and manufacture recommendations		☐	☐	
2	Confirm mounting supports, vibration mountings, frames and bolts are correctly installed		☐	☐	
3	Confirm there is sufficient space for withdrawal purposes and adequate access for maintenance		☐	☐	
4	Confirm drip tray and drain pipes installed and functional		☐	☐	
5	Check Impeller secure and clearance satisfactory, confirm the fan turns freely by hand.		☐	☐	
6	Confirm ducting and dampers connections are complete and the unit is internally clean and free of debris. Confirm gaskets are installed in ducting joints and the flexible connection joints (if installed)		☐	☐	
7	Confirm surface coating and insulation is complete and to the correct specification		☐	☐	
8	Check Impeller secure and clearance satisfactory, Static balance satisfactory, Fan shaft level and bearings aligned, Motor level and aligned, Pulleys aligned, and belts tensioned		☐	☐	
9	Grease fan and motor bearings		☐	☐	
10	Confirm inspection doors and hatches correctly installed and lock operable, gaskets are undamaged. Confirm flanges secure and bolts tight		☐	☐	
11	Confirm name plate details and tag plates correct and readable and flow direction correctly indicated		☐	☐	
12	Confirm guarding is sufficient to prevent access to rotating parts		☐	☐	
13	Confirm all electrical and instrument check sheets associated with fan are complete		☐	☐	
14	Record Belt details Manufacturer: Type: Size: Number fitted:		☐	☐	
15	Confirm earth bonding correct		☐	☐	
Defects reason and actions:					
Test Equipment					
Make:		Model:		Serial No:	
				Cal Expiry Date:	

	COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP
COMPANY			
SIGNATURE			
PRINT NAME			
DATE			

REVERSE CYCLE HEAT PUMP INSTALLATION				H-05A	
Asset			Project No.		
Location			System		
Tag Number			Manufacturer		
Layout Drawing			Model		
D&ID Drawing			Serial number		
Termination Drawing			Data Sheet		
			PASS	N/A	Comments
1	Confirm the unit and components are undamaged and installed in accordance with approved drawings, specification and manufacture recommendations		☐	☐	
2	Confirm the size of the unit is suitable for the area to be heated / cooled		☐	☐	
3	Confirm mounting supports, vibration mountings, frames and bolts are correctly installed		☐	☐	
4	Confirm the exterior unit is level and if ground mounted is located on a solid surface.		☐	☐	
5	Confirm there is sufficient space for withdrawal purposes and adequate access for maintenance		☐	☐	
6	Confirm refrigerant and drain pipes are installed and functional		☐	☐	
7	Confirm refrigerant pipes have been pressure and leak tested		☐	☐	
8	Check Impeller secure and clearance satisfactory, confirm the fan turns freely by hand.		☐	☐	
9	Confirm ducting and dampers connections (if installed) are complete and the unit is internally clean and free of debris.		☐	☐	
10	Confirm filters are installed and clean		☐	☐	
11	Confirm name plate details and tag plates correct and readable		☐	☐	
12	Confirm guarding is sufficient to prevent access to rotating parts		☐	☐	
13	Confirm all electrical and instrument check sheets associated with the system are complete		☐	☐	
14	Test and record earth continuity (max. value 0.5Ω)		Ω		
Defects reason and actions:					
Test Equipment					
Make:		Model:	Serial No:		Cal Expiry Date:
COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

VALVE and PENSTOCK INSTALLATION				M-01A	
Asset Description		Tag Number			
Site		Process area			
Project/Project No.		Type and Model			
Manufacturer		Serial number			
				PASS	N/A
				Comments	
Documentation and Specifications					
1	Specification correct as per design			☐	☐
2	Vendor test documentation complete.			☐	☐
Condition and Installation					
3	Condition satisfactory, free from mechanical damage			☐	☐
4	Equipment installed correctly to all relevant layout, Isometric, and P&IDs, flow direction is correct			☐	☐
5	Installed equipment supported at the right reaction/support points			☐	☐
Accessibility and Functionality					
6	Equipment is readily accessible for operation and maintenance and is clear of any obstructions			☐	☐
7	All handwheels, lever functions etc function correctly. Local indicators clearly visible and correctly set up.			☐	☐
8	Valve stem / gearbox indication match the actual position of the valve. Stem and ball/flap/butterfly etc correctly attached and aligned.			☐	☐
9	Valve and Penstock stops set (where applicable), equipment operates smoothly across its full range			☐	☐
10	Penstock guides and slides are as per design and square. Seals and grouting are adequate			☐	☐
11	Gearbox and spindles packed and greased with a suitable packing and lubricant type applicable to environment			☐	☐
12	Actuators are installed as per design and correct for the application			☐	☐
13	Electrical and instrument point-to-point I/O checks completed on actuators			☐	☐
Observations/Comments/Defects:					
COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					



STRAINERS FILTERS AND SCREENS INSTALLATION				M-02A	
Asset Description				Tag Number	
Site				Process area	
Project/Project No.				Type and Model	
Manufacturer				Serial number	
Reference Drawings					
				OK	N/A
				Comments	
Equipment Verification					
1	Equipment checked, data correct, vendor test documentation complete.			☐	☐
2	Specification correct for service, (filter, medium /strainer, mesh size)			☐	☐
3	Condition satisfactory, no mechanical damage			☐	☐
4	Paint finish satisfactory, free from damage, correct to project specification			☐	☐
Installation & Accessibility					
5	Installed correctly per layout, Isometric, P&ID's, flow direction correct			☐	☐
6	Readily accessible for operation/maintenance, no obstructions			☐	☐
7	Handwheels, lever, function correctly, indicators visible and set up.			☐	☐
8	Screen guides/ slides as per design, square, seals/ grouting adequate			☐	☐
9	Access for operations/maintenance adequate			☐	☐
Lubrication & Instrumentation					
10	Spindles greased with suitable grease type/ environment			☐	☐
11	Gearboxes greased, repacked if required by vendor manual			☐	☐
12	DP instruments e complete / available, if fitted			☐	☐
13	Actuators installed per design, correct for application, electrical/ instrument check been complete			☐	☐
Final Checks					
14	Chamber and element clean			☐	☐
15	Drains and vents completed			☐	☐
Observations/Comments/Defects:					
COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

MISCELLANEOUS MECHNICAL INSTALLATION				M-03A	
Asset Description				Tag Number	
Site				Process area	
Project/Project No.				Type and Model	
Manufacturer				Serial number	
P&ID Drawing					
				PASS	N/A
				Comments	
Equipment Verification					
1	Equipment checked, data correct against data sheet, vendor test documentation complete.			☐	☐
2	Preservation/protection caps are removed			☐	☐
3	Condition satisfactory, complete and free from any mechanical or paint damage			☐	☐
Installation & Accessibility					
5	Equipment installed correctly to layout, Isometric, P&ID's, flow direction correct, supported at right points.			☐	☐
6	Equipment accessible for operation and maintenance, clear of obstructions			☐	☐
7	Handwheels, levers and local indicators function and are visible			☐	☐
8	Sliding feet unobstructed, bolts correctly installed with washers			☐	☐
9	Access for operations and maintenance adequate			☐	☐
Pipework & Structural Integrity					
10	Pipework correctly aligned, gaskets of correct type			☐	☐
11	Flanges correctly bolted and torqued			☐	☐
12	Access ladders and platforms secure			☐	☐
13	Spindles, bearings, moving parts greased with suitable grease			☐	☐
14	Vents and drains installed correctly			☐	☐
Observations/Comments/Defects:					
Test Equipment					
Make:		Model:		Serial No:	
				Cal Expiry Date:	
	COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

PUMP INSTALLATION			M-04A	
Asset Description		Tag Number		
Site		Process area		
Project/Project No.		Type and Model		
Manufacturer		Serial number		
Reference Drawings		Coupling Type		
			Pass	N/A
			Comments	
Documentation and Specifications				
1	Specification and installation correct as per design (IFC, manual)		☐	☐
2	Vendor test documentation complete (Refer to QAQC M11.4 Template)		☐	☐
Condition and Installation				
3	Condition satisfactory, free from mechanical damage		☐	☐
4	Paint finish free from damage, correct to project specification		☐	☐
5	Equipment installed correctly to layout, Isometric, P&ID's, flow direction is correct		☐	☐
6	Condition of visible mechanical seal and auxiliaries as per design		☐	☐
7	Relief arrangement installed as per design		☐	☐
Accessibility and Functionality				
8	Equipment accessible for safe operation and maintenance, clear of any obstructions		☐	☐
9	Cold alignment completed (Refer to QAQC M11.4 Template)		☐	☐
10	Coupling gap DBSE recorded		☐	☐
11	Coupling and guard installed, guard adequate		☐	☐
12	Earthing to project specification		☐	☐
13	Mounting as per manufacturer's recommendation		☐	☐
14	Torque values recorded (torque sheet attached or in comments)		☐	☐
Alignment & Connections				
15	Pipework and supports correctly aligned, gaskets of correct type, bolts torqued		☐	☐
16	Vents and drains installed as per design		☐	☐
17	Pump and motor lubrication systems installed and filled (products recorded in comment)		☐	☐
18	Pump skid and drip tray clear of debris		☐	☐
19	Tubing in good condition and lubricated (for positive displacement pumps)		☐	☐
Observations/Comments/Defects:				
	COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY				
SIGNATURE				
PRINT NAME				
DATE				

SUBMERSIBLE PUMP INSTALLATION				M-05A	
Asset Description			Tag Number		
Site			Process area		
Project/Project No.			Type and Model		
Manufacturer			Serial number		
Reference Drawings					
			Pass	N/A	Comments
Equipment Verification					
1	Data matches data sheet.		☐	☐	
2	Vendor test documentation complete		☐	☐	
3	Nameplate data, including tag plate complete		☐	☐	
Specification and Condition					
4	Specification correct to service and conditions		☐	☐	
3	Condition satisfactory, complete, free from mechanical and paint damage		☐	☐	
Installation and Accessibility					
4	Equipment installed correctly to layout, Isometric, and P&ID's, flow direction correct		☐	☐	
5	Equipment accessible for operation and maintenance, clear of obstructions		☐	☐	
Specific Checks					
6	Air release vent installed and operational		☐	☐	
7	Earthing complete as per project specification		☐	☐	
8	Pipework correctly aligned, gaskets are of correct type, and bolts torqued		☐	☐	
Electrical submersible type					
9	Number of riser spools are as per drawing		☐	☐	
10	Riser spool flange faces undamaged and square		☐	☐	
11	Riser spool flange gaskets and stud bolts correct to design specification		☐	☐	
12	Number of spider restraints are as per design		☐	☐	
Line Shaft type					
13	Number of riser spools are as per drawing		☐	☐	
14	Riser spool flange faces are undamaged and square		☐	☐	
15	Number of line shafts are as per drawing		☐	☐	
Observations/Comments/Defects:					
COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

COLD ALIGNMENT DATA SHEET				M-06A	
Asset Description				Tag Number	
Site				Process area	
Project/Project No.				Type and Model	
Manufacturer				Serial number	
Reference Drawings					
				OK	N/A
				Comments	
	Coupling Alignment				
1	Manufacturers figures for coupling alignment, cold offsets recorded (below)			☐	☐
	Equipment Skid				
2	Level to tolerance, signed as per approved design			☐	☐
3	Skids welded prior to the fitting of pipe			☐	☐
	Alignment and Installation				
4	Pre-welding alignment complete, recorded			☐	☐
	Soft Foot Check				
5	Soft foot check performed, results recorded			☐	☐
	Pipework and Flange Alignment				
6	Pipework complete and flange alignment correct			☐	☐
7	Pipework loosened to the driven equipment			☐	☐
	Coupling Installation				
8	Coupling split, spacer (if fitted), bolts and guard removed			☐	☐
9	Record DBSE (Distance Between Shaft Ends)			☐	☐
10	Coupling and guard installed, bolts tensioned as per spec.			☐	☐
	Final Check				
11	Gauge positions checked, completed (alignment sheet attached)			☐	☐
Observations/Comments/Defects:					
		COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

DIESEL ENGINE INSTALLATION						M-08A	
Asset Description			Tag Number				
Site			Process area				
Project/Project No.			Type and Model				
Manufacturer			Serial number				
Reference Drawings							
					Pass	N/A	Comments
	Documentation and Specifications						
1	Engine matches design specification and vendor Test Documentation				☐	☐	
2	Engine installation matches design drawings and name plate details				☐	☐	
	Installation and Alignment						
3	Skid location and level correct				☐	☐	
4	Engine barring facilities operational				☐	☐	
5	Rig saver system (if fitted) operational				☐	☐	
6	Engine inspected for external damage, including paintwork				☐	☐	
7	Exhaust system complete to design specification				☐	☐	
8	Air intake complete to design specification				☐	☐	
9	All associated pipe work complete and aligned				☐	☐	
10	Alignment completed and recorded				☐	☐	
11	All guards fitted and all auxiliary systems complete				☐	☐	
13	Anti-vibration mounts secure				☐	☐	
14	Integral cooling fan installed as per design drawings				☐	☐	
15	Diesel fuel emergency shut off valve operational				☐	☐	
16	Diesel fuel system complete and operational				☐	☐	
17	Earth boss and strap fitted				☐	☐	
18	Engine skid clear of debris/contaminates				☐	☐	
Observations/Comments/Defects:							
		COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP		
COMPANY							
SIGNATURE							
PRINT NAME							
DATE							

LIFTING EQUIPMENT INSTALLATION						M-10A	
Asset Description			Tag Number				
Site			Process area				
Project/Project No.			Type and Model				
Manufacturer			Serial number				
Reference Drawings							
				Pass	N/A	Comments	
	Documentation and Specifications						
1	Equipment matches design specification and vendor test documentation available			☐	☐		
	Installation and Setup						
2	Installation is correct as per design drawings and name plate details are accurate			☐	☐		
3	Skid location and levels are correct			☐	☐		
4	Access for maintenance meets Watercare Standard, and permanent access provided (e.g. to gantry cranes)			☐	☐		
5	Utility connections complete			☐	☐		
6	Alignment checks complete on all associated equipment			☐	☐		
	Safety and Alignment						
7	Stops fitted on ends (e.g. of runway beams, chains, ropes, moving tracks)			☐	☐		
8	Personnel protection and safety devices are installed			☐	☐		
9	Equipment is isolated and locked from energy sources (electrical, gravitational, kinetic)			☐	☐		
10	Red-line markup complete			☐	☐		
Observations/Comments/Defects:							
		COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY							
SIGNATURE							
PRINT NAME							
DATE							

RELIEF / SAFETY VALVE INSTALLATION						M-11A	
Asset Description			Tag Number				
Site			Process area				
Project/Project No.			Type and Model				
Manufacturer			Serial number				
Reference Drawings							
					Pass	N/A	Comments
	General Checks						
1	Equipment matches design specs and vendor documentation available				☐	☐	
2	Installation correct as per design drawings				☐	☐	
3	Name plate details correct				☐	☐	
4	Attach test / calibration sheets				☐	☐	
5	No damage to equipment				☐	☐	
6	Seal wire integrity correct				☐	☐	
	Valve Details						
7	Cold set Pressure:		Bar g	Back Pressure:		Bar g	
	Data Sheet Setting:		Bar g	Operating Temperature:		oC	
	Calibration & Leak Test						
8	Test Medium:			Cold set Pressure:		Bar g	
	Lifting Pressure:			Bar g	Re Seat Pressure:		Bar g
	Leak Test Pressure (90%):			Bar g			
	Duration:			mins	Leak Rate:		(bubble per minute)
Observations/Comments/Defects							
		COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY							
SIGNATURE							
PRINT NAME							
DATE							

TANKS and VESSELS INSTALLATION				M-12A	
Asset Description			Tag Number		
Site			Process area		
Project/Project No.			Type and Model		
Manufacturer			Serial number		
Reference Drawings					
			Pass	N/A	Comments
	Equipment Verification				
1	Equipment matches design specification and vendor test docs available		☐	☐	
2	Name plate in place and details correct		☐	☐	
	Documentation				
3	Pressure and material test certificates submitted and filed		☐	☐	
	Inspection and Verification				
4	Tank inspected for internal and external damage (including internal and external coatings)		☐	☐	
5	Pipework aligned correctly		☐	☐	
6	Relief / venting arrangements correct		☐	☐	
7	Insulation requirements complete		☐	☐	
8	Associated internal equipment, external fittings, correct to design specification		☐	☐	
9	Manways accessible and lifting facilities correct and design to specification		☐	☐	
10	Manway door gaskets to specification and intact, bolts correctly torqued		☐	☐	
11	Earth boss and strap fitted		☐	☐	
12	Bunding / containment arrangement meets HSNO and project specifications		☐	☐	
13	Sliding feet are not obstructed, bolts correctly installed, washers fitted		☐	☐	
Observations/Comments/Defects					
COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

[illegible]

VENDOR SUPPLIED PACKAGED SKIDS						M-14A		
Asset Description			Tag Number					
Site			Process area					
Project/Project No.			Type and Model					
Manufacturer			Serial number					
Reference Drawings								
					Pass	N/A	Comments	
	Equipment Verification							
1	Equipment checked, data correct against data sheet, name plate details correct.				☐	☐		
2	Specification correct for service, conditions, and design				☐	☐		
	Installation and Alignment							
3	Equipment installed correctly to all relevant layout, Isometric, and P&ID's				☐	☐		
4	Piping and manways complete and adequately supported, correct gaskets installed, and drains (including skid drains) installed and clear				☐	☐		
5	Insulation as per vendor drawings				☐	☐		
6	Skid equipment correctly aligned, appropriate guards installed, equipment free to rotate.				☐	☐		
	Finishing and Cleanliness							
7	Paint finish satisfactory, is free from damage, correct to project specification				☐	☐		
8	Skid package internally and externally clean				☐	☐		
	Functional Checks							
9	Valves operate through full range, correct direction of flow				☐	☐		
10	Instrumentation and electrical equipment/cabling installed per vendor documentation and project standards				☐	☐		
11	Interface and termination points correct and complete, earth bonding correct and complete				☐	☐		
	Documentation and Testing							
12	Shipped loose items clearly identified and checked				☐	☐		
13	FAT Completed to approved procedure, punch list items attached				☐	☐		
14	All vendor documentation and drawings available and as-built				☐	☐		
Observations/Comments/Defects:								
COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP				
COMPANY								
SIGNATURE								
PRINT NAME								
DATE								

CENTRIFUGE			M-19A	
Asset Description		Tag Number		
Site		Process area		
Project/Project No.		Type and Model		
Manufacturer		Serial number		
Reference Drawings				
			Pass	N/A
Documentation and Preservation				
1	Equipment is correct to design specification and vendor test documentation is available		☐	☐
2	Installation is correct as per design drawings and name plate details correct		☐	☐
3	Materials of construction are suitable for application including internal coatings		☐	☐
5	Pressure and material test certificates, engineering transpeople proof of qualification attached		☐	☐
Equipment Condition and Inventory				
6	Machine body and covers visually inspected for internal and external damage, including coatings		☐	☐
7	Bolts and seals are tight on all assemblies		☐	☐
8	Associated pipework correctly aligned		☐	☐
9	Decanter bowl relief / venting arrangements correct		☐	☐
10	Vibration dampers mounted correctly		☐	☐
11	Associated internal and external equipment correct to design specification (vibration & temperature sensors, lifting lugs, external fittings)		☐	☐
12	Bowl shaft is free to move by hand and direction arrow in place		☐	☐
13	flushing and cleaning in place		☐	☐
14	lubrication points are accessible and in place (bearings, gearbox)		☐	☐
15	Sliding feet not obstructed, and bolts correctly installed, washers fitted (where applicable)		☐	☐
16	Machine guards are available and properly installed		☐	☐
17	Decanter isolated from vibration of nearby machinery		☐	☐
Observations/Comments/Defects:				
	COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY				
SIGNATURE				
PRINT NAME				
DATE				

SYSTEM PIPING COMPLETION CERTIFICATE				P-01A	
Asset Description				Tag Number	
Site				Process area	
Project/Project No.				Type and Model	
Manufacturer				Serial number	
Reference Drawings					
				Pass	N/A
				Comments	
	Document and Preservation				
1	Pipework as per isometrics and P&IDs, Discrepancies approved and as built.			☐	☐
2	Piping material and valve specification as per design, tags correct.			☐	☐
3	QA pack and NDT PWHT complete.			☐	☐
	Debris Removal				
4	Hydro glazing, air blowing, flushing of pipework complete			☐	☐
	Direction and Orientation				
5	Inline filters, strainers, and directional flow valves in correct direction and orientation			☐	☐
6	Orifice and flow meter flanges have required upstream and downstream run clearance.			☐	☐
7	Thermowells and air release valves installed as per P&IDs.			☐	☐
	Supports and Mechanical Checks				
8	Pipe supports installed as per spec and design including pipe anchors, sliders, PTFE pads etc.			☐	☐
9	Mechanical checks on all equipment including valves, strainers.			☐	☐
	Pressure Tests and Flange Management				
10	Pipework fall correct as per design.			☐	☐
11	Pre-Pressure Test checks complete (P-02A)			☐	☐
12	Piping Pressure Test complete (P-03A)			☐	☐
13	Flange management complete (P-04A).			☐	☐
Observations/Comments/Defects:					
		COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

PRE-PRESSURE TEST PIPELINE CHECK			P-02A	
Asset Description		Tag Number		
Site		Process area		
Project/Project No.		Type and Model		
Manufacturer				
			Pass	N/A
			Comments	
Document and Preservation				
1	Pipework as per isometrics and P&ID s. Discrepancies approved and as-built.		☐	☐
2	Piping material and valve specification as per design; Tags correct		☐	☐
3	QA pack and NDT PWHT complete		☐	☐
Direction and Orientation				
4	Inline filters, strainers, and directional flow valves; correct direction and orientation		☐	☐
5	Orifice and flow meter flanges run clearances upstream and downstream correct		☐	☐
6	Thermowells installed as per P&IDs		☐	☐
Supports and Mechanical Checks				
7	Pipe supports installed as per design (including pipe anchors, sliders, PTFE pads etc).		☐	☐
8	Mechanical checks complete on all equipment within the test limits (valves, strainers)		☐	☐
Pressure Tests and Flange Management				
9	Pipe work fall correct and as per design		☐	☐
10	Flange management complete as per check list (P-04)		☐	☐
Hydro Vents and Drains				
11	Hydro vents and drains installed correctly for venting and draining of the system		☐	☐
Connections and Supports				
12	Sealant on screwed connections as per specification		☐	☐
13	Line adequately supported for hydrotesting		☐	☐
Valve and Instrumentation Checks				
14	All ball valves half open for testing		☐	☐
15	Check valves internals removed, bagged and tagged by P&ID		☐	☐
16	Non-rated items removed for test pressure: instrumentation, flow meters etc		☐	☐
Test Equipment and Safety				
17	Test equipment calibration certificates valid: includes pressure recorders		☐	☐
18	Barriers and signage setup to restrict access		☐	☐
19	Site talk conducted to communicate risks to all persons on the site		☐	☐
Observations/Comments/Defects:				
	COMPLETED BY: (Contractor)	REVIEWED BY: (Project Engineer)	WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY				
SIGNATURE				
PRINT NAME				
DATE				

PIPING PRESSURE TEST CERTIFICATE				P-03A	
Asset Description				Tag Number	
Site				Process area	
Project/Project No.				Type and Model	
Manufacturer					
				Pass	N/A
				Comments	
Document and Preservation					
1	NDT PWHT complete and QA release note issued			☐	☐
2	Spool numbers and relevant Isometrics listed (where applicable) / Subcontractors Hydro-test pack attached			☐	☐
3	Pre-Pressure Test Check Sheet P-02 complete			☐	☐
4	Approved test plan attached / procedure with test limit P&ID clearly marked			☐	☐
5	Release for pressure test			☐	☐
Pressure Test					
6	Test date:		Ambient Temp:		
	Design Pressure:		Test Pressure:		
	Recorder serial No:		Test Gauge Serial No:		
	Test Medium:		Duration of Test:		
	Pressure at start of test:		Pressure at end of test:		PASS/FAIL:
7	Recorder chart / printout attached			☐	☐
Post-Test Actions					
8	System depressurised and drained, test equipment disconnected			☐	☐
9	System flushed, dried and disinfected			☐	☐
10	Items removed prior to test re-instated (i.e. instruments, check valves etc.)			☐	☐
Spool numbers and relevant Isometrics (where applicable)					
Line Number		Isometric drawing numbers			
Observations/Comments/Defects:					
COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					

FLANGE MANAGEMENT CERTIFICATE				P-04A	
Asset Description			Tag Number		
Site			Process area		
Project/Project No.			Type and Model		
Manufacturer			Serial number		
Reference Drawings					
			Pass	N/A	Comments
	Flange and Gasket Checks (complete as per M8.7 QAQC Template)				
1	Flange faces cleaned, undamaged and correctly aligned.		☐	☐	
2	Gaskets undamaged, and right for service and correctly installed: flange type, design, and project specification.		☐	☐	
	Bolts, Washers and Joints (complete as per M8.7 QAQC Template)				
3	Bolts correct for the service: material, size, length, and complete with washers.		☐	☐	
4	Bolts lubricated and tightened: Correct bolt tightening pattern and torque on flange and gasket.		☐	☐	
5	Joints and tagged details captured (table below).		☐	☐	
6	Isolation sleeves and washers installed		☐	☐	
7	Insulation joints installed and tested (completed >1MΩ)		☐	☐	
8	Joints loaded and supported.		☐	☐	
List all flanged joints and relevant Isometrics					
Joint Number / Identifier		Isometric drawing numbers		Joint Number / Identifier	
Defects and Action taken:					
COMPLETED BY: (Contractor)		REVIEWED BY: (Project Engineer)		WITNESSED BY: (Commissioning Engineer) If flagged in ITP	
COMPANY					
SIGNATURE					
PRINT NAME					
DATE					