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SECTION B : CONSTRUCTION SPECIFICATION

1.0 SITE

The site shall be laid out such as to comply with Drawing TS501. This shall allow for all weather access to the centre line of the parking space being no greater than 4m in plan from the furthest pump or 0.5 m in elevation between the parking area and lid elevation.

Where the access way has to be of a length greater than 30 m, a turning point is to be provided at the well.

The cabinet is to be located with the switch gear facing the wet well.

2.0 CHAMBER

The Pumping Station chamber shall be constructed from flush jointed Class 4 reinforced concrete pipes installed as shown on Drawing TS502.

Pipe joints shall be sealed and made watertight using "Expocrete UA" or an acceptable equivalent.

Care shall be exercised to ensure that the pump chamber is vertical and set to the correct levels before the station floor is poured. A precast base may be used provided flotation of the chamber is prevented.

Buoyancy of the chamber is considered at the time of designing a pump station. Accordingly the chamber may require mass concrete in the bottom to counter buoyancy forces. The depth and extent of mass concrete shall be as specified on the construction plans.

Once excavated to a firm foundation free of any organic soil, the wet well pump station foundation shall be prepared with a layer of compacted GAP 40 no less than 250mm thick followed by a capping of site concrete no less than 100mm thick.

The top slab shall be cast as shown on Drawing TS504.. The placement of reinforcement shall be carefully controlled to ensure adequate cover. The lids and frames shall be carefully set into the concrete upstands so that they fit flush with the finished upstand level. All concrete shall be ordinary grade 21 MPa crushing strength.

The lid and frame specified on the drawings shall be constructed as shown on Drawings TS520 to TS522.

The pump discharge holding down bolts shall be grouted in and accurately positioned so that the 50mm dia. pipe guide rails stand vertically between the guide rail brackets and the discharge connection. Care is to be exercised in grouting in the bolts to ensure that they will not vibrate loose with use.

All reinforcing steel bars shall be grade 300 deformed bars complying with NZSS.3402 : 1989. All nuts, bolts and washers shall be grade 316 stainless steel. Where concrete is to

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be poured around high density polyethylene pipe, the pipe shall be first wrapped with 1.5mm thick butynol sheeting.

Any blockwork mortar joints shall be pointed inside and outside and all cores filled with grout. The outside of the blockwork shall be painted with two coats of "Mulseal" or acceptable equivalent in accordance with the manufacturers specifications.

2.0 CABLE BRACKET

The float and motor cables shall be secured by a grade 316 stainless steel bracket with ceramic insulators. The bracket shall be mounted in such a position as to be easily accessible from the lid opening.

3.0 WATER SUPPLY

A 40mm diameter water supply, or standard 63OD MDPE pipeline as used for water supply ridermains (Vol 3 Part 6 Section D Installation of MDPE Pipelines) shall be provided to the pump station. Wastewater pump stations are a "High Hazard" risk requiring reduced pressure zone type backflow prevention devices installed above ground level (refer BIA Acceptable Solution G12/AS1 and AS/NZS2845.1). The backflow prevention device is to be positioned adjacent to the electrical control cabinet, as per Drawing TS540.

4.0 Control Cabinet

An integrated 3 zone single control cabinet shall be installed atop a plinth built as per Drawing TS531 constructed as per Councils approved product lists and material. The construction of the cabinet shall be as per Drawing TS502 with a single 50mm galvanised pole for attachment of a single Yagi radio aerial, mounted to either short face to provide maximum radio transmission and reception.

The internal layout of the cabinet shall be set out as shown on Drawing TS530.

Acceptance of the requirement that all securing locks are fitted using lock barrels as supplied from the Council to ensure compliance with the Councils key system. Doors one and two shown on Drawing TS530 are to be secure using an approved three point locking system.

5.0 REMOTE TERMINAL UNIT AND TELEMETRY SYSTEM

A remote terminal and telemetry system, meeting the Council approved listing, shall be installed for station control and alarm annunciation. It shall be installed by the Council's agent and communicate to the "Base Station" situated in the Council offices at the Contractors cost.

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6.0 CABLE DUCTS

One Pump Cable duct and one Control Cable duct of 100 mm dia shall be installed from the base of the Electrical Control Cabinet concrete plinth to the pump stations chamber. One 100 mm duct will be installed in the plinth for the mains cable. A 50 mm duct will be installed from the Electrical Control Cabinet concrete plinth to the flow meter. Seal duct to restrict corrosive fumes entering the electrical cubicle. A further 50 mm duct will be installed for each of the emergency storage spray wash control solenoid and/or a distal float overflow if fitted.

7.0 COMMISSIONING TEST

All pumping stations shall undergo a series of commissioning tests covering mechanical, electrical & telemetry aspects, Council shall be present at the test. A minimum of 2 working days notice shall be given to Council prior to the test taking place. Any defect, found or non-conformance to agreed standards, shall be rectified prior to acceptance of the pumping station by Council.

8.0 AS BUILT INFORMATION

An accurate "as built" record shall be maintained as work progresses in accordance with Volume 1 Part 2 of this Development Manual, or the Contract Documents (Part D2).

9.0 ELECTRICAL SPECIFICATIONS

9.1 Electricity Act 1992

9.1.1 *General*

The Contractor shall provide copies of Practising Licences of all personnel proposing to work on electrical components within this pump station and control cabinet. The Contractor shall ensure all personnel are familiar with relevant requirements under the Electricity Act, Electricity Regulations and AS/NZS 3000: 2000.

9.1.2 *Self Certification*

The Contractor shall note the requirements of self Certification under the Electricity Act. To that end the Contractor shall set up a written procedure of checking, testing and Quality Assurance self assessment for the duration of the Contract. This shall be submitted to the Principal for comment within 10 days of awarding of the Contract.

9.1.3 *Certificate of Compliance (CoC)*

The Contractor shall ensure a Certificate of Compliance is completed. This Certificate shall be completed and copies with a full schedule of test results appended, shall be submitted with application for commission clients:

- (a) Council
- (b) The Engineer

The provision of COC in no way provides for acceptance of the cabinet by the HCC

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9.1.4 *Inspections*

The Contractor shall allow for inspections to be undertaken by Council, or subject to Council's approval, an independent Inspector.

Allowance to correct, change, add to or delete equipment/works shall be the Contractor's expense and to Council's satisfaction, should it be found:

- (a) The work does not comply with the Specification.
- (b) The work does not meet the requirements of the Electricity Regulations, Codes of Practice, NZS 3000 and/or Technical Safety Regulations.

Any extra inspection costs required of the Inspector shall be passed onto the Contractor.

9.2 **Equipment And Materials Standards**

Unless otherwise specified, all materials and supplies required under this specification shall be new and from the approved fittings list. Sub-standard or lower grade items shall not be used.

All works must be carried out in accordance with the specified and relevant statues, standards and any equipment supplied must also comply with the relevant safety and current regulations covering trade practices and manufacturing practices for such equipment.

9.3 **Redundant Equipment**

The Contractor shall be aware that all existing electrical equipment and componentry in the pump station is the property of Council.

The Contractor shall not dispose of any such equipment without first bringing the matter to the Principal's attention, and reaching agreement on the course of action in this regard.

9.4 **Technical Requirements**

9.4.1 *General Introduction*

Contractors are referred to the equipment data sheets in Section A and preferred vendors list included in this document. Any deviations require specific approval from HCC.

9.4.2 *Cabling And Wiring*

9.4.2.1 *Direct Buried Cables & Cable Ducts*

Where specified cables laid direct in the ground shall be located not less than 0.6 metres below ground on a 50mm thick bed of clean sand. The trench shall be backfilled with a 75mm thick layer, measured from the top of the cable, of clean sand. Lengths of "Mag-Slab" cable cover shall then be laid end to end to provide cable protection. The trench shall then be further backfilled with clean sand or soil, free from rock, stones or other debris, to a level 200mm below the surface. Orange PVC Signal tape shall then be laid and backfilling completed, the surface being restored to the Engineer's satisfaction.

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9.4.2.2 *Glanding of Cables*

Cables shall be terminated in weather-proof metric threaded cable glands in accordance with the cable gland manufacturer's instructions and as noted on the cable schedules or as specified. The Contractor shall install threaded adapters to equipment having other than metric threaded cable entries.

The Contractor shall be responsible for ensuring that a cable gland of the correct type and size is used to terminate individual cables.

Where non-circular (e.g. two core neutral screened cables) are glanded they shall be taped circular before glanding. PVC weather-proof shrouds shall be fitted at all exterior glands. Glands shall be of the type approved by the Engineer.

9.4.2.3 *Wiring*

Termination of Conductors

The conductors in electrical cables shall be terminated in the terminal strips provided in equipment in accordance with an appropriate connection schedule or connection diagram. Terminations shall use an approved crimp lug, no multi-strand cable shall be terminated bare.

Wire Colouring:

(a) General

All power/control AC circuits to which these practices are applicable shall normally operate at a supply frequency of 50 Hz. The colouring of AC circuits of different frequencies, other than signal circuits, shall be subject to approval. The exception being where power/control circuits applicable to variable frequency speed drive power circuitry in which case the standard 3 phase AC or DC conductor colouring shall apply.

(b) Earth Conductors (All Systems)

Earth linking/bonding conductors Green/Yellow

Each conductors for intrinsically safe systems shall be legibly and permanently identified as intrinsically safe earths and shall be terminated in accordance with details given by the appropriate drawing/specification.

(c) Neutral Conductors

The colour black applies only to the neutral of an earthed system. The two live poles of an unearthed single phase AC system (men) shall be wired in the same colour.

That is, from the secondary side of a transformer where the conductors are "above earth".

(d) Colours

(i) <u>400/230V AC Power Wiring</u>	
Phases (as appropriate)	Red/Yellow/Blue
Neutral	Black

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- (ii) 400/230V AC Control Wiring
230V control circuit sourced from one phase:
Phase (irrespective of source) Brown
Neutral (earthed) Black
Neutral (unearthed) Brown

- (iii) Extra Low Voltage Supplies
Positive Violet
Negative Violet plus "-ve" ferrules

Limited to supplies derived from the switchboard battery system(s). The colour will apply to all conductors connected to the incoming supply terminals, isolation/power supply switches, protective devices, loads or the first of a series control circuit contacts.

Otherwise in control panels all conductors supplying such power to instruments, loads and supply side of control circuits will utilise the colours designated above, i.e. including transformed and rectified DC circuits.

- (iv) Extra Low Voltage DC Control
Positive Orange
Negative White

- (v) Signal Wiring Twisted Pairs
Positive White
Negative Black

- (vi) Intrinsically Safe
All conductors (except earth) Blue

9.4.2.4 Identification of Cables, Wiring and Equipment

All cables, including TPS wiring, neutral and earth continuity conductors installed or terminated or re-terminated, shall be identified at each end by means of Critchley cable markers type K and approved equivalent wire ferrule markers on a standard carrier strip tied with cables, tied at both ends of the cable or approved Graftoplas method.

All wires identified by means of wire numbers on the schematics or connection diagrams shall be identified at each and every termination with that wire number by means of full circle plastic cable markers, Critchley "Z" or Graftoplas or approved equivalent.

Similarly, each and every terminal in which an identified wire is terminated shall itself be identified with wire numbers shown on the termination diagrams using terminal markers matching the terminals. It shall be noted that terminal numbers will not necessarily be identical with wire numbers.

Equipment identification labels with permanent marking of a type to be approved by HCC, shall be provided to identify all components and items of equipment.

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9.4.3 *Switchboard Construction*

9.4.3.1 *General*

Where specified elsewhere herein, the Contractor shall supply and install the main Switchboard and any associated distribution switchboards and Linked Busbars switchboards as shown on the drawings.

The dimensions shown on the switchboard arrangement are typical only. However, in the event the actual switchboard dimensions vary from those shown as limiting, it shall be the responsibility of the Contractor to ensure the board, as built, will fit into the space allotted to it in every way suitable for its intended purpose.

The switchboard shall be built so as to withstand a maximum prospective through fault current for the site for a period of one second .

The Contractor has three options for provision of an approved main switchboard integral and associated downstream distribution boards, and linked busbar switchboards as follows. That is, design, fabrication and testing:

- (a) To a type tested design - with full supporting documentation.
- (b) To a standard accepted in New Zealand and proven equivalent to or better than the current NZS or AS documents. Full documentation supporting written proof that the switchboard and/or distribution boards have been designed and constructed to such standards shall be provided to HCC before they are accepted.
- (c) Completion of a separate Certificate of Compliance for the Switchboard(s) and each distribution switchboard or linked busbar switchboard with the following appended thereto:
 - (i) Reference documentation for design and construction; and
 - (ii) Complete set of test results according to AS/NZS 3000:2000 and AS/NZS 3017: 1996.

New Zealand/Australian Standards applicable to which the switchboards and distribution boards.

The Switchboard shall be built by a Vendor approved by the Principal, who is regularly engaged in the manufacture of similar switchboards.

Before manufacture is commenced, the Contractor shall provide a reasonably detailed shop drawing of the board for review and comment by Council.

9.4.3.2 *Detailed Requirements*

For the detailed specified requirements for the Switchboards under this contract, Tenderers should refer to Clause 8.5 included as part of this set of documents.

9.4.3.3 *Workshop Inspection*

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Where specified in the "Job Specification", (Clause 8.5) the Contractor shall allow to make arrangements for Council or the appointed Engineer to visit the Specialist Switchboard manufacturer's premises for a workshop inspection prior to despatch to site.

9.4.4 *Earthquake Precautions*

Provisions shall be made to restrain all plug-in devices and modular elements. Complete switchboard/panels and equipment mounted thereon shall comply with the the following Earthquake requirements:

NZS 4219: 1983, Clause 2.24, 2.26, 2.27 and 2.28. Proof of compliance may be requested by the Engineer and to that end a written report shall be made available within 48 hours of the request.

Full details of how the Contractor proposes to achieve this requirement shall be submitted to the Principal for comment.

9.4.5 *Thermal Overloads*

TOL's shall be 3 pole adjustable electronic. Manually resettable with operational trip test facility. Single phasing protection shall be inherent.

9.4.6 *Inspection, Testing, Commissioning*

9.4.6.1 *Notice of Testing*

The Contractor shall give 2 days written notice to the Engineer of the date after which the works are ready to carry out any tests required under the Contract.

On receipt of such notice the Engineer shall agree with the Contractor as to the day or days on which the tests shall take place which shall be within 10 days of the date on which the Contractor has indicated the works will be ready for the tests.

9.4.6.2 *Test Instruments*

All test instruments and other testing facilities shall be provided by the Contractor at their cost. Should the Engineer have any doubt as to accuracy of a measuring device, he reserves the right to instruct the Contractor to have the instrument re-calibrated at no extra cost. Nevertheless, if the re-calibration was in fact not necessary, the cost will be borne by Council.

Should it be evident to the Engineer that the pre-testing has not been completed and the Contractor is not ready to carry out the workshop testing or site commissioning testing programme in a logical sequence, then the charge for the Engineer's extra (wasted) time may be compensated for by reduction of the Contractor's claim/contract moneys by the equivalent amount.

9.4.6.3 *Testing*

All testing shall be carried out in strict accordance with NZECP 11.

A thorough test schedule shall be prepared and copies of all test results as required by NZECP 11 and as specified herein for AS/NZS 3017:2007, shall be appended to the COC and shall be executed by an independent registered Electrical Inspector, (Not part of the Contractor's business organisation), on a subcontract basis. Any such or similar

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subcontractor service and responsibilities shall be in full compliance with and subject to the requirements of this specification, drawings and ensuing contract agreement.

9.4.6.4 *Commissioning*

As a follow on from electrical testing, the Contractor shall allow for a full commissioning of the switchboard, associated pumps, soft starters, control, alarms, and measurement instrumentation and telemetry systems and commissioning, filter and extract fan if installed. Included with this requirement is the commissioning by standby generator on the switchboard and interconnections. Full operational checks and pump running shall be carried out on the Standby Power generator supply.

A fully scheduled pre-commissioning and commissioning program shall be derived and submitted to the Engineer. This shall include, but not necessarily be limited to, defining all activities to be undertaken after the testing is completed.

Such pre-commissioning checks and commissioning shall allow to co-ordinate with the Principal's operational staff and include for their input.

Commissioning in the regard is the confirming of operational safety and reliability only after all non livened tests have been completed.

Full written records of all operational set points, readings of all dials, instrument digital displays for the whole range of operational equipment, alarm indications etc, shall be taken at the time, on site, and presented in a tabulated and written/typed form to the Engineer.

9.5 Job Specification

9.5.1 *Scope*

Work shall be as indicated in the specification and on the drawings.. The Contractor shall be responsible for declaration of conformity and for equipment rating to ensure electrical compliance with Electricity Acts, Regulations and Codes of practice and that all circuits including the incoming power supply are adequate for their anticipated operational peak loading and that they shall comply with all requirements of HCC.

Including but not limited to:

For existing installation upgrades or replacements the Contractor shall check incoming mains cables and upgrade if appropriate upon Maximum Demand assessment. Check with HCC if any future loads are to be imposed:

- The incoming power applicable supply.
- Supply, installation and termination of switchboard and ancillary equipment.
- The wiring of all fixed wired outlets
- Provision of all ducting where required. Note the cables are to be concealed or protected by approved ducting.
- Allow to wire from the enclosure field devices to a demarcation terminal barrier for connections by others to the Telemetry equipment.
- Testing and commissioning of all equipment specified herein.

Provision of as-built drawings and information for inclusion into Operating, Maintenance and Spare Parts manuals)..

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9.5.2 **Standards**

This Job Specification and the following additional specifications or standards shall comprise the complete Specification for the works:

- NZ Electricity Regulations.
- NZ ECP 36 (Harmonic Levels).
- NZS 3000 (Wiring Rules).
- Previously issued Electrical Supply Regulations “Earthquake Requirements” as detailed in the 23 October 1980 issue of the NZ Gazette or latest equivalent document.
- In the event of conflict or ambiguity, the Job Specification shall have precedence.

9.5.2.1 *Main Earth*

The Contractor shall allow to install a main earth system to comply with AS/NZS 3000: 2000 as amended.

9.5.3 **Switchboard**

9.5.3.1 *Layout*

The layout shall be generally as per cabinet plane Drawing TS530. The Contractor to check dimensions on site and allow to suit allocated space.

The switchboard shall be designed and fabricated for front and rear entry.

9.5.3.2 *Construction*

Materials

The switchboard material shall be industrial formica P1 brown, size 1050 x 850 x 9 mm for the DOL Starter Panel and size 1263 x 850 x9 mm for the Soft Starter Panel.

Features

The switchboard shall be a MEN (Multi Earth Neutral) switchboard.

- | | |
|--------------|--|
| IP Rating | The enclosure shall be at least IP21 rating. |
| Door | Access shall be from the front and rear via hinged doors (no side access). Key lockable and keyed alike to the Principal's standard/master key system. |
| Hinges | The door shall be capable of being opened at least 180 degrees and be fitted with a restrainer to prohibit “over-openings” and hinge stretching. Allow for tinned flexible braid across all door hinges where electrical equipment is mounted on the door. |
| Sealing | Door seals shall be provided to ensure dust tight sealing, all around the door.
The sealing material shall be of a compressible nature to allow for door fabricmovement and temperature variations. |
| Penetrations | Shall be sealed to ensure compliance with the IP rating. |

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Colour The enclosure shall be deep Brunswick green in colour, by pacific gold orica, code 81879.

Gland Plate All cables entering the panel via the base gland plate shall be round in external section. They shall pass through an appropriate cable gland which will ensure a good air seal. Any additional cut outs shall be sealed.

9.5.3.3 *Electrical Equipment and Wiring Features*

General

The enclosure shall be equipped with all the componentry as shown on the attached single line diagrams and itemised elsewhere in this specification in order to meet the power supply, control, starting and distribution functions required.

All mechanical supports for internal equipment shall be aluminium and all fixings shall be STAINLESS STEEL.

Where possible all equipment shall be din rail mounted and all wiring contained within internal (snap-on cap) trunking. With the exception of the incoming mains, generator and pump power cabling, all outgoing circuits shall be wired to designated terminals for connection of the field cabling and/or remote monitoring interfacing circuitry.

The Contractor is referred to the preferred Vendors as shown on the attached data sheet. Where a component is not specified, or no longer available, the Contractor shall nominate the component proposed for HCC's consideration.

Alternative components may be proposed providing it can be shown that these have technical and/or economic advantage both at the time of connection and total life costs.

9.5.3.4 *Labelling*

Provide labels, white letters on black background, engraved to show wording appropriate to the function and description for all componentry. Permanent fixing and not gluing is required for all labelling and numbering systems. All such labelling shall be to HCC's satisfaction.

9.5.4 *Rating Of Equipment*

Where equipment Details & type are not specified, the Contractor shall be responsible for correctly selecting and rating all other equipment to meet the installed plant and functioning requirements. Record the installed rating on the as built drawings.

The Contractor shall ensure all equipment complies with NZECP 36 for acceptable Harmonic Levels.

The Contractor shall allow to check and confirm effectiveness of these devices on site during testing and commissioning.

9.5.5 *Drawings*

9.5.5.1 *General*

The Contractor shall allow for production of all manuals and As-built drawings as specified in 8.5.1 Scope.

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The Contractor is referred to the following drawings which shall be read in conjunction with the specification.

TS 530 - Cabinet Plan
 TS532.1 - DOL Main Power
 TS532.2 — SS Main Power
 TS532.3 — DOL — Control Power, Pump Call and Valve
 TS532.4 — SS — Control Power, Pump Call and Valve
 TS532.5 — DOL & SS — Instrument Power Supply
 TS532.6 — DOL — PLC Control Wiring
 TS532.7 — SS — PLC Control Wiring
 TS532.8 — DOL & SS — PLC Digital Input Expansion Module Wiring
 TS532.9 — DOL & SS — PLC Analogue Input Expansion Module Wiring

9.5.6 *Workshop Inspection*

The Contractor shall allow for the Engineer's Inspection of the Switchboard at the manufacturers/fabricators premises and prior to despatch to site and include for all associated workshop inspection and travel time.

To this end, the Contractor shall produce a full schedule of all tests to be carried out and submit these to the Engineer for review at least two weeks prior to any testing.

Allow to accurately record all results and append a copy of the test results and functional checks to the Certificate of Compliance (COC), a copy of which shall be forwarded to the Engineer within three days of placing in service.

Note: The Engineer regards the proof and submission of a full and accurate set of test and functional checks results, crucial to the proof of a satisfactory and safe installation and to this end may recommend to the Principal withholding of up to one third of the contract payment sums should the Contractor fail to complete the tests satisfactorily and submit the results.

9.5.7 *Component Specification*

9.5.7.1 *Electrical Panel*

See Drawing TS530(cabinet plan) for layout of components with cabinet. The installation shall comply with the relevant Electrical Regulations and Standards. Also to comply with Network Utility Supply Operator requirements.

The switchboard shall be a MEN (Multiple Earth Neutral) Switchboard, material to be industrial formica P1 brown, size 1050 x 850 x 9 mm for the DOL Starter Panel size and 1263 x 850 x 9 mm for the Soft Starter Panel. Labels shall be black letters on white background, fixed just above or on component.

All cables entering the panel via the base gland plate shall be round in external section. They shall pass through an appropriate cable gland which will ensure a good air seal. Any additional cut outs shall be sealed.

With respect to the need or otherwise of electronic soft starters, reference to the Networks Company's requirements shall dictate. Ensure early consultation to gauge any starting restrictions. At this stage also consult with respect to the need for power factor correction.

9.5.8 *Electrical Components*

See Drawing TS530and Equipment List.

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9.5.9 *Circuit Breakers*

3 phase circuit breakers shall be 400V, type and rating to be compatible with pump manufacturers design relative to starting & running loads and prospective short circuit rating for the site.

1 phase circuit breakers shall be 230V, type and rating to be compatible with the design criteria of the user circuit.

It shall be clearly marked with pump identification e.g “Pump No 1”

9.5.10 *Control Switch (Auto/Off/Man)*

Shall be three position selector switch from Allen Bradley 800FP-SM32PX20 fitted on to a plastic box for manual/automatic function. It shall be clearly marked with pump identification e.g “Pump No 1” and mounted in the same box with Ammeters and Phase Failure Relay.

9.5.11 *Motor Isolating Switch*

Shall be rotary type PDL 56SW4XX four pole fitted in plastic boxes; each one individually fitted near its corresponding motor contactor clearly marked with pump identification e.g. “Pump No 1”. All such switches shall be a minimum AC3 individually rated.

9.5.12 *Mains Switch (MCCB)*

Prior to starting construction of a cabinet, an assessment of the short circuit fault current is to be made at which point a decision will be made as to the main switch type.

Where “excessive” fault current potential exist at a site then the Main Switch shall be at least 63Amp AC3 rated wiping contact type but not less than the AC3 total load rating of site.

This Mains Switch is to be mounted in its own compartment in the main switch board.

9.5.13 *Generator Socket Outlet*

A flush mounted socket outlet, SCAME type, shall be fitted for portable generator application. The rating of this socket outlet shall be suitable for each individual pump station electrical loading. One of three standard types of SCAME socket outlets shall be installed as follows;

1. 380/415V, 32A, 3P+N+E; SCAME Type 247.3297
2. 380/415V, 63A, 3P+N+E; SCAME Type 246.6398 + Base 570.M0163
3. 380/415V, 125A, 3P+N+E; SCAME Type 246.12597 + Base 570.M0125

9.5.14 *Change-Over Switch*

K&N Change-Over Switch, type for 63 Amp power supply KG64B T904 NZ 007VE or for 63 to 100 Amp power supply KG100 T904 NZ 007VE shall be fitted for Generator/Off/Mains selection. Note: the requirement for neutral switching to allow compliance with ECP4.2.5.5(c).

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9.5.15 *Motor Control Contactors and Overloads :*

9.5.15.1 *D.O.L.*

7.5 kW or under shall be Allen Bradley type DOL-16P1 Cat.No.DOL-16P1-VA-X, coils to be 230V, in enclosure fitted with reset button. Overloads to be type 193-EEDB.
Over 7.5 kW to 12kW shall be Allen Bradley type DOL-16P1 Cat.No.DOL-30P1-VA-X, coils to be 230V, in enclosure fitted with reset button. Overloads to be type 193-EEED.

Starter to be clearly marked with pump identification e.g. "Pump No 1".

9.5.15.2 *Electronic Soft Starter*

Motors over 12 kW shall be Allen Bradley SMC-3 soft starter. Or unless directed otherwise by the Network Company.

9.5.16 *Ammeter*

Shall be Analog type Carrel & Carrel CEQ-72 that shall show full load current at approximately midscale.

9.5.17 *Control Relays*

Shall be Omron type -G2R and LY4 relays and mounted in the same box as the Auto/Off/Manual switches.

9.5.18 *Phase Failure Relay*

This relay will be a TELE Automation Components Enya EP3F model relay. It is mounted inside the distribution board, connected via a three phase circuit breaker.

9.5.19 *Overflow Float Switch*

One float switch shall be installed to monitor overflows at the pump station. The float switch shall be wired to the telemetry to provide an "overflow alarm" and to the overflow relay to operate the pumps in the event of the level control system failing. There are three floats connected to the telemetry system, these are installed to provide an alternative system of level control. All four float switches are Flygt -: ENM 10-13.

9.5.20 *Level Control*

The Contractor shall allow to supply and install the complete level control system.

All pump stations are to have Ultrasonic level control at the pump. Type : ABB/Pulsar Black Box 130-D with an ABB/Pulsar dB6/10 transducer.

For the ABB/Pulsar Black Box 130-D to function properly it is advised to follow the installation instructions as contained in the manual provided with device. Note that Ultrasonic head shall be tightened only "finger tight" as per instructions. The Ultrasonic head is to be mounted as per drawing TS502

9.5.21 *Night Latch Locks and Door Switches*

Night Latch locks and microswitches are to be fitted on specified doors for access security (restricted entry) connected to the Telemetry (Datran) system. Lock barrels will be supplied by Council.

9.5.22 *Telemetry*

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The Contractor shall note Council require the pump stations to be monitored and controlled via a Telemetry system, the current system utilises an Allen Bradley PLC's. The Contractor shall be responsible for installing the appropriate Telemetry equipment and carrying out the necessary work requirement to set up the Base Station Scada screens by an approved Council agent.

Council will provide the PLC telemetry to the Contractor (at contractors expense). The Contractor shall provide Council with 21 days written notice of intent to pick up the PLC telemetry controller.

The Contractor shall allow a space as per cabinet drawing to allow this equipment to be accommodated.

Allow to wire from the enclosure field devices to a demarcation terminal barrier for connection by others to the Telemetry equipment Drawing TS530. (

The Contractor is also to produce a drawing of the connections in AutoCad version 14LT or better upon completion,.

9.5.23 *Flow Meter*

The flow meter shall be an ABB Water Master Potted for IP68 which is required to be factory "Finger printed". The size is to approved by Council.

It is to be installed as per the manufacturers instructions.

9.5.24 *1 Phase Outlet*

Shall be 3 pin standard RCD socket outlet type PDL 691RCD-30.

9.5.25 *Thermostat*

To control 60 watt cabinet heater shall be type Seitron TAM011.

9.5.26 *Cabinet Heater*

Shall be flat or round low wattage (minimum 60 watt) protected by aluminium or stainless steel mesh or expanded metal grill to prevent fire risk or finger contact with element. This heater shall be well away from the doors to prevent contact with any paper material present inside cabinet. Cabinet heater is only required in electrical switchboard compartment. Controlled by thermostat and connected via a circuit breaker on the switchboard which shall be clearly marked as per the drawings. The thermostat is to be set to 10 degrees C.

9.5.27 *Cabinet Lights*

Shall be, Thorn ML 8 watt, "Mini Lite", light to be fitted at the front to illuminate component side of the switchboard, to be switched manually by means of architrave light switch type PDL 661 VH.