TasWater

Electrical preferred equipment schedule

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1 Change Log

Revision	Date	Changes
A	1/03/2013	Initial Draft for Review Workshop 1
B	6/03/2013	Review Workshop 1 input included
C	7/03/2013	Follow up review input included
D	28/05/2013	Workshop 2 review input included
E	28/06/2013	Workshop 3 review input included, Stop/Start Push Buttons added
F	5/07/2013	Workshop 4 review input included, Industrial ethernet switches added
1	30/07/2013	TasWater Release 1.

2 Electrical preferred equipment schedule

2.1 General

This electrical preferred equipment schedule identifies the equipment types that shall be provided in the absence of specific direction in the Electrical Scope of Works Documentation. This schedule will be reviewed and updated on a periodic basis (at least annually) to reflect the current requirements of the TasWater.

2.1.1 Responsibilities

General

General: Provide equipment in accordance with the schedules in this worksection and as documented.

2.1.2 Cross references

General

Requirement: Conform to the following:

Electrical scope of works

Equipment model numbers

Equipment model numbers shown do not necessarily include all required references for the accessories listed in the description of the fitting. Ensure all accessories as described in this worksection and the *Electrical scope of works* worksection are included. Ensure all mounting accessories are provided to suit the fitting specified and mounting type referenced.

2.2 Selections

General

Item	Brand/Description/Requirements
3 phase outlets	Clipsal 56 series or NHP equivalent
Field Isolating Switches	Clipsal 56 series or NHP equivalent or Kraus & Naimer
Socket outlets (GPOs)	Clipsal or HPM or NHP
General Purpose Plugs	Clipsal

External amber beacon	24VDC "Xenon" strobe light Mechtric LT3 or NHP/Allen Bradley
Alarm Siren	NHP/Allen Bradley or Klaxon
Batteries	General - Sealed Lead Acid (7A-h / 20hr) Solar – Sun Xtender or equivalent
Solar Panels	Suntech or equivalent
Solar Regulators	Morningstar / SMA inverters (MPPT)
Light Pole	R.O.B. Australia for swivel type
Motor	ABB, CMG, Teco, WEG, SEW, Toshiba
AC UPS	Eaton Powerware 9000 series with SNMP ethernet communications (and external bypass switch where scheduled)
Wire/Cable Labels	Brady, Graphoplast

Switchboard or enclosure components

Item	**Brand/Description/Requirements**
Proprietary Distribution Boards	NHP Concept Range or Schneider (NHP Grizz-Bar Isolation Chassis mandatory on essential services/UPS distribution)
Loop powered indicator	Red Lion CUB4LP00 loop powered indicator 4-20mA transmitter or Weidmuller
Instrumentation Display	Endress & Hauser or Weidmuller or MJK
Hours Run Meter	NHP (Carlo Gavazzi or Sprecher + Scuh)
Multifunction Meter	NHP/Carlo Gavazzi or Schneider/Telemecanique
Panel Displays / Electronic Indicators	NHP or Amalgamated Instruments or MJK or Lascar
Voltmeter	NHP/IPD or Crompton Instruments
Soft Starter	NHP EMX3 Aucom Range and Remote Mounting Display (MODBUS module as scheduled)
Variable Speed Drive (VSD)	To be confirmed on a per project basis. Telemecanique (Schneider) Altivar 61 or Danfoss or Omron or ABB Escutcheon Operator interface option. Ethernet TCP/IP card with Modbus TCP communications option. Reinforced version. (IP54 when wall mounted)

Fused Control Terminals	Weidmuller ASK1 4mm fused terminals or equivalent.
Control Terminals	Weidmuller SAKR/35 4mm control terminals disconnect type or equivalent
Coaxial Surge Protection	Critec CSP-NMF90
Single Phase Inline Surge Protection	Critec TDF range.
3 Phase and Single Phase Shunt Surge Protection	Critec TDS range.
Control signal surge protection	Critec Universal Transient Barrier (UTB), Critec DINLINE Surge Diverter (DSD) and Critec Remote Transmitter Protection (RTP) range. Refer to drawing TBA – I/O WIRING DIAGRAM EXAMPLES.
RTU DC Power Supply Unit	Omniflex Powerterm PTL120C-D (Provides both 12VDC and 24VDC) with single phase inline surge protection.
PLC DC Power Supply Unit	Same as PLC brand.
General Power Supply/Converter	Phoenix or Weidmuller or Snaptec
Fault Indicator	Amber/Yellow LED, push to test. NHP or Moeller
Closed/Stopped Indicator	Red LED, push to test. NHP or Moeller
Duty indicator	White LED, push to test. NHP or Moeller
Run/Open indicator	Green LED, push to test NHP or Moeller
Start Push Button	Green. NHP or Moeller
Stop Push Button	Red. NHP or Moeller
Reset Push Button	Blue. NHP or Moeller
Operate Push Button	Black. NHP or Moeller
Maintenance Push Button	Yellow. NHP or Moeller
Emergency Stops	NHP/Specher + Schuh or Moeller. To comply with AS60947.5.1 Annex K.
Rotary Selector Switch	NHP/Specher + Schuh or Kraus & Naimer
Decontactor	Marechal DS9, DSN6 and DSN3 series complete with protective rubber cap.

Anti condensation heater	Complete with thermostat. Solid state.
Phase monitoring relay relay	Auto reset. NHP/Carlo Gavazzi (DPB-01-C-M48) or Omron (K8AB-PM2)
Miniature Circuit Breakers	NHP/Terasaki or Schneider/Merlin Gerin
MCCB and Air Circuit breakers	NHP/Terasaki or Schneider/Merlin Gerin
Motor Circuit Breakers	NHP/Specher +Schuh or Schneider/Telemecanique (to match Contactor brand)
Control Relays	NHP Finder 55 Series with gold flashed contacts e.g. 55-34-5074-24VDC
Terminal Relays	Omron or Phoenix Contact
Programmable / Electronic Relays	Schneider/Zelio
Thermistor Relay	NHP/Specher +Schuh or Schneider or to motor manufacturer's recommendation
Timer	NHP/Specher +Schuh or Omron or Schneider
Contactors	NHP/Specher +Schuh or Schneider/Telemecanique (to match Motor Circuit Breaker brand)
Signal Isolators / Conditioners	APCS or Weidmuller or Phoenix Contact
Data Loggers	Omron
RTU	Recommended for sites with less than 100 physical I/O. Opto-isolation must be provided as per the *PLC/RTU hardware and software* worksection. Schneider SCADAPack when selected the following models shall be used: - ES - 334E - 350 Kingfisher – When selected the following models shall be used: CP30-I-T3, include the following option cards: - Comm Port 1: Base Ethernet RJ45 Copper - 10/100 Mbps. - Comm Port 2: Serial RJ45 Copper- Isolated RS232/422/485. - Comm Port 3: Ethernet RJ45 Copper - 10/100 Mbps. Input/Output cards to suit the application. Kingfisher power supply typically PS22. 20 – 60VDC for use with typical power supply arrangement shown in drawing <TBA>.

Expansion I/O Modules	To match PLC vendor as further detailed below.
PLC	Recommended for sites with greater than 100 physical I/O. Omron (CS1 or CJ) – GRT1 distributed I/O Schneider (M340) – Advantys STB distributed I/O Siemens (S7 300) – SIMATIC distributed I/O
PLC/RTU HMI Panel	To match PLC/RTU vendor recommendation
Communications device	Ethernet Radio - Schneider TRIO ER45E or J series or 4RF Aprisa SR Radio Repeaters: to suit specified radio network architecture 3G Router - Cybertec Model 2100W/2150W. The required configuration file and SIM card will be free issued. PLC Industrial Switch – To match PLC vendor recommendation. General Industrial Switch – Westermo L210-F2G 8 x RJ45 Ports and 2 x Fibre Ports, Allen Bradley Statrix 8000 - 1783-MS10T, Cisco Industrial Ethernet 3000 - IE-3000-8TC
Enclosure light	18W slimline fluorescent Pierlite with integral switch and door open switch or equivalent.

SCADA

Item	Brand/Description/Requirements
Software	Schneider ClearSCADA (latest version)
SCADA Servers	All SCADA server hardware shall be supplied free issue by TasWater on a per project basis. AC powered via UPS. All associated software shall be supplied and installed free issue by TasWater on a per job basis. Free issue hardware shall come complete with two LCD screens. Free issued software will include pre-configured operating system, antivirus protection, drivers, ClearSCADA software and licensing.
SCADA Panel Hardware – for Wet Areas or Small Sites with < 500 points.	All SCADA panel hardware (embedded PC) shall be supplied free issue by TasWater on a per project basis. This will comprise a Windows based touch screen panel PC with suitable IP rating which is AC powered via UPS. Hardware will be preconfigured and free issued complete with operating system, drivers and ClearSCADA software.
SCADA Server AC Uninterruptible Power Supply (UPS)	SCADA server UPS's shall be supplied free issue on a per project basis. All associated operating system shutdown software shall be supplied and installed free issue. Free issued software will include pre-configured operating system for auto shutdown.

Antennas and RF Cable

Item	Brand/Description/Requirements
6 Element UHF Yagi	RFI Wireless UHF Yagi YB06-xx (9dBd)
9 Element UHF Yagi	RFI Wireless UHF Yagi YB09-xx (11dBd)
16 Element UHF Yagi	RFI Wireless UHF Yagi YB16-xx (12dBd)
UHF Omni-Directional	RFI Wireless UHF Colinear COL8 (6dBd)
UHF Vandal Proof Unity Gain	RFI Wireless TLA400 series
3G Panel Mount (Vandal Proof)	RFI Wireless CSM900
3G Pole Mount	RFI Wireless COL2195
UHF Low Loss Cable	CNT400 (RG8 equivalent) or RG213

Potable water services instrumentation

Item	Brand/Description/Requirements
Electomagnetic Flow Meters and Transmitter	ABB WaterMaster Range or Endress & Hauser or Siemens (SITRANS F M MAG 5000/5100W) Install to manufacturers recommendations. Size to match pipe size. Class 2 accuracy. The sensors terminal box shall be potted to prevent ingress of moisture. Minimum IP68 rated. Pipe work modifications shall provide unobstructed straight pipe work upstream and downstream of the Flow Meter to the Flow Meter manufacturer's recommendations. ABB Watermaster and E+H Proline Promag are Self Calibrating – fault signal when out of calibration. Lining to suit the application. 4-20mA Analogue output for instantaneous flow. Digital output for fault. Pulsed digital output for flow totalisation. Provide earthing rings to manufactures recommendations. Power Supply: 230Vac or 24Vdc (as scheduled) Flange type to match pipe work. Denzo wrap if buried direct.

Turbidity Probe and Transmitters	Endress + Hauser CUS31 series complete with wiper. Transmitter: CUM253-TU0005 Raw water applications: CUA250 flow chamber (1 to 15NTU). Post clarifier applications: S-Version debubbler flow chamber. (≤ 4 NTU). Instrument panel mounted: Model: TE1553. 660mm x 530mm x 10mm PVC backing board. 1 x Ball Valve, Georg Fischer. 1 x VA Meter, P/N 198801893 Georg Fischer ½" 8-80l/h. 1 x Solenoid Valve (230vac) P/N 91600013 Solenoid Valve ½"S/W PVC/EPDM 230VAC. 1 x diaphragm valve, Georg Fischer.
Level Transmitter (Pressure Type)	Siemens DS III Range The level sensing units shall be hydrostatic pressure sensing types complete with remote transmitter. Stilling tubes shall be supplied and mounted in such a way as to stop movement of the transducer unit due to turbulence. Refer to Water Services Association of Australia (WSAA) drawing SPS-1505 for stilling well typical arrangement. or Endress & Hauser (Cerabar S PMC71)
Level Transmitter (Ultrasonic)	Siemens SITRANS Probe LU Or Siemens LUT400 Utilise the Siemens LUT400, which has remote electronics, when: 1. Remote display and configuration is required. 2. Installing in hazardous situations such as confined spaces or at heights. 3. Greater accuracy, within 1mm is required. or Endress & Hauser
Level Switches (Float type)	Flygt – ENM-10 series. Cable length to suit application
Level Switch (Vibrating)	Endress & Hauser (Liquiphant)
Air Pressure	Siemens DS III Range or IFM

pH Probe and Transmitter	Endress + Hauser - Memosense Digital pH Probe Model: CPS11D-7AA21 (for conductivity≥ 50µS/cm) or CPS41D-7AC2B1** (for conductivity< 50µS/cm) complete with electrolyte reservoir CPY7-A0 (unpressurised) mounted at least 1m above the process pressure or CPY7-B0 (pressurised, >0.1bar). Provide 1 only CPY4-4, 1.5mol electrolyte solution when supplying CPS41D-7AC2B1** probe. Digital Transmitter and Display: Model: CM42-MAA100EAE00. 24VDC. 2 x 4-20mA outputs. Digital Cable (probe to display) CYK10-AXX1. Cable length as listed in *Electrical scope of works* worksection. Immersion Assembly: CYA112-AA21D2AE/ 316SS 2.4m long. Traverse system to suit CYA112: CYH112-AB60B30D1. Spray Nozzle Kit. 50086336. Spray cleaning function. Controlled via I/O module and solenoid.
Chlorine Residual Analyser and Transmitter	Siemens Depolox 3 display. Siemens membrance type FC1 probe. or Prominent
Chlorinator	Wallace & Tiernan / Siemens V10k or Acromet
Chlorine Controller	Wallace & Tiernan / Siemens MFC + Depolox 5 or Acromet
Fluoride Probe and Transmitter	Prominent Dulcometer D1C measuring system with FLEP fluoride probe.
Fluoride Controller	Prominent

Chlorine Gas Leak Detection	Chlorine Alarm Installations shall comply with AS2927:2001 Drager Regard-1 alarm controller hardwired to a Drager Polytron docking station with a Drager Polytron 7000 measuring unit fitted with chlorine gas sensor and a sounder/strobe for audible visual warning. Audible / Visual Alarm: Klaxon sounder/strobe. The Klaxon unit will be powered from 24V DC with battery backup and switched by the PLC relay output card. The alarm controller/display unit receives a 4-20mA signal from the sensor and contains pre-set alarm thresholds that are used to generate 3 alarm signals. Alarm signals are hard wired to the local RTU. The unit is powered from 240V AC and contains internal battery backup in case of mains failure. Operation of alarms is as follows: - Alarm Relay A1: Not Acknowledgeable, non-latching. Activated when chlorine level above 1ppm. Cancels automatically when chlorine level falls below 1ppm. Displayed on SCADA system alarm summary and paged out. - Alarm Relay A2: Acknowledgeable from alarm controller, latching. Activated when chlorine level above 1ppm. Cancels when acknowledge button on controller is pressed. Triggers sounder/strobe. Displayed on SCADA system alarm summary and paged out. - Fault Relay: Activated should a fault be detected in the sensor or controller, or in the sensor wiring. De-activates when fault is rectified and a manual reset of controller is performed. Displayed on SCADA system alarm summary and paged out. System wiring: Refer to TasWater Chlorine alarm system wiring diagram <TBA> for specific wiring requirements between the chlorine alarm system components and PLC. Note the optional alarm dialler on drawing <TBA> is not required if paging is performed via the TasWater head end SCADA system. or Wallace & Tiernan / Siemens
DO Probe and Transmitter.	Endress + Hauser Digital DO probe. DO Probe Model: COS61D-AAA1A3+IB. Transmitter Model: CM442-AAM2A3F210A+AA. Digital Transmitter and Display. 230Vac. 4 x 4-20mA outputs, 2 x digital inputs. Immersion Assembly: CYA112-AC11C1BB and CYH112-A11A11E1+KC. Include immersion assembly: Integral float. Pendulum hand rail mount and sensor raised immersion assembly holder. Water Cleaning Head OR Compressed air cleaning unit: ISEmax 230Vac Air Blast Cleaning System complete with IP65 enclosure. Controlled via transmitter. Connect to transmitter. Allow to program transmitter schedule to operators and manufacturers recommended cleaning frequency. Air cleaning connection fitting on probe to suit ¼ tubing. Provide flexible compressed air hose to connect compressor to cleaning head on DO probe. or Royce or Hach digital equivalent

Flow Switch.	Endress & Hauser T Switch order code ATT11. IFM (Flow Switch - Thermal)

Waste water services instrumentation

Item	Brand/Description/Requirements
Electomagnetic Flow Meters	Refer to Potable water services instrumentation.
Level Sensor (Hydrostatic type)	Vega, Vegawell 52 (Non Hart) 4...20mA output. 24VDC. Cable length to suit application. Cable and breather tube length to suit the application. Complete with straining clamp. Stilling tubes shall be supplied and mounted in such a way as to stop movement of the transducer unit due to turbulence. Refer to Water Services Association of Australia (WSAA) drawing SPS-1505 for stilling well typical arrangement. or Endress & Hauser (Waterpilot) or MJK
Level Switches (Float type)	Flygt – ENM-10 series. Cable length to suit application.
Level Sensor (Radar type)	Vega. Vegapuls WL61 4...20mA output. Non contact, maintenance free. IP68. or Siemens
Level Sensor (Ultrasonic Type)	Not preferred for waste water applications – assess on a case by case basis
DO Probe and Transmitter.	Refer to Potable water services instrumentation.
pH and Temperature Probe and Transmitter	Endress + Hauser Digital pH Probe Model: CPS11D-7AA21 Digital Transmitter and Display: Model: CM42-MAA100EAE00. 24VDC. 2 x 4-20mA outputs. Digital Cable (probe to display) CYK10-AXX1. Cable length as listed in *Electrical scope of works* worksection. Immersion Assembly: CYA112-AA21D2AE/ 316SS 2.4m long. Traverse system to suit CYA112: CYH112-AB60B30D1. Spray Nozzle Kit. 50086336. Spray cleaning function. Controlled via I/O module and solenoid.

	pH Buffer liquid ampoules: 20x18ml box of 4ph, 20x18ml box of 7ph
Conductivity Probe and Transmitter	Endress + Hauser Conductivity probe E&H model CLS50D-AA1B21 Digital Transmitter and Display: Model: CM42. 240V ac. 2 x 4-20mA outputs. Immersion Assembly: To suit application. or Hach
Methane Analyser	Riken

General instrumentation

Item	**Brand/Description/Requirements**
Pipe Voltage Safety Tester	Plumb Guard
Coriolis Mass Flowmeter	Krohne
Oxygen Analyser	Riken
Gas Flowmeter	Endress & Hauser
Pressure Switch	IFM
Pressure Transmitter	Endress & Hauser or IFM or Siemens
Differential Pressure Transmitter	Endress & Hauser or Siemens
Proximity Switch	IFM or Pepperl + Fuchs
Rain Gauge	Texas Instruments
RTD	Pyrosales or Temtrol
Solenoid Valves	Burkett or Process Systems
Temperature Switch	IFM
Temperature Transmitter	IFM

Electronic security and access control

Item	Brand/Description/Requirements
Security Panel	Tecom Challenger Version 8
Hardwired Communication Device	Tecom Challenger inbuilt in modem and telephone line
Wireless Communications Device	Tecom Challenger GSM device
Card Readers	Tecom Smart Card. Externally mounted IP66 vandal proof, LED indicator light Armed/Disarmed.
Door control devices	Padde ES2000 Electric Strikes.
PIR detector types	Tritech DS835i
Reed Switch	Direct Alarm Supplies (DAS)
CCTV	As specified