Preferred Equipment List
Control Systems

TMS1151

Technical Specification

Revision Control

Revision Number	Date	Revision Details	Responsible Officer
1	July 2015	Initial Issue – content transferred from TMS62	Danny Perazzolo
2	October 2015	Major update to most equipment lists	Danny Perazzolo
3	October 2015	Minor correction to part number Moxa IMC-21A-M-ST Addition of Wireless Access Points	Danny Perazzolo
4	Feb 2016	Inclusion of computer equipment minimum guides lines, Optical Bypass Relay, rack mounted power supply, rack mounted managed switch, DC-UPS/Battery Chargers, network management software.	Danny Perazzolo
5	Nov 2017	Updated computer equipment, added CISCO switches, Siemens S7-1518 & ET200SP PLCs. Added HP Rack mount Server & 3G Modems, FOBOTs	Steve Bourke
6 , 7 , 8		Internal use only	Steve Bourke
9	Jan 2018	Issued for Use	Steve Bourke
10	Feb 2019	Updated Moxa Network Switches Removed Cisco Network Switches Updated Siemens S7-300, ET200M & ET200S as legacy platforms. Updated Siemens S7-1500 & ET200SP equipment. Added Allen-Bradley Stratix equipment. Added Allen-Bradley Logix equipment. Updated rack mount server minimum specification.	Gavin Davidson

DOCUMENT CONSULTATION

Revision Number	Date Sent	Name	Comments	
			Received	Incorporated
10	Jan 2019	Gavin Davidson	Y	Y
10	Jan 2019	Kanchana Hattotuwegama	Y	Y
10	Jan 2019	Steve Bourke	Y	Y
10	Jan 2019	Gerard Anderson	Y	Y
10	Jan 2019	Scott Adams	Y	Y
10	Jan 2019	Steven Walton	Y	Y
10	Jan 2019	Technical Engineering Group(TEG)	Y	Y

Contents

1 INTRODUCTION

1.1 SCOPE

This specification details the preferred control systems equipment to be installed on Queensland Urban Utilities facilities. The Contractor shall seek QUU's acceptance for any alternative equipment proposed to be supplied.

All materials and equipment supplied by the Contractor shall be of standard manufacture and readily available from local suppliers unless specified otherwise in the Project Documentation. All equipment supplied shall be sourced from local OEM (Original Equipment Manufacturer) Authorised Distributors within Australia. Proof of OEM supply must be readily available on demand.

All sewage treatment plant equipment shall be conformal coated.

All system critical equipment is to be hardwired and preferably powered by a UPS. Socket Outlet power packs shall not to be used.

1.2 DEFINITIONS

In this document, the following definitions apply:

Project Documentation	Governing technical documents for the specific item(s) for the specific works included or referenced in the Contract
Contractor	The entity bound (including sub-contractors and sub-suppliers appointed by the Contractor) to execute the work having responsibility for design, manufacture and supply, installation, delivery, documentation and other functions as further defined in the Project Documentation related to the work.
Contract:	The agreement between QUU and the Contractor to which this specification pertains.

1.3 ACRONYMS AND ABBREVIATIONS

Term	Definition
OEM	Original Equipment Manufacturer
QUU	Queensland Urban Utilities
CSMS	QUU Control Systems Maintenance and Support
EWS	Engineering Work Station
STP	Sewerage Treatment Plant
PLC	Programmable Logic Unit
RTU	Remote Telemetry Unit
FOBOT	Fibre Optic Break Out Terminal
UPS	Uninterruptable Power Supply

2 CONTROL SYSTEM NETWORKS

2.1 NETWORK SWITCHES

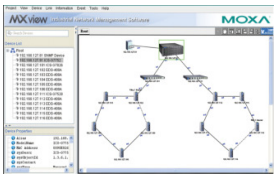
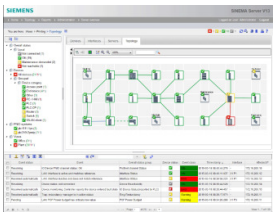
Equipment Category	Description	Model
Fibre LAN Switch 	Allen-Bradley Stratix 5700 Industrial Ethernet Switch 24Vdc, 12 copper, 4 PoE Fast Ethernet, 2 SFP Gigabit Ethernet, Conformal coated	1783-BMS12T4E2CGNK SFP for fibre connections is to be included as required, modules are additional
Fibre LAN network switch 	Allen-Bradley Stratix 5410 Industrial Distribution Switch Low DC, 12 PoE Gigabit Ethernet, 12 SFP Gigabit Ethernet, 2 SFP Ten Gig Ethernet, Conformal coated To be used on SCADA server / Telstra MPLS 19" racks	1783-IMS28RDC Second power supply modules are additional. SFP for fibre connections is to be included as required, modules are additional
Fibre LAN network switch 	Siemens XR324-12M TS Scalance 19" Rack mounted managed switch, 24Vdc, Front-side Ports Redundancy manager, VLAN, Conformal coated To be used on SCADA server / Telstra MPLS 19" racks	6GK5324-0GG00-1CR2 C-Plug is to be included Modules are additional
Fibre LAN Switch 	SIPLUS NET SCALANCE X212-2 12 copper, 2 fibre, 100Mb/s ST connectors, conformal coated.	6AG1212-2BB00-4AA3
Fibre LAN network switch 	Siemens XC206-2SFP Manageable layer 2 IE switch 24Vdc, 6 copper 10/100 Mbit/s 2 SFP 100/1000 Mbit/s Conformal coated	6GK5206-2BS00-2FC2

Equipment Category	Description	Model
Fibre LAN network switch 	Siemens XC216-4C Manageable layer 2 IE switch 24Vdc, 16 copper 10/100/1000 Mbps 4 SFP 1000 Mbps Conformal coated	6GK5216-4GS00-2FC2
Fibre Module 	XR300 MM991-2 (BFOC) Fibre Optic Media Module, ST (BFOC) Connectors, 100Mb/s, up to 5kms	6GK5991-2AB00-8AA0
Copper Module 	XR300 MM992-2CUC (RJ45)CONF.COAT. RJ45 Media Module, 10/100/1000 Mb/s, Conformal coated	6GK5992-2GA00-8FA0
Device LAN Switch 	SIPLUS NET SCALANCE X208 8 copper, 0 fibre Conformal coated	6AG1208-0BA10-2AA0
2 port Fibre LAN switch 	MOXA Managed Gigabit Ethernet switch with 16 x 10/100BaseT(X) ports, 2 x SFP (mini-GBIC) ports, -40 to 75°C operating temperature Radius Authentication (Conformal coating required for sewerage applications. A setup fee is incurred per batch) EDS518A supersedes EDS510E and EDS510A. Exemptions must be sought from CSMS.	EDS-518A-T (CV-CT) SFP for fibre connections is to be included as required, modules are additional

Equipment Category	Description	Model
Fibre LAN switch 	MOXA Modular managed Ethernet switch with 8 x 10/100BaseT(X) ports, 4 x SFP (mini-GBIC) ports, 2 x modular slots for expansion (Conformal coating required for sewerage applications. A setup fee is incurred per batch) IKS-6728A supersedes PT-7728. Exemptions must be sought from CSMS.	IKS-6728A-4GTXSFP-24-24-T(CV-CT) SFP for fibre connections is to be included as required, modules are additional modular slots for expansion are additional
Fibre LAN switch IEC61850 	MOXA IEC61850-3 managed Ethernet switch with 8 x 10/100BaseT(X) ports, 4 x SFP (mini-GBIC) ports, 16 x 100BaseFX ports (Conformal coating required for sewerage applications. A setup fee is incurred per batch)	Single power supply model: PT-7528 -12MST12TX-4GSFP-WV (CV-CT) Dual power supply model: PT-7528-12MST-12TX-4GSFP-WV-WV (CV-CT) SFP for fibre connections is to be included as required, modules are additional
	MOXA Small Form Factor pluggable transceiver with 1000BaseSX, LC connector, 0.5 km, 0 to 60°C (Not Conformal Coated) To be used with MOXA equipment	SFP-1GSXLC
	Small Form Factor pluggable transceiver with 1000BaseSX, LC connector, 0.75 km, -40 to 85°C (Not Conformal Coated) To be used with Siemens equipment	6GK5 992-1AL00-8AA0

Equipment Category	Description	Model
	Allen-Bradley Small Form Factor pluggable transceiver with 1000BaseSX, LC connector, 0.5 km, 0 to 60°C (Not Conformal Coated) To be used with Allen-Bradley equipment	1783-SFP1GSX
	Allen-Bradley Second power supply for Stratix 5410 Low DC To be used with Allen-Bradley equipment	1783-IMXDC

2.1.1 Network Switch Accessories

Equipment Category	Description	Model
	Siemens Scalance Optical Bypass Relay XC100-4OBR, Multimode Fibre SC Connectors, conformal coated To be installed on every network node on STP Fibre ring	6GK5100-4AW00-2FA2 4 x ST->SC fibre patch leads may be required
	Moxa Network Management Software Licensed software to be installed on Engineering Work Stations on all MOXA based STP networks	MXview-50,100,150 (minimum licensed count to include 20% additional capacity)
	Siemens Sinema Server V13+ Licensed software to be installed on Engineering Work Stations on all Siemens based STP networks	6GK1781-1xA13-0AK0 or newer (minimum licensed count to include 20% additional capacity)
	4 RU19” DIN rail rack mount - by Madison Technologies Comes with DIN rail already mounted. Used for mounting of power supplies and networking equipment into 19” rack	MT1954RUDIN

2.2 STP WIRELESS ACCESS POINTS

2.2.1 Permissions and Usage

Wireless access points are a restricted installation device. The following conditions shall be adhered too.

- Permission for each and every installation is required by QUU ICT Security & CSMS
- A record of all final settings shall be set to the ICT Security department for review
- Used in a limited number of applications;
    - an alternative to catenary wiring such as rotating platforms
    - a temporary installation on an STP until a Fibre Trunk is installed

2.2.2 Configuration Rules

Refer to TMS1202 Control System Implementation Technical Specification

2.2.3 Access Point Hardware

Equipment Category	Description	Model
Wireless connection 	SCALANCE W788-1 IWLAN Access Point – Supports Profinet Used on Siemens sites	Parts: IWLAN access pt, Antenna, Lightning protector, cable, cable, IWLAN client, client-antenna 6GK5788-2GD00-0TA0 6GK5793-8DJ00-0AA0 6GK5798-2LP00-2AA6 6XV1875-5AH50 6XV1875-5CE30 6GK5774-1FY00-0TA0 6GK5793-6MN00-0AA6

2.3 FIBRE OPTIC BREAK-OUT TRAY (FOBOTS)

Equipment Category	Description	Model
Panel Mounted FOBOT 	12 Port Mini DIN Rail Enclosure, 6 LC Adaptors, OM3, FOBOT to be fully enclosed to be rodent resistant.	FDE-6-LC-3-S (AFLGlobal)
 1RU 12F OM3 Loaded Rodent Proof Static Sliding Enclosure (12 core Multimode)	• 1RU 2 panel modular SS2 enclosure rodent proof • SC/LCD 6P panel 1-6HP angled left • Blank panel • 6x LC Duplex Adapter Reduced Flange Aqua • LC OM3 50um 2M Pigtails, COL 900um 12PK • Splice Cassette Kit with HD Comb for 12/24 Splices • 1RU Front mount cable tray with hinged cover 19" to 21" 1RU mounting gear	RAW-1GP1DL-BA-1FF-JJ-Z (AFLGlobal)
1RU 24F OM3 Loaded Rodent Proof Static Sliding Enclosure (24 core Multimode Mode)	• 1RU 2 Panel modular SS2 enclosure rodent proof • SC/LCD 6P Panel 1-6HP angled left • SC/LCD 6P Panel 1-6HP angled right • 12x LC Duplex Adapter Reduced Flange Aqua • 2 x LC OM3 2M Pigtails, COL 900um 12PK • Splice Cassette Kit with HD Comb for 12/24 Splices 1RU Front mount cable tray with hinged cover 19" to 21" 1RU mounting gear	RAW-1GP1GQ-BA-2FF-JJ-Z (AFLGlobal)
1RU 24F SM Loaded Rodent Proof Static Sliding Enclsoure (24 core Single Mode)	• 1RU 2 Panel modular SS2 enclosure rodent proof • SC/LCD 6P Panel 1-6HP angled left • Blank panel • 12x LC Duplex Adapter Reduced Flange Aqua • 2 x LC 9um 2M Pigtails, COL 900um 12PK • Splice Cassette Kit with HD Comb for 12/24 Splices • Splice Cassette Kit with HD Comb for 12/24 Splices 1RU Front mount cable tray with hinged cover 19" to 21" 1RU mounting gear	RAW-1EH1EK-BA-2GG-JJ-Z (AFLGlobal)

Equipment Category	Description	Model
Communication Panel	B&R	
	Rittal	

2.4 MEDIA CONVERTERS

Not to be powered from socket outlet power packs. Allowances made for 19" rack on-board power outlets. All other installations shall be hardwired to the dedicated dc-supply.

Media Converters	Description	Model
	Allen-Bradley Industrial 10/100BaseT(X) to 100BaseFX media converter, multimode, LC fibre connector, -25 to 60°C operating temperature	1783-ETAP2F
	MOXA Industrial 10/100BaseT(X) to 100BaseFX media converter, multimode, ST fibre connector, -10 to 60°C operating temperature	Moxa IMC-21A-M-ST
	MOXA Industrial 10/100/1000BaseT(X) to 1000BaseSX/LX/LHX/ZX media converter, 0 to 60°C (SFP module SFP-1GSXLC with 1 1000BaseSX port with LC connector for 0.5 km transmission, 0 to 60°C operating temperature)	Moxa IMC-101G
	RS232/422/485 to Ethernet Converter	Moxa N-Port IA5250a
	Profibus Optical Link Module (OLM) Conformal coated	Siemens 6AG1 503-2CB00-2AA0

Media Converters	Description	Model
	PROTOCOL CONVERTER Red Lion Data Station. Install software file must be submitted along with Build Number and Version to be recorded. NOT TO BE USED FOR SIEMENS INTERFACING OR CRITICAL PROCESSES Each implementation must be approved by CSMS.	DSPSX000 (Version 3 minimum) (Memory Card must be included)
	RS485 REPEATER ISOLATOR Din-Rail Mountable RS-422/485 Repeater	Moxa TCC-120I
	Analogue to RS485 by Advantech 8 channel AI Module with Modbus output, 24 VDC supply, 3kV Isolation. Not to be used as a substitute to a remote I/O rack	ADAM-4017
	Analogue to Fibre Optic Transmitter and Receiver by Weed Instruments	EOTec 2000 2T14 EOTec 2000 2R14

3 SCADA & HMI

3.1 SCADA

For other areas, confirm the preferred SCADA prior to commencing design.
Refer to QUU as to the current version required

Equipment Category	Manufacturer	Model
Process Control SCADA System	Citect - platform for Treatment Plants for all regions.	Citect SCADA
	Citect – legacy platform for Ipswich region transport network water sites.	Citect
	ClearSCADA platform for the Ipswich region transport network sewerage sites.	ClearSCADA
	CGI Australia Mosaic SCADAplatform for the Brisbane region transport network sites.	Mosaic SCADA
	Automation Group (formerly Rad-tel systems). Legacy platform for Scenic Rim, Lockyer Valley, and Somerset regions.	Radtel SCADA
	Eaton (formerly Elpro Technologies). Legacy platform for Boonah area (Scenic Rim)	Elpro SCADA

3.2 HMI/OPERATOR PANEL

3.2.1 Sewage Treatment Plants

- Panel PC's shall not be installed.
- Redlion touchscreen HMI's are permitted for local control and monitoring of HV and LV switchboards.
- All HMI critical controls, setpoint entry and visualisation shall be fully replicated on main site wide SCADA. Failure of a HMI should not compromise the control system in any way.
- Permission shall be sort from QUU for any exceptions to above.

3.2.2 Networks

- Redlion touchscreen HMI's as per QUU switchboard standard design

HMI	Description	Model
HMI 	Red Lion	G306A000, G315C210

4 PROGRAMMABLE LOGIC CONTROLLERS (PLC)

The selection of the PLC platform is based around the following criteria:

- Any existing site standard
- Suitability of PLC platform for project requirements
- QUU direction through design review and risk assessment

The selection of a PLC size is based around the following criteria:

PLC Size	PLC Duty	Memory (Program and Data)	Communications
Small PLC	Small Process Area	Up to 1MB used	Single-Protocol
Medium PLC	Process Area / Central PLC	Up to 3MB used	Multi-Protocol
Large PLC	Process Area / Central PLC	Greater 3MB used	Gateway Interface

The requirement to use a High Availability PLC should be identified through risk assessment.

4.1 ROCKWELL PLC

The ControlLogix and CompactLogix range of products is the preferred range of Rockwell equipment for all Sewage Treatment Plants (STPs).

4.1.1 Logix PLC System

New STPs or control system installs to existing STPs where Rockwell is the existing site standard.

Part Description	Treatment Plants	Networks
Small PLC GuardLogix 5380 Safety Controller CPU	5069-L330ERS2K	
Medium PLC ControlLogix 5580 L82 CPU	1756-L82EK	
Large PLC ControlLogix 5580 L84 CPU	1756-L84EK	
High Availability PLC ControlLogix 5575 L75 CPU	1756-L75K	
Power Supply ControlLogix 24Vdc Power Supply	1756-PB72K	
Chasses ControlLogix Chassis	1756-A4K 1756-A10K	

Part Description	Treatment Plants	Networks
Communications ControlLogix Ethernet/IP Bridge Module	1756-EN2TRK	
Digital Input – 16 Channel ControlLogix 16 x Digital Input	1756-IB16DK	
Digital Input – 32 Channel ControlLogix 32 x Digital Input	1756-IB32K	
Digital Output – 16 Channel ControlLogix 16 x Digital Output	1756-OB16DK	
Digital Output – 32 Channel ControlLogix 32 x Digital Output	1756-OB32K	
Relay Output - 16 Channel ControlLogix 16 x Relay Output	1756-OW16IK	
Analog Input - 8 Channel ControlLogix 8 x Analog Input	1756-IF8K	
Analog Input - 16 Channel ControlLogix 16 x Analog Input	1756-IF16K	
Analog Output - 8 Channel ControlLogix 8 x Analog Output	1756-OF8K	
In-Panel I/O Wiring System	1492-CABLE XXX X (select XXX X in part number to suit project requirements)	

Additional synchronisation components are required when implementing a high availability PLC using the ControlLogix 5575 L75 CPU.

Part Description	Treatment Plants	Networks
ControlLogix Redundancy Module	1756-RM2K	
ControlLogix Redundancy Cable (or custom cable up to 10km)	1756-RMC1	

4.1.2 FLEX 5000

Part Description	Treatment Plants	Networks
FLEX 5000 16 x Digital Input	5094-IB16XT	
FLEX 5000 16 x Digital Output	5094-OB16XT	
FLEX 5000 8 x Relay Output	5094-OW8IXT	

Part Description	Treatment Plants	Networks
FLEX 5000 8 x Analogue Input	5094-IF8XT	
FLEX 5000 8 x Analogue Output	5094-OF8XT	
FLEX 5000 Ethernet/IP SFP Adapter	5094-AEN2SFPRXT	

The appropriate Interface Ethernet/IP SFP is to be selected to fit the required network connection media. Two SFP modules are required per FLEX 5000 Ethernet/IP SFP Adapter.

Part Description	Treatment Plants	Networks
FLEX 5000 SFP 1000Base-T RJ45	1783-SFP1GTE	
FLEX 5000 SFP 100Base-FX LC Fibre	1783-SFP100FX	
FLEX 5000 SFP 1000Base-SX LC Fibre	1783-SFP1GSX	

4.2 SIEMENS PLC

The SIPLUS range of products is the preferred range of Siemens equipment for all Sewage Treatment Plants (STPs).

4.2.1 SIPLUS S7-1500 PLC System

New STPs or control system installs to existing STPs where SIPLUS is the existing site standard.

Part Description	Treatment Plants	Networks
Small PLC SIPLUS S7-1500 CPU 1513-1 PN	6AG1513-1AL01-7AB0	NA
Medium PLC SIPLUS S7-1500 CPU 1516-3 PN/DP	6AG1516-3AN01-2AB0	NA
Large PLC SIPLUS S7-1500 CPU 1518-4 PN/DP	6AG1518-4AP00-4AB0	NA
High Availability PLC SIPLUS S7-1500 CPU 1517H-3 PN	NA	6ES7517-3HP00-0AB0 (Conformal coating required for sewerage applications. A setup fee is incurred per batch)
Power Supply SIPLUS S7-1500 PM 1507 24V/8A	6AG1333-4BA00-7AA0	
Digital Input – 16 Channel SIPLUS S7-1500 DI 16X24VDC HF	6AG1521-1BH00-7AB0	

Part Description	Treatment Plants	Networks
Digital Input – 32 Channel SIPLUS S7-1500 DI 32X24VDC HF	6AG1521-1BL00-7AB0	
Digital Output – 16 Channel SIPLUS S7-1500 DQ 16X24VDC/0.5A HF	6AG1522-1BH01-7AB0	
Digital Output – 32 Channel SIPLUS S7-1500 DQ 32X24VDC/0.5A HF	6AG1522-1BL01-7AB0	
Analog Input - 8 Channel SIPLUS S7-1500 AI 8XU/I HF	6AG1531-7NF00-7AB0	
Analog Output - 4 Channel SIPLUS S7-1500 AQ 4XU/I ST	6AG1532-5HD00-7AB0	
Analog Output - 8 Channel SIPLUS S7-1500 AQ 8XU/I HS	6AG1532-5HF00-7AB0	

Additional synchronisation components are required when implementing a high availability PLC using the SIPLUS S7-1500 CPU 1517H-3 PN.

Part Description	Treatment Plants	Networks
Within 10 meters Sync SFP module (2 per CPU)	6ES7960-1CB00-0AA5	
Within 10 km Sync SFP module (2 per CPU)	6ES7960-1FB00-0AA5	

4.2.2 SIPLUS ET200SP

Part Description	Treatment Plants	Networks
Communications ET200SP IM155 Profinet Interface	6AG1155-6AU00-4CN0	6ES7155-6AU00-0CN0
ET200SP 16 x Digital Input	6AG1131-6BH01-7BA0	6ES7131-6BH01-0BA0
ET200SP 16 x Digital Output	6AG1132-6BH01-7BA0	6ES7132-6BH01-0BA0
ET200SP 4 x Analogue Input	6AG1134-6GD01-7BA1	6ES7134-6GD01-0BA1
ET200SP 4 x Analogue Input HART	6AG1134-6TD00-2CA1	6ES7134-6TD00-0CA1
ET200SP 4 x Analogue Output	6AG1135-6HD00-7BA1	6ES7135-6HD00-0BA1
ET200SP CM PtP serial module	6AG1137-6AA00-2BA0	6ES7137-6AA00-0BA0
ET200SP Isolated base	6AG1193-6BP00-7DA0	6ES7193-6BP00-0DA0

The appropriate Interface Module Bus Adapter or ProfiNet to ProfiNet coupler is to be selected to fit the required network connection media.

Part Description	Treatment Plants	Networks
ET200SP IM 2 by RJ45 100BaseTX	6AG1193-6AR00-7AA0	6ES7193-6AR00-0AA0
ET200SP IM 1 by RJ45/100BaseTX and 1 by 100 Base FX FO LC	6ES7193-6AG20-0AA0	6ES7193-6AG20-0AA0
ET200SP IM 2 by 100 Base FX LC	6AG1193-6AG00-2AA0	6ES7193-6AG00-0AA0
ProfiNet to ProfiNet coupler	6AG2158-3AD01-1XA0	6ES7158-3AD10-0XA0

4.3 SIEMENS LEGACY PLC

4.3.1 SIPLUS S7-300

The S7-300 is a legacy platform and this equipment should only be used for minor upgrades and repairs.

Siemens ET200M - Existing Sites only (prefix 6AG1 = conformal coated SIPLUS range)

Part Description	Treatment Plants	Networks
S7-300 Power Supply 24Vdc /5A	6AG1307-1EA01-7AA0	6ES7307-1EA01-0AA0
S7-300 CPU317-2 PN/DP	6AG1317-2EK14-7AB0	6ES7317-2EK14-0AB0
S7-300 CPU315-2 PN/DP (384kB)	6AG1315-2EH14-7AB0	6ES7315-2EH14-0AB0
S7-300 CPU315F-2DP (fail-safe)	6AG1315-6FF04-2AB0 (requires permission from QUU CSMS)	6ES7315-6FF04-0AB0 (requires permission from QUU CSMS)
NET CP 343-1 LEAN	6AG1343-1CX10-2XE0	6AG1343-1CX10-2XE0
NET CP 343-1 ADVANCED	6AG1343-1GX31-4XE0	6GK7343-1GX31-0XE0
Micro Memory Card 2MB	6ES7953-8LL31-0AA0	6ES7953-8LL31-0AA0
Profibus DP Link module	6ES7153-2BA70-0XB0	6ES7153-2BA70-0XB0
Profibus DP Link module - note will NOT work with DP/PA coupler.	6AG1153-1AA03-2XB0	6ES7390-1AJ30-0AA0
IM 153-4 Profinet Interface module (no redundancy)	6AG1153-4AA01-7XB0	6AG1153-4AA01-7XB0
IM 153-4 Profinet Interface module (with redundancy)	6AG1153-4BA00-7XB0	6AG1153-4BA00-7XB0
SM321 32DI 24VDC	6AG1321-1BL00-2AA0	6AG1321-1BL00-2AA0
SM 321, 16 DI, 24 V DC	N/A	6ES7321-1BH02-0AA0
SM 321 16 DI, 24-125V DC	N/A	6ES7321-7EH00-0AB0
SM322 16DO Relay	6AG1322-1HH01-2AA0	6AG1322-1HH01-2AA0
SM331 8AI	6AG1331-7KF02-2AB0	6ES7331-1KF02-0AB0

Part Description	Treatment Plants	Networks
SM332 4AO U/I	6AG1332-5HD01-7AB0	6AG1332-5HD01-7AB0
SM 332, 8 AO	N/A	6ES7332-5HF00-0AB0
TIM 4R-IE DNP3 COMMUNICATIONS MODULE	N/A	6NH7803-4BA00-0AA0
Front connector with 40 single wires 0.5 mm², H05V-K, screw version, L = 5.0 m	6ES7922-3BF00-0AC0	6ES7922-3BF00-0AC0
Front connector with 20 single wires 0.5 mm², H05V-K, screw version, L = 5.0 m	6ES7922-3BF00-0AB0	6ES7922-3BF00-0AB0
Siemens (2.5m) 32 Point Digital Input Helmholz (40 Way 5m) 700-392-1AM10C	6ES7922-3BC50-0AC0	6ES7922-3BC50-0AC0
Siemens (2.5m) 16 Point Digital Output Helmholz (20Way 5m) 700-392-1AJ10C	6ES7922-3BC50-0AB0	6ES7922-3BC50-0AB0

4.3.2 SIPLUS ET200S

The ET200S is a legacy platform and this equipment should only be used for minor upgrades and repairs.

Siemens ET 200S Series - Existing Sites Only
All new Control System installs to migrate to ET200SP
(note part prefix 6AG = conformal coated SIPLUS range)

Part Description	STP Parts (SIPLUS)	Networks
1 SI Modbus Master	6AG1138-4DF11-7AB0	6ES7 138-4DF11-0AB0
2AI 4WIRE	6AG1134-4GB11-2AB0	6ES7 134-4GB11-0AB0
2AO I ST	6AG1135-4GB01-2AB0	6ES7 135-4GB01-0AB0
4DI DC24V ST	6AG1131-4BD01-2AA0	6ES7 131-4BD01-0AA0
4DO DC24V/0,5A ST	6AG1132-4BD02-7AA0	6ES7 132-4BD02-0AA0
4DO DC24V/2A ST	6AG1132-4BD32-2AA0	6ES7 132-4BD32-0AA0
IM151-1 Standard	6AG1151-1AA05-7AB0	6ES7 151-1AA05-0AB0
IM151-3PN	6AG1151-3AA23-2AB0	6ES7 151-3AA23-0AB0
IM151-7 F-CPU	6AG1151-7FA21-2AB0	6ES7 151-7FA20-0AB0
Power Module PM-E	6AG1138-4CB11-2AB0	6ES7 138-4CB11-0AB0

DC24/48V/AC24/230V		
PM-E DC24V	6AG1138-4CA01-2AA0	6ES7 138-4CA01-0AA0
IM153-2PN	6AG1153-2BA02-7XB0	6ES1153-2BA02-7XB0

Siemens - New STPs or sitewide control system installs to existing STPs

4.4 GE, PAC SYSTEMS, PLC

	GE PACSystems RX3i	**Part Number**
	CPU Energy Pack & Cable	IC695ACC400CA IC695CBL001A
	Power Supply 24Vdc	IC695PSD140CA
	Backplane 12 Slot Backplane 16 Slot	IC695CHS012CA IC695CHS016CA
	Small PLC - CPU	IC695CPE310CA
	Medium PLC - CPU	IC695CPE330CA
	Ethernet Module	IC695ETM001CA
	16 Bit Digital Input Module (20pole)	IC694MDL645CA
	32 Bit Digital Input Module	IC694MDL655CA
	16 Bit Digital Output Module (Relay Output)	IC694MDL940CA
	12 Channel Analogue Inputs	IC695ALG112CA
	8 Channel Analogue Output Module	IC695ALG808CA
	Serial Comms Modbus Module RS485	IC695CMM002CA
	Terminal Block	IC694TBB132
	RX3i PROFINET Controller Module 10/100/1000, 4 Ports - 2 SFP connections. Minimum of Proficy V8.6 required	IC695PNC001CA
	RX3i PROFINET Scanner Module 10/100/1000 with four Ports (two SFP connections, two Copper) Minimum of Proficy V8.6 required	IC695PNS001CA
	RX3i IEC 61850 Ethernet Communication Module	IC695ECM850CA
	RX3i Ethernet DNP3 Slave/Outstation	IC695EDS001CA

5 CABLING AND ACCESSORIES

5.1 REQUIREMENTS:

Installation Requirements: Profibus & Profinet only to be installed by Certified Profibus Installers as listed http://profibusaustralia.com.au/index.php?src=certification

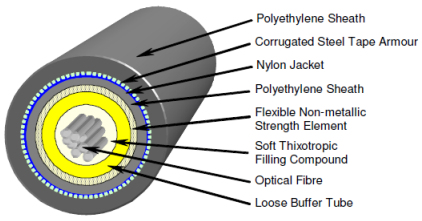
Multi-Stranded Profibus cable is not acceptable.

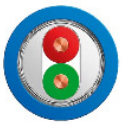
All cable minimum bending radiuses are to be maintained. No Profibus/Profinet cable is to be looped inside cable ducts. Minimum spur lengths of 1metre are to be maintained.

Cable stripping is to be done using specialized tools such as the Siemens Fast Connect Stripping Tool 6GK1905-6AA00.

Metal conduits and anaconda shall be used when run next to power cables.

All cable screens are to be properly terminated and connected as per manufacturer recommendations by a certified installer.

Part	Description	Part Number
Fibre Optic Trunk 	12-core, OM3, multimode, armoured fibre cable. Resistant to insects and rodents. Minimum of 12 cores	Metallic armour AQT153EA012BK Non-metallic armour AQ7153EW012BK
Fibre Patch leads	OM3/4 Multimode, ST, LC connectors. Minimum quality standard	ST MM OM3/4
Profinet Plugs 	Siemens part RJ45 PLUG 180	6GK1901-1BB10-2AA0
Profinet cable 	Siemens Profinet Cable – 4-wire shielded, CAT. 5E	Siemens 6XV1840-2AH10

Part	Description	Part Number
Profibus PA cable 	Simatic Net, Profibus FC Process cable GP, 2-wire, shielded. For **EX** environments	Siemens 6XV1830-5EH10
Profibus PA cable 	Simatic Net, Profibus FC Standard cable GP, 2-wire, shielded. For **NON-EX** environments	Siemens 6XV1830-5FH10
Profibus DP cable 	Simatic Net, Profibus FC Standard cable GP, 2-wire, shielded	Siemens 6XV1830-0EH10
Active Profibus Terminator 	To be used at the end of all Profibus DP branches and located in PLC panel. To be fed from its own dedicated circuit breaker.	Siemens 6ES7972-0DA00-0AA0
Profibus DP/PA Coupler 	DP/PA Coupler Module	Siemens 6ES7157-0AC85-0XA0
	SIPLUS DP Diagnosis Repeater	Siemens 6AG1972-0AB01-4XA0
Profibus PA Splitter & Segment Protectors 	Screw terminals, 4 spurs, zone 2 gas and dust	F2-SP-IC04.0.03.03.00

5.2 SEWAGE TREATMENT PLANTS – POWER SUPPLIES & ACCESSORIES

All 24VDC power supplies shall be DIN-rail mountable and minimum IP2X compliant. The IP2X rating shall not be compromised by the removal of any clip-on shrouding.

A DC-UPS is only permitted in a local control panel where an AC-UPS is not available and is not cost effective to install an LV supply from an AC-UPS to the control panel.

A UPS that complies with TMS1187 shall be installed for all communications racks that support SCADA servers and other control system equipment including instrumentation.

Part	Part Description	Part Number
	Siemens SIPLUS 24Vdc Redundancy Module Used for coupling two redundant 24V power supplies with 20A max each DIN Rail mounted (not to be used in 19" racks)	6AG1961-3BA21-4AX0
	Siemens SIPLUS PSU 24Vdc Power Supply 10A Conformal Coated DIN Rail Mounted (not to be used in 19" racks)	6AG1334-2BA20-4AA0
	Sitop DC-UPS Module 24V/10A –with Profinet/Ethernet interface DIN Rail mounted (not to be used in 19" racks)	6EP41343-AB00-2AY0
	SITOP LiFEPO DC-UPS Battery Module 24V5AH Used in conjunction with Sitop DC-UPS (not to be used in 19" racks)	6EP4133-0JB00-0AY0

Part	Part Description	Part Number
 Heat sink included. 24Vdc,330W, 2U, IEC socket	Powerbox Rack mount 27.6Vdc, 12A Power Supply Options: Network Card, Conformal Coated, 2A charging current, Temperature compensation, Ammeters and voltmeter (not to be used in 19" racks and not to be used as a UPS)	PB251A-24RML-CC-T-S-N-M All options to be included.
	Powerbox Redundancy Diode Module for PB251 Supply	PB-RBOX-251A-24
	12V, 26Ahr Battery (L250,W97,H156)mm 9kg Fastener M6, 15 year life, maintenance free	SuperSafe SBS 30 Battery connector Part # 2205-4215
	12V, 50Ahr Battery (L299,W128,H217)mm maintenance free, 10 year life	YUASA UXH50-12
 *Only used for replacement of existing assets. See TMS1187 for new installs*	Eaton 9130 240Vac UPS (minimum 2kVA) Selection must match others used on site	Eaton 9130 Tower or Rack
	Eaton Web-card ConnectUPS-BD Web/SNMP UPS Connectivity Device	
 *Only used for replacement of existing assets. See TMS1187 for new installs*	APC 1.5KVA 240V Smart-UPS LCD 2RU Selection must match others used on site	APC SMT1500RMI2U Tower or Rack

6 RTU

DNP is the preferred communication protocol between field devices (e.g. RTUs) and SCADA Master Stations.

It is preferred to use a RTU with a QUU standard program code for the asset class.

If the asset needs to connect to legacy SCADA then the preferred method is to link the standard RTU to the legacy RTU via MODBUS. The function of the legacy RTU is to convert the MODBUS to the legacy protocol.

Legacy protocol support:

1. The Kingfisher RTU is used in Ipswich where connectivity is required to legacy Citect.
2. The Miri RTU is used for regional areas where connectivity is required to legacy RADTEL SCADA.
3. The Elpro RTU is used in Boonah (Scenic Rim) region where connectivity is required to legacy Elpro SCADA.

Equipment Category	Manufacturer	Model	QUU Application Suitability: Standard Program Code Availability
Brisbane RTUs	Motorola	ACE3600 with 3680 CPU, DNP option.	1. Sewerage pump station 1,2 & 3 pump – all options including VSDs 2. Pressure Reducing Valve 3. Pressure Gauge
	Schneider	SCADAPack 535E	1. Water Booster (VSD) 2. Pressure Reducing Valve
	Serck	eNet legacy platform	3. Water Booster (VSD) 4. Pressure Reducing Valve
	GE RX3I with DNP Ethernet option		1. Sewerage pump station 3 pump VSD
	Siemens S7-315 with DNP option	6NH7803-4BA00-0AA0 (DNP Module) legacy platform	1. Water pump station 2. Reservoir
Ipswich RTUs	Kingfisher RTU CSE Semaphore	PC-1 CP-11/12	***No standard code in service*** Water sites in Ipswich region Kingfisher modules in service: BA4, BA6, BA12 (Backplanes); DI5, IO3, IO4, MC11,

Equipment Category	Manufacturer	Model	QUU Application Suitability: Standard Program Code Availability
			PS11/12, KF-II protocol.
	Kingfisher RTU CSE Semaphore	CP30	***No standard code in service*** Used for Sewage pump stations using DNP3
	Multismart Pump Station Manager Xylem-Multitrode	V3.0.3 MSM-QUU2	Sewage pump station 2&3 pump controller using DNP3
Regions RTUs	Miri Technologies	Miri AD2006 RTU	***No standard code in service*** ***RTU is monitoring only*** RTU contains radio – need to specify when ordering: (i) frequency and channel width (ii) Radtel firmware
	Elpro	TLX400	***No standard code in service***
EROS	Hawkeye	Hawkeye 2 i/s Sewer Level Monitoring System	***Note:*** equipment under review due to GSM communications phase out.

6.1 COMMUNICATIONS – RADIO AND ANTENNA

Note the Radio and the Antenna shall be selected as a pair and not individually.

6.1.1 Brisbane Region

QUU's private radio network operates in the licenced 900 MHz band and uses Trio radios. A secondary network operates in 480 MHz band. RFI and Polar are the preferred antennas manufacturers.

Andrew Products are preferred for the RF feeder. Andrew CNT-400 cable for short runs (<10m), and Andrew LDF4-50 Heliax for longer runs. Andrew N type connectors are used on cables.

Equipment Category	Manufacturer	Model
Digital data radio 900MHz band	TRIO Radios now owned by Schneider	TRIO D series: DR900-07-A02-D Both Type 6 and type 7 radios are used. Type 7 being the most common.

Equipment Category	Manufacturer	Model
Antenna 900MHz band	RFI	Yagi 20 element YB820-82
Digital data radio 480MHz band	TRIO Radios now owned by Schneider	TRIO E Series: ER450-53A02-EH0
Antenna 480MHz band	Polar	Yagi model 326 with centre frequency of 483MHz
Antenna 480MHz band	RFI	Yagi 9 element YB9-62
Digital data radio	4RF	Aprisa SR+ series (under evaluation)
Serial data cables – RTU to radio	Complete Wiring Harness	Made to order in batch quantities
Radio to RF feeder fly leads	Trio	Trio D series part no. SMAM/NM/TLL23
	NCom	N-Com Andrew FSJ1-50 made to order

6.1.2 Ipswich Region

Equipment Category	Manufacturer	Model
Digital data radio 480MHz band	TRIO Radios now owned by Schneider	TRIO E Series: ER450-53A02-EH0
Antenna 480MHz band	RFI	Yagi 9 element YB9-62

6.1.3 Western Region

Equipment Category	Manufacturer	Model
Analogue radio		Purchase from RTU supplier. Model no's to be confirmed

6.2 COMMUNICATIONS – MODEM

Equipment Category	Manufacturer	Model
GSM Antenna	RFI	TLA2000
GSM modem	No preferred manufacturer	
PSTN modem	Maestro	Woomera

3G modem (STP alarm paging)	Maestro	M100 3G (M1003GXT04)
3G Antenna	Panorama Antennas	WS-MAR-C3G-2SP
4G modem (network station to MOSAIC)	www.Cybertec.com.au	Cybertec Model 2455X

7 COMPUTERS & SERVER HARDWARE – STPS

7.1 CITECT CLIENT HARDWARE

Citect client workstation	Part Description	Part Number
PC  Not to be used in hot or very humid installations	HP EliteDesk 800 G2 Desktop mini-PC	
	Windows 10 enterprise 64 bits (QUU licence supply)	
	Intel® Core™ i7-6700T with Intel HD Graphics 530	
	8 GB DDR4-2133 SDRAM (1 x 8 GB)	
	256 GB SATA SSD (1 x drive)	
	1 VGA + 2 DisplayPort (total of three video outputs)	
	3-year (3-3-3) limited warranty and service offering includes 3 years of parts, labour and on-site repair.	
Monitor	HP EliteDisplay E221 21.5-inch	HP EliteDisplay E221

7.2 ENGINEERING WORK STATIONS (EWS)

Where a standalone EWS is required the following configuration shall be used.

EWS	Part Description	Part Number
HP Z420, Z440 or higher 	128GB SATA 1ST SSD (or higher)	A3D19AV
	128GB SATA 2nd SSD	C2P95AV
	2TB 7200 RPM SATA 3RD HDD (or higher)	QE204AV
	2TB 7200 RPM SATA 4TH HDD (or higher)	QE205AV
	HP USB Optical 3-Button Mouse	QE217AV
	16X SuperMulti DVDRW SATA 1st ODD	QE236AV
	HP Single Unit Packaging	QE243AV
	Windows 10 enterprise 64 bits (QUU licence supply)	QD971AV#ABG
	HP Z420 600W 90% Efficient Chassis	QE159AV
	8GB DDR3-1600 ECC (4x2GB) RAM	QE256AV

EWS	Part Description	Part Number
	HP Processor Air Cooling Kit	A7E48AV
	HP Z420 Country Kit	QD956AV#ABG
	HP USB Keyboard	A8Z48AV#ABG
	Intel Xeon E5-1607v2 3.0 10M 1600 4C CPU	E2R00AV
	NVIDIA NVS 510 2GB 1st GFX	C2J38AV
	No Factory OS Recovery Media	B6S40AV
	HP 5/5/5 Warranty	B3M04AV#B4
Monitor	23" LED backlit monitor	Elite Display E231

7.3 RACK MOUNTED SERVER MINIMUM SPECIFICATIONS

Two servers are to be installed to create a physically redundant system. The selection of the rack mount server is based around the following criteria:

- Size and criticality of the site
- Consistency with existing installations
- QUU direction through design review and risk assessment

The selection and configuration of rack mounted servers is based around the following criteria:

Server Size	ESX Server 1	ESX Server 2
Small Site	Standard	Standard
Medium Site	Large	Standard
Large Site	Large	Large

All new CitectSCADA servers are to be implemented as ESX hosts running VMware and must be rack mounted.

7.3.1 Standard ESX Server

Server	Item	Minimum Specification
Dell PowerEdge R330 or R340 Server	Server format	Rack Server
	CPU Installed	One
	ESX Licence	One CPU ESXi Licence
	CPU Family	Intel Xeon
	CPU Cores / Threads	4C/8T

Server	Item	Minimum Specification
	Memory	32GB
	Storage	RAID 10 - 4 x 1.2TB (usable 2.4TB)
	Network	2 x 1GbE
	Power Supply	Dual hot plug

7.3.2 Large ESX Server

Server	Item	Minimum Specification
HPE ProLiant DL380 Gen 9 or Gen 10	Server format	Rack Server
	CPU Installed	Two
	ESX Licence	Two CPU ESXi Licences
	CPU Family	Intel Xeon
	CPU Cores / Threads	10C/20T (each CPU, total 20C/40T)
	Memory	128GB
	Storage	RAID 10 - 8 x 1TB (usable 4TB)
	Network	4 x 1GbE
	Power Supply	Dual hot plug

8 OBSELETE/DISCONTINUED/DISSALLOWED EQUIPMENT

The following equipment shall not be installed

GE 90-30 	Removed - Product has now started being discontinued.
Siemens OSM TP62 	Removed - Product Cancellation 1/10/2012
Allen Bradley SLC500 	Removed - Not to be installed. Minimal spares are held by QUU
Moxa PT-7728 (240V) 	240V switch removed - due to a high number of 240Vac power supply failures and the potential electrical hazard from exposed terminals
Corsel 240Vac/24Vdc Supply 	Removed - due to accidental removal shrouds resulting in exposed 240V terminals. Also not DIN rail mountable.
UPS Powerware 9125 or 9120. 	Powerware has been superseded by Eaton 9130 http://powerquality.eaton.com/Products-services/Legacy/Legacy-Products.asp
GE VersaMax	Removed
ProSCADA IO Driver	Not to be used