



Townsville Water and Resource Recovery
Preferred Equipment List Electrical and Instrumentation



Authorised by: – Team Manager Mechanical and Electrical services

Effective Date: 11/03/2022

Townsville City Council

Electrical & Instrumentation Preferred Equipment Standard

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Townsville Water and Resource Recovery

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1. Version History

Rev No.	Date	Description	Position
1	02/12/2021	Document Developed	Team Leader Electrical and Instrumentation
2	22/02/2022	Document made current	Team Leader Electrical and Instrumentation
3	22/02/2022	Authorised for use	Team Manager Mechanical and Electrical Services

2. Document Development and Review

Position	Section	Involvement
Team Leader Electrical and Instrumentation	Mechanical and Electrical Services	Document Developer/Administrator
Electrical and Instrumentation Technician	Mechanical and Electrical Services	Primary Content Input
Industrial Electrician	Mechanical and Electrical Services	Primary Content Input
Electrical Technical Officer	Engineering and Asset Infrastructure Planning	Primary Content Input
Team Leader Electrical	Mechanical and Electrical Services	Primary Content Input
Team Leader Electrical Technical	Mechanical and Electrical Services	Primary Content Input
Team Manager Mechanical and Electrical Services	Mechanical and Electrical Services	Content Review
Team Leader Water and Waste Asset Management	Engineering and Asset Infrastructure Planning	Content Review
General Manager Engineering & Asset Infrastructure Planning	Engineering and Asset Infrastructure Planning	Review/Support
Water and Wastewater Engineer	Townsville Water and Resource Recovery	Content Review
Electrical Engineer	Engineering and Asset Infrastructure Planning	Content Review
Signal Maintenance Officer	Construction Maintenance and Operations	Content Review
General Manager Water and Resource Recovery	Townsville Water and Resource Recovery	Review/Support
General Manager Infrastructure Property and Fleet	Infrastructure Property and Fleet	Review/Support
Team Manager Water and Wastewater	Townsville Water and Resource Recovery	Review/Support

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3. Purpose

To maintain standard electrical and instrumentation equipment at Townsville City Council, the following lists preferred equipment for use on Townsville City Council assets and shall be used in conjunction with the documents it references as well as other relevant documentation.

Unless specifically approved by Townsville City Council Manager Mechanical & Electrical Services, all equipment shall be selected from this preferred equipment list.

This preferred equipment list applies to all Townsville City Council employees, suppliers, contractors, and consultants working for, or on behalf of Townsville City Council. Unless otherwise stated, it applies to all new, modified and end of life replacement equipment.

Deviation from the requirements in this preferred equipment list requires written agreement from Townsville City Council Manager Mechanical & Electrical Services.

Where noted in this preferred equipment list approval or acceptance shall/must be sought, approval or acceptance must be gained.

Responsibility for ensuring compliance with Townsville City Council Standard Specifications lies with those engaged in the management and execution of design, construction, and maintenance activities on Townsville City Council assets.

This preferred equipment list must be used in conjunction with other relevant asset standards and project specific documents to define the technical requirements for asset design and construction.

The contractor maintains responsibility for a fit for purpose design and compliance with all relevant Australian legislation, standards, codes and guidelines. Where no Australian standard exists for an application, work should conform to the most current version of an industry accepted international standard.

Advice must be sought from Townsville City Council Manager Mechanical & Electrical Services, to clarify any ambiguities regarding this standard specification.

Townsville City Council undertakes regular updates of standards. Before utilising this standard specification, the complete list of Townsville City Council standards should be reviewed, to ensure currency and applicability of standards applied to the works.

Where a proposed category of equipment is not listed, the contractor shall seek advice from the Townsville City Council Manager Mechanical & Electrical Services before proceeding. Where multiple manufacturers are listed for a category of equipment, the selection shall be based the priority order of equipment listed within, taking into consideration the project specification and/or design.

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4. Preferred Equipment List – General Electrical

Image	Product Type	Brand/Model/Requirements	Comments
	Batteries - Telemetry	Drypower 9Ah 12SB9P-F2, Drypower 12Ah 12SB12P-F2	Other brand batteries shall be maintenance free, sealed lead acid. Larger sites to use Drypower 30Ah 12SB30P-F3.
	Battery Chargers – Solar Power	Victron SmartSolar MPPT	Model dependant on load and charging requirements.
	Cable Glands		Not brand specific.
	Cable Glands Metal	CCG	
	Cable Glands Hazardous Areas	CCG	

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	Cable Lugs	CABAC	Correctly sized hole and lug.
	Cable Tags/Labels (Inside)	Pacific Components CML70	Black writing on yellow background with clear sleeve.
	Cable Tags/Labels (Outside)	Pacific Components SSTEELM88	Must be stainless steel, and must use stainless cable ties to fix to cables.
	Coaxial Surge Diverters	Novaris CN-FF-90-3	
	Conduits		Corrugated conduit not accepted unless project-specific approval given.
	Flexible Heavy-Duty Conduit (Non-Metallic)	Flexicon FPAL	Split corrugated conduit not accepted. Black for general use, blue for hazardous area.
	Flexible Heavy-Duty Conduit (Metallic)	Flexicon LTP	Black for general use, blue for hazardous area.

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	<p>Earth Pits</p>	<p>ACO or ABB Furse/Fulton</p>	<p>Other types will be considered.</p>
	<p>Field Isolators (Lighting Power)</p>	<p>Clipsal 56 series or NHP ISO</p>	
	<p>Field Isolators (Motors)</p>	<p>Kraus and Naimer</p>	<p>Custom LCS shall be approved on a project basis, sloping roved enclosures as required.</p>
	<p>Generator Controllers and Synchronisation Controllers</p>	<p>Deep Sea Electronics DSE7410/20 MKII</p>	
	<p>Generator Inlet Socket and Plug</p>	<p>Marechal 400A< OR NHP Proconnect</p>	<p>For use on Mobile Generators only, fixed generators shall be hard wired. Refer to TCC Generator Standard for more details.</p>

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  	Generators	Eneraque or Welling & Crossley or Cummins	Refer to TCC Generator Standard for more details.
	Junction Boxes – General Distribution and Control	BnR or AE Stainless	
	Junction Boxes – Lighting and Power	CCG	Bottom entry boxes.
	Labels	Traffolyte White Background-Black Text	Brady thermal EPREP labels on approval.

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	LCS (local Control Station)	Kraus & Naimer S/S or custom built alternative	Custom design on approval.
	P.E. Cells	Clipsal 56 SSR – 3 wire only	
	Power Outlets - 1 Phase Exenal	Clipsal 56 series or NHP ISO	Must be suitable for installation outside.
	Power Outlets - 1 Phase Internal	Clipsal "classic" or "2000" series or similar Red for UPS backed circuits.	
	Power Outlets - 3 Phase	Clipsal 56 series or NHP ISO	Must be suitable for installation outside.
	Sealing compounds	Henley's compound	Not grout, foam-a-fill only on approval.



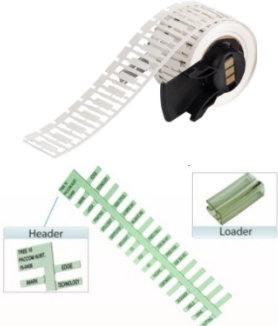
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	Strobe Light Alarm/Beacons	Klaxon Nexus	
	Valve Tags	Pacific Components SSMLA	Must be stainless steel, and must use stainless cable to fix to valve/equipment.
	Wire Labels	Brady Durasleeve B-390 15mm or Pacific Components 20mm	Approved thermal printed type on white label in clear sleeve. Legrand Memocab not allowed.

5. Preferred Equipment List – Switchboard Components

Image	Product Type	Make and Model	Comments
	Ammeters (Analogue)	Schneider or IME	
	Ammeters (Digital)	Schneider PowerLogic PM5000	
	Analogue Digital Displays 4-20mA (Panel Mount)	Red Lion CUB5PR00	





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	<p>Circuit Breakers - Air Circuit Breakers</p>	<p>Schneider Masterpact MTZ or NHP – Terasaki TemPower 2</p>	<p>Others accepted upon approval for Type 2 coordination, arc flash and discrimination.</p>
	<p>Circuit Breakers – Miniature (MCB) & RCD/RCBO</p>	<p>Schneider Acti 9 or NHP – Terasaki Din-t</p>	<p>Others accepted upon approval for Type 2 coordination, arc flash and discrimination.</p>
	<p>Circuit Breakers - Moulded Case Circuit Breakers (MCCB's)</p>	<p>Schneider Compact NSX or NHP – Terasaki TemBreak 2</p>	<p>Others accepted upon approval for Type 2 coordination, arc flash and discrimination.</p>
	<p>Contactors</p>	<p>Schneider LC1D or Sprecher & Schuh CA7</p>	

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	Control Fuses	Glass cartridge fuses	Not brand specific.
	Control Switches & Selectors (Rotary Cam Switch)	Kraus & Naimer CAD Series or Schneider Harmony K	
	Current Transformers/ Torroid	Crompton or IME or Schneider METSECT	
	DC UPS - 12V DC / 24V DC	Puls UB20.241 or Weidmuller 1251220000	
	DIN Rails	TS35 aluminium or stainless steel.	

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	<p>Earth Leakage Relay</p>	<p>Schneider RH99P or NHP RD1EP</p>	
	<p>Earth Links</p>	<p>Clipsal BP 165 Series or Netec</p>	
	<p>Emergency Stop Trip Wire Switch- Small</p>	<p>NHP 440E or Steute ZS80</p>	
	<p>Emergency Stop Trip Wire Switch - Large</p>	<p>NHP 55400</p>	<p>With or without window.</p>
	<p>Emergency Stop Pushbuttons</p>	<p>Schneider Harmony XALK or NHP D71YM1</p>	<p>Enclosures to be yellow.</p>

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	<p>Emergency Stop Safety Monitoring Relays</p>	<p>SICK UE400 Series or PILZ myPNOZ Series</p>	<p>Forced guided contact relays not allowed.</p>
	<p>Enclosure Fans</p>	<p>BnR or AE Stainless</p>	
	<p>Harmonic Filters</p>	<p>Schneider AccuSine PCS+</p>	

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 	<p>Hour Run Meter</p>	<p>Schneider Zelio XBKH700000002M or NHP RQ480240VAC</p>	<p>Panel Mount</p>
 	<p>Indication Lamps (22.5 mm)</p>	<p>Schneider XB7 or Sprecher & Schuh D7P Series</p>	
 	<p>Intrinsically Safe Isolation Barrier</p>	<p>Eaton MTL5500 or Pepperl+Fuchs K-System</p>	
 	<p>Intrinsically Safe Zener Barrier</p>	<p>Eaton MTL7700 or Pepperl+Fuchs Z-System</p>	

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	<p>Isolators & Main Switches</p>	<p>Schneider Compact INC/INV and MasterPact or NHP Socomec SIRCO</p>	
	<p>Multi-Level Control Relays</p>	<p>Multitrode MTIC</p>	<p>Not allowed in sewage treatment plants.</p>
	<p>Motor Circuit Breaker</p>	<p>Schneider GV2/3/4P or Sprecher and Schuh KTA7</p>	
	<p>Motor Protection Relays</p>	<p>Schneider TeSys T LTM</p>	
	<p>Neutral Links</p>	<p>Clipsal BP 165 Series or Netec</p>	

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	OEM distribution Boards	Schneider MB/DB or NHP Concept	
	Phase Failure Relays	Crompton Protector or Carlo Gavazzi DPB01CM48 or Schiedier Harmony RM22TR33	
	Potentiometers		Not brand specific.
	Power Meters	Schneider PowerLogic PM5000	
	Power Supply - 240V AC / 12V DC	Puls CP10.121 or Weidmuller 1478230000	

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	<p>Power Supply - 240V AC / 24V DC</p>	<p>Puls CP10.241 or Weidmuller 1478130000</p>	
	<p>Power Supply Converter – 24V DC / 12V DC</p>	<p>Puls CD10.241</p>	
	<p>Pump Seal Fail Relay</p>	<p>Grundfos IO 113 or Flygt MiniCAS</p>	
	<p>Pushbuttons</p>	<p>Schneider Harmony XB5 or Sprecher & Schuh D7P</p>	
	<p>Relays (Control)</p>	<p>Finder 55 relay with 94.04 base or Schneider Zelio RXM4AB2BD with RXZE2S114M Base</p>	<p>4 contact minimum.</p>
	<p>Relays (Interface)</p>	<p>Finder 38 or Schneider Zelio RSL1PRBU</p>	<p>For PLC interface, SPST.</p>

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 	Relays (Solid State)	Finder 38 or Schneider Harmony SSL1A12BD	For pulse, SPST.
	Signal Isolators	APCS SL332	
	Signal Point Level Control Relays	Multitrode MTR2/3	
 	Soft Starters	Schneider Altistart 22 or Danfoss VLT Soft Starter MCD 500	Altistart 48 depending on application and on approval.
	Surge Diverters 1 Phase Parallel	Novaris SDD1	



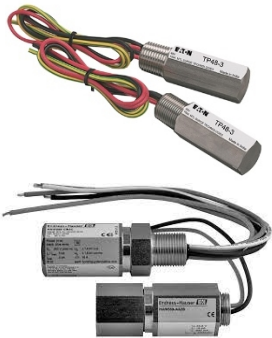
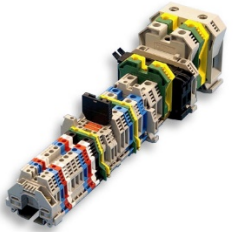
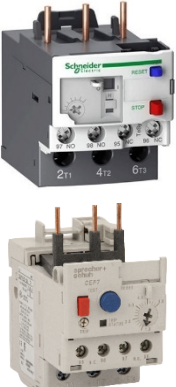
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	Surge Diverters 3 Phase	Novaris SDD3	
	Surge Diverters 1 Series Phase	Novaris SSP1	
	Surge Diverters 3 Phase Series	Novaris SSP3	
	Surge Protection Device (Field Mounted to Instrument)	Eaton MTL TP48 or E+H HAW569	
	Terminals (including Fuse and Blade Terminals)	Weidmuller WDU series or Schneider NSYTRV or Sprecher + Schuh	No push in terminal allowed.
	Thermal Overloads	Schneider LRD or Sprecher & Schuh CEP7	

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	Thermistor Protection Relays	Schneider LT3 24V DC or Sprecher & Schuch RT7E2	On VFD applications direct connection to drive preferred.
	Thermostats	Rittal or NHP Cosmotec	
	Timers	Schneider Zelio RE22R1MYMR or Carlo Gavazzi DMB51CM24	Where possible use PLC/SCADA/RTU for this function.
	Transducers (Current)	Sentry 200 series or Crompton Paladin 253-TRW-C5-AN	
	Transfer Switch (Automatic)	Schneider TransferPacT or NHP Socomec ATyS p	

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	Transfer Switch (Manual)	Schneider TransferPacT or NHP Socomec SIRCOVER	
	Transient Barriers	Novaris SL36 or MTL SD32	
	Transient Barriers (Intrinsically Safe)	Novaris SL36I	
	Uninterruptible Power Supplies Small <3kVA	Eaton or Schneider APC	
	Uninterruptible Power Supplies Large >3 kVA	Eaton or Schneider APC	

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	<p>Variable Frequency Drives (LV)</p>	<p>Schneider Altivar Process ATV600 or Danfoss VLT Aqua FC202</p>	
	<p>Variable Frequency Drives (MV/HV)</p>	<p>Schneider Altivar 1200</p>	
	<p>Voltmeters (Analogue)</p>	<p>Schneider or IME</p>	

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6. Preferred Equipment List – Instrumentation

Image	Product Type	Make and Model	Comments
	Actuator Pilot Solenoid	Keystone F791 or Burkert Series 6519	To suit NAMUR interface & DIN 43650 Form A connector.
	Actuator Positioner (Electro-Pneumatic)	SMC IP8101 Smart Positioner or ABB TZIDC Smart Positioner	
	Actuator Switch Box	Keystone F792 LP Series or Burkert type 1061 (with solenoid/limit/terminal built in)	Burkert model eliminates the need for external solenoid pilot.
	Actuators (1 Phase Electric)	Rotork ROM or Bray 70 Series	Only to be used as requested if 3 phase isn't available, otherwise Rotork 3 phase actuator IQ3 to be used.

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	Actuators (3 Phase Electric)	Rotork IQ3	415 Volt 3 phase 50 Hz.
	Actuators (Pneumatic)	Keystone F89U pneumatic quarter-turn or Burkert Type 2052	Must be double acting, unless on emergency fail safe system.
	Autosampler	Hach All Weather Auto Sampler AS950	
	Averaging Pitotube/Annubar	Yokogawa Verabar V100 & V110	Depending on pipe diameter V100 for smaller than DN300 pipes, V110 for larger than DN300.
	Belt Alignment switch	Schneider XCRT or Steute ZS 73 SR	

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	Chlorine Analysers - Water Treatment	Evoqua Depolox 400 M	
	Chlorine Dosing Pumps	Grundfos DDA	
	Chlorine Gas Leak detector	Hydramet	
	Chlorine Probe/Sensor - Low Residual >1ppm	Endress & Hauser CCS51D or Hach CL17	Outlet monitoring of treatment plants, nominally around 0.05-0.7ppm. If CL17 is used, SC200 analyser controller also to be used.

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	Chlorine Probe/Sensor - Sewerage Treatment	Endress & Hauser CCS51D	Memosense must be used when using Endress & Hauser.
	Chlorine Probe/Sensor - Water Treatment	Depolox 5 flow cell	pH/Chlorine/Temperature used with Evoqua Depolox 400 M.
	Conductivity Analyser	Endress & Hauser Liquiline CM442 or Yokogawa FLXA402	Yokogawa FLXA transmitter to be used when using Yokogawa conductivity sensor – typically for water application.
	Conductivity Probe/Sensor	Endress & Hauser Condumax CLS21E or Yokogawa SC42	Memosense must be used when using Endress & Hauser, no toroidal coil type to be installed into pipework unless approved. Yokogawa conductivity sensor – typically for water application.
	Dissolved Oxygen Analyser	Endress & Hauser Liquiline CM442	CM442 standard, multiple probes CM444 or CM448.
	Dissolved Oxygen Sensor	Endress & Hauser Oxymax COS61D	Memosense must be used when using Endress & Hauser.

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	<p>Electromagnetic Flowmeters - Battery Powered</p>	<p>Krohne Waterflux 3070 or ABB Aquamaster</p>	<p>See TCC Flowmeter Selection and Installation Standard.</p>
	<p>Electromagnetic Flowmeters - Bulk Water</p>	<p>Krohne Optiflux 2300 or ABB Watermaster</p>	<p>See TCC Flowmeter Selection and Installation Standard.</p>
	<p>Electromagnetic Flowmeters - Partially Filled Pipes</p>	<p>Krohne Tidalflux 2300</p>	<p>See TCC Flowmeter Selection and Installation Standard (for both water and sewerage).</p>

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	<p>Electromagnetic Flowmeters - Sewerage</p>	<p>ABB Processmaster or Endress & Hauser Promag W400</p>	<p>See TCC Flowmeter Selection and Installation Standard.</p>
	<p>Electromagnetic Flowmeters - Sewerage Treatment</p>	<p>ABB Processmaster or Endress & Hauser Promag W400</p>	<p>See TCC Flowmeter Selection and Installation Standard.</p>

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	<p>Electromagnetic Flowmeters – 0xOD Pipeline Requirements</p>	<p>Endress & Hauser Promag W400 0 x DN or Krohne Optiflux 2300</p>	<p>See TCC Flowmeter Selection and Installation Standard.</p>
	<p>Flow Switches – Air/Gas</p>	<p>IFM SA5020</p>	
	<p>Flow Switches – Liquid</p>	<p>IFM SA5000 or Kelco FMH25</p>	<p>IFM for digital, Kelco for mechanical.</p>
	<p>Fluoride Analyser</p>	<p>ABB Aztec 600</p>	

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	Instrumentation Field Display	Endress & Hauser RIA15	For standalone loop instruments, level, temp and percentage display in the field.
	Instrumentation Field Display/Controller - Multi Sensor	VegaMET 841/842	
	LEL (H2S) Analysers/Sensors	Drager	Both handheld and fixed.
	Level Sensor - Guided Radar	Endress & Hauser FMP51 or VegaFLEX 81	
	Level Sensor - Hydrostatic Pressure	VegaWELL 52 HART or Endress & Hauser Waterpilot FMX21	VegaWELL 52 approved for sewerage pump station use. When installed in a turbulent environment, stilling tubes shall be supplied and mounted in such a way as to stop movement of the transducer unit due to turbulence

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	<p>Level Sensor - Radar</p>	<p>Endress & Hauser Micropilot FM50 & 51 or VegaPULS 31</p>	
	<p>Level Sensor - Ultrasonic</p>	<p>VegaSON62 or Endress & Hauser Prosonic FMU30 & 42</p>	
	<p>Level Switch - Ball Float</p>	<p>Flygt ENM-10 series or Kelco Q series</p>	
	<p>Level Switch - Capacitive (External Tank Mount)</p>	<p>IFM KQ6002 or SICK CQ35</p>	<p>4 wire PNP sensors 10mm sensing range minimum.</p>

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	Level Switch - Capacitive Probes	Endress & Hauser Liquicap FMI51 or Multitrode	Multitrode probes to be used with MTR level control relay.
	Level Switch - Vibrating Fork	E+H Liquiphant FTL41 or VegaSWING 61	
	Limit Switches	Schneider XCKJ or OMRON D4A	Steel roller, 1NC + 1NO spring/snap action, adjustable length. Other brands will be considered following approval, must be industrial style.
	MLSS Analyser	Endress & Hauser Liquiline CM44*	CM442 standard, multiple probes CM444 or CM448.
	MLSS Sensor	Endress & Hauser Turbimax CUS51D	

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	Nitrate Analyser	Endress & Hauser Liquiline CM44*	CM442 standard, multiple probes CM444 or CM448.
	Nitrate Sensor	Endress & Hauser Viomax CAS51D	Memosense must be used when using Endress & Hauser.
	Nutrient Analyser – Ammonia	Endress & Hauser CA80AM	To be installed in a climate controller room.
	Nutrient Analyser – Other	Endress & Hauser CA80**	To be installed in a climate controller room.
	Nutrient Analyser – Phosphate	Endress & Hauser CA80PH	To be installed in a climate controller room.






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	Nutrient Analyser Sample Preparation System - Plant Inlet	Endress & Hauser CAT860	To be installed in a climate controller room. Used for high turbidity levels and solid content.
	Nutrient Analyser Sample Preparation System - Plant Outlet	Endress & Hauser CAT820	To be installed in a climate controller room. Used for low turbidity levels and solid content. Not to be used on treatment plant raw inlet.
	pH Analyser – (Sewerage Treatment)	Endress & Hauser Liquiline CM442	CM442 standard, multiple probes CM444 or CM448.
	pH Analyser – (Water Treatment)	Endress & Hauser Liquiline CM442 or Evoqua Depolox 400 M	
	pH Probe/Sensor – (Sewerage Treatment)	Endress & Hauser CPS71E	Memosense must be used when using Endress & Hauser. When selecting sensor refer to project specific probe type. CPF82D only approved on request.

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	<p>pH Probe/Sensor – (Water Treatment)</p>	<p>Endress & Hauser CPS31E or Depolox 5 flow cell with W3T169297 probe</p>	<p>Memosense must be used when using Endress & Hauser.</p> <p>When selecting sensor refer to project specific probe type.</p>
	<p>Pool Analyser</p>	<p>Evoqua Depolox Pool Compact or Prominent DULCOMETER dialog 800</p>	<p>pH/chlorine/temperature (conductivity, ORP and total chlorine on request).</p>
	<p>Pressure Switches (Smart with Display)</p>	<p>Endress & Hauser Ceraphant PTC31 or IFM PN 2694</p>	<p>Ceramic sensor.</p>
	<p>Pressure Switches - Industrial (Simple Non-Display)</p>	<p>United Instrument Controls Series 120 or Telemecanique Sensors XMLA series</p>	

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	<p>Pressure Transmitters - Differential</p>	<p>Yokogawa EJA110E or Endress & Hauser DeltaBar PMD55</p>	<p>Must be supplied with S/S isolating valve manifold when used on all installations to allow for maintenance and removal of blockages.</p> <p>Accuracy of 0.1% minimum.</p>
	<p>Pressure Transmitters - Gauge</p>	<p>Yokogawa EJA530E or Endress & Hauser Cerabar PMC51</p>	<p>Must be supplied with S/S isolating valve manifold when used on all installations to allow for maintenance and removal of blockages.</p> <p>Accuracy of 0.1% Minimum.</p> <p>Ceramic Sensor.</p>
	<p>Pressure Transmitters - Gauge (Simple)</p>	<p>Endress & Hauser Cerabar PMC11 or VegaBar 38</p>	<p>Approval must be obtained before use.</p>
	<p>Proximity Switches/Sensors</p>	<p>IFM IGM20* or SICK IMS</p>	<p>Check requirements of sensing distance, No or Nc functionality.</p>
	<p>Pump Station Level Controller</p>	<p>Yokogawa UM33A</p>	

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	<p>Rain Fall Gauge (Tipping Bucket)</p>	<p>Campbell Scientific RIM-7499-BOM or Hydrological Services (Hyquest solutions) TB3</p>	<p>Receiving Collector Diameter: 203 (8") ± 0.2mm.</p>
	<p>Rotameter (Airflow)</p>	<p>Yokogawa RAGK/RAGL or Kytola VA Model L</p>	<p>Variable area flow meter, size on application.</p>
	<p>Rotameter (Liquid Process)</p>	<p>Georg Fischer Type 335 & 350 or Krohne K20</p>	<p>Variable area flow meter, size on application.</p>

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	Sludge Blanket Level Detector	Krohne Optisys SLM 2100	
	Solenoid Valves (pneumatic)	SMC	
	Solenoid Valves (process)	Burkert Type 0290 & 6213 or Process Systems B35 & S35	Valve seat and diaphragm to be suitable for process (FKM, EPDM or PTFE).
	Temperature Transmitters	Endress & Hauser TC10 or Yokogawa YTA610	HART comms.

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	Thermal Mass Flowmeter	Endress & Hauser 65i and B150	Insertion type only.
	Thermowell		Not brand specific.
	Tubing and Fittings - Metal	Swagelok	Stainless steel 316, NPT tapered thread.
	Tubing and Fittings – Polyurethane/Nylon	SMC	For pneumatic and some liquid applications where it is not practical to use stainless.
	Turbidity Analyser	Endress & Hauser Liquiline CM442	CM442 standard, multiple probes CM444 or CM448.

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	Turbidity Probe/Sensor	Endress & Hauser Turbimax CUS52D	Memosense must be used when using Endress & Hauser.
	Ultrasonic Flowmeters	Krohne Optisonic 6300 or Flexim FLUXUS F501	See TCC Flowmeter Selection and Installation Standard.

7. Preferred Equipment List – Control/SCADA Components



Image	Product Type	Make and Model	Comments
	Antenna	Yagi (not brand specific) Whip (not brand specific)	Materials throughout shall be matched to prevent galvanic corrosion.
	Communication Racks	Dell SX	

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	<p>HMIs</p>	<p>Siemens SIMATIC Comfort or Schneider Magelis</p>	<p>Minimum size 9", all treatment plants 15".</p>
	<p>Programmable Controller</p>	<p>Siemens LOGO! or Zelio Logic SR2/SR3</p>	<p>Only for approved use in small applications where control cannot be achieved with relay logic, SCADA pack or larger PLC.</p>
	<p>Programmable Controller Power Supply (240v – 24v)</p>	<p>Siemens SIPLUS 10A - 6AG1334-2BA20-4AA0</p>	
	<p>Programmable Controller Power Supply DC-UPS</p>	<p>Siemens SITOP DC-UPS 24v-10A - 6EP41343-AB00-2AY0</p>	

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	Programmable Controller Power Supply Redundancy Coupler	Siemens SIPLUS 24Vdc Redundancy Module - 6AG1961-3BA21-4AX0	Used for coupling two redundant 24V power supplies with 20A max each.
	Programmable Controller Power Supply Battery Module	SITOP LiFEPO DC-UPS Battery Module 24V5AH - 6EP4133-0JB00-0AY0	Used in conjunction with Sitop DC-UPS (not to be used in 19" racks).
	Programmable Logic Controllers	Siemens SIMATIC S7 Schneider M340/580	Any deviations from these PLCs must be approved.
	Profibus Repeater	Procentec ProfiHub B5+R & A5 (for IP rated areas)	
	Profibus Terminator	Procentec Terminator T1	







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	Protocol	Profibus DP, ProfiNET, EthernetIP and HART	<p>Profibus PA for ex rated areas.</p> <p>All smart instruments HART enabled.</p>
	Protocol Convertors	Siemens SCALANCE or Hirschmann OZD	Use for fibre to other communication protocol.
	Fibre/LAN Switch	Siemens SCALANCE	
	Radio Unit	Trio	
	Remote IO Unit	WAGO I/O	
	RTUs	SCADA Pack 575	



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	<p>Serial to 3g/4g GSM Modem</p>	<p>Schneider SR2COM01 or Wavecom Fastrack M1306B</p>	<p>For use on small standalone sites only.</p>
	<p>Telemetry Point-to-Point Controller</p>	<p>Elpro 905U-L</p>	