



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

ADDENDUM No.1 TO TENDER

1. THIS ADDENDUM SHALL FORM PART OF THE CONTRACT

Tenderers are required to record receipt of this Addendum in Part T2: Returnable Documents, FORM A: RECORD OF ADDENDA TO TENDER DOCUMENTS. Attach this Addendum to Page 44 of the Document.

2. QUESTIONS & RESPONSE

The following questions were received regarding the Bid:

2.1 Must it be a single 2 500 kVA generator unit?

Engineers Response – Yes, a single 2 500 kVA unit must be supplied for tender purposes.

2.2 Can a quote be provided for two or more sync sets?

Engineers Response – No, not for tender purposes.

2.3 Can an alternative fuel tank be supplied or must the fuel tank be in a shipping container conversion?

Engineers Response – All fuel tanks must comply with specification, also refer to Variations & Additions to Standard and Particular Specifications.

2.4 Where in the document are the following to Variations & Additions to Standard and Particular Specifications: PSESGS, PSPMC-8D and PSESGS-7.2 in the document?

Engineers Response – See the Variations & Additions to Standard and Particular Specifications, attached.

THE TENDER
Part T2: Returnable Documents

T2.2
Addendum 1

Employer

Witness 1

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3. ALTERATIONS TO TENDER DOCUMENTS

The following changes / additions / amendments must be incorporated in the document:
Contractors to remove page 321 to 407 and replace with A321 – A439 within this Addendum No.1.

CONFIRMATION OF RECEIPT OF ADDENDUM NO.1

Please confirm receipt of this addendum by completing the information below and returning *via* facsimile to Mr Coenie Van Eck (fax number 012 843 9000) OR return via e-mail to Coenie.vaneck@bigengroup.com. Also include a copy of the signed addendum in the Bid submission

Name of Tendering Entity: _____
Contact Person: _____
Telephone Number: _____
Date: _____
Signature of Authorised Representative: _____

THE TENDER
Part T2: Returnable Documents

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T2.2
Addendum 1

Employer

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

ELECTRICAL / ELECTRONIC ABBREVIATIONS

- AI Analogue Inputs
- AO Analogue Outputs
- C&I Control and Instrumentation
- COC Certificate of Compliance
- CPU Central Processing Unit
- DB Distribution Board
- DI Digital Input
- DO Digital Output
- EC&I Electrical, Control and Instrumentation
- FT Flow Transmitter
- GA General Arrangement
- HMI Human Machine Interface
- LT Level Transmitter
- LV Low Voltage
- FDS Functional Description Specification
- FM Flow Meter
- MCC Motor Control Centre
- MV Medium Voltage
- O&M Operations & Maintenance
- OHL Overhead Line
- PLC Programmable Logic Controller
- PT Pressure Transmitter
- RCC Regulatory Conformance Certificate
- RIO Remote I/O
- SABS South African Bureau of Standards
- SLD Single Line Diagram
- SOW Scope of Work
- SST Secondary Settling Tank
- TT Temperature Transmitter
- VSD Variable Speed Drive
- WTW Water Treatment Works

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

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Contractor

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REFERENCE DRAWINGS

DRAWINGS	DESCRIPTION
1890.11.00.AAA.01.A002	DRAWING REGISTER - PUMP STATION, RESERVOIR AND ACCESS ROAD
1890.11.00.AAA.01.A011	CONTRACT NAME BOARD DETAILS
1890.11.00.AAA.21.A001	PIPING AND INSTRUMENTATION DIAGRAM (P&ID)
1890.11.00.AAA.01.S001	LOCALITY PLAN
1890.11.00.GZA.05.S001	ROUTE PLAN
1890.11.00.WPA.13.D001	HIGH LIFT PUMP STATION DETAILS
1890.11.00.WPA.23.D001	MOTOR CONTROL CENTRE AND SOFT STARTER LAYOUT
1890.11.00.WPA.23.D002	ELECTRICAL DISTRIBUTION SHEET 1
1890.11.00.WPA.23.D003	ELECTRICAL DISTRIBUTION SHEET 2
1890.11.00.WPA.21.U001	COMMUNICATION MAST, ANTENNAS AND CONTROL ROOMS LAYOUT
1890.11.00.WPA.21.D001	SIGNAL PROFILES SHEET 1
1890.11.00.WPA.21.D002	SIGNAL PROFILES SHEET 2
1890.11.00.SUA.23.D001	CONTROL ROOM EARTHING AND LIGHTNING, SMALL POWER, LIGHTING AND DISTRIBUTION LAYOUTS
1890.11.00.AAA.21.D001	TYPICAL DETAIL FOR LATTICE COMMUNICATION MAST

CONTRACT
Part C3: Scope of Works

A322
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

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Contractor

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PSEMCC MOTOR CONTROL CENTRES AND DISTRIBUTION BOARDS

PSEMCC-1 SCOPE OF WORKS

Bidders shall allow for proper liaison with all other contractors to ensure the intended functioning of all equipment supplied and installed for this project.

Should there be conflicting specifications between the specifications in this section with regard to mechanical equipment required and electrical control equipment specified this must be brought to the attention of the Engineer not later than one week before the tender close, who will give clarity the matter or issue an addendum in this regard.

All equipment offered under this contract shall be selected to **be equal and similar of make** as far as possible. The tenderer shall provide equipment for motor starter panels that is at **least Type 2 coordinated**. If moulded case circuit breakers and miniature circuit breakers are cascaded, supportive documentation must be supplied with the tender and the tenderer shall allow for the proper labelling as required by SANS.

Motor control centres (MCC) and distribution boards (DB) as specified shall be provided in the following locations:

No.	DESCRIPTION	LOCATION
A	Modifications and Additions to Existing Main MCC	RGS Filter,CW Sump & Pump Hall Building
B	Four Variable Frequency Drives for High Lift Pumps [Four (x4)]	RGS Filter,CW Sump & Pump Hall Building
C	Modifications and Additions to Existing Main MCC Incomer No.1 and Incomer No.2	RGS Filter,CW Sump & Pump Hall Building

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications C3.4.3

Employer

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No.	DESCRIPTION	LOCATION
D	Modifications and Additions to Existing Main MCC with a Standby Generator Panel	RGS Filter, CW Sump & Pump Hall Building

PSEMCC-8.A MODIFICATIONS AND ADDITIONS TO EXISTING MAIN MOTOR CONTROL CENTRE

The existing main MCC was commissioned in 2005 and consists of the following panels [the highlighted items will be the effected panels]:

- a) Backwash, Blower, Daff & Filter Control,
- b) Transformer No.1 Incomer,
- c) Supply to Chemical Dosing MCC,
- d) Supply to Local DB,
- e) Supply to Main DB Plant,
- f) Blower No.1,
- g) Daff Recycle Pump No.1,
- h) Daff Recycle Pump No.3,
- i) Terminals,
- j) Blower No.2
- k) Daff Recycle Pump No.2,
- l) Daff Recycle Pump No.4,
- m) Filter Wash Water Pump No.1
- n) Filter Wash Water Pump No.2
- o) High Lift, Raw Water, Filter, Pumps Control,
- p) Transformer No.2,
- q) High Lift Pump No.1A, [effected panels]
- r) High Lift Pump No.1B, [effected panels]
- s) High Lift Pump No.2A, [effected panels]
- t) High Lift Pump No.2B, [effected panels]
- u) Raw Water Booster Pump No.1,
- v) Raw Water Booster Pump No.2,
- w) Filtered W/W Recycle Pump No.1,
- x) Filtered W/W Recycle Pump No.2,
- y) DB,

CONTRACT
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Variations & Additions to Standard & Particular Specifications

C3.4.3

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- z) Terminals
- aa) Bus section
- bb) PLC [effected panels]

Part of this contract is to remove the existing High lift Pumps Panels No. 1A to 2B to Feeder panels as described below.

Type: The Indoor floor mounted with front access and busbars shall be top rear mounted.

The equipment referenced below does not relieve the contractor of his responsibilities in terms of quality, dimensions and proper functioning of the system. The Electrical contractor responsibility is to coordinate with mechanical contractor in terms of P&ID's, motor sizes, operation of the plant and provide all equipment, Interlocks and relays required.

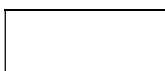
Supply: Existing supply, no cables required.
Colour: Electric orange
Fault level: 65kA

Equipment will be the following:

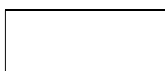
QTY	DESCRIPTION	IDENTIFICATION
Four	Panel comprising of the following:	High Lift Pump 1A, 1B, 2A & 2B
All	Change the wording of all name plates from High Lift Pump 1A, 1B, 2A & 2B to High Lift Feeder 1A, 1B, 2A & 2B: Plus	Panel Name Changes
All	Remove all internal equipment including back plane, accessories, circuit breakers, starters, relays, timers, busbar droppers from main busbars and all equipment inside the panel. It is the Contractors responsibility to visit the site and to establish the entire scope of work required for the removal of equipment. Plus	Removal of all equipment

CONTRACT
Part C3: Scope of Works

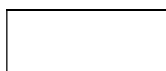
A325
Variations & Additions to Standard & Particular Specifications C3.4.3



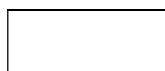
Employer



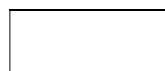
Witness 1



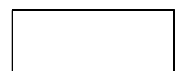
Witness 2



Contractor



Witness 1



Witness 2



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QTY	DESCRIPTION	IDENTIFICATION
All	Remove the front panel door and allow for new powered coated orange [same colour as existing] 2mm mild steel front panel door. Contractor's responsibility to visit the site and to establish the entire scope of work required for the removal of panel doors: Plus	Remove and replace
1	New 355kW continuous current rated TP door interlocked motor protection MCCB [thermal magnetic] with opening / closing release contacts including adjustable electronic trip relay. The motor circuit breaker shall be IEC 60947 certified and shall have type 2 coordinated capabilities complete spreaders, door interlock and all accessories: Plus	New High Lift Pump feeders 1A, 1B, 2A & 2B
Set	800/1 Amp current transformer: Plus	New Current inputs
3	2 Amp HRC fuse holders and fused links: Plus	New Voltage inputs
1	Front panel mounted LCD digital display supply network analyzer comprising of combined voltage, current, maximum demand power measurement and power factor correction measurement complete with network card: Plus	New Network analyser

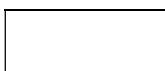
PSEMCC-8.B FOUR VARIABLE FREQUENCY DRIVES TIER FOR HIGH LIFT PUMPS [FOUR (X4)]

Type: These specification shall be considered as minimum design requirement in terms of the Contractor's Tender offer. The Electrical and Electronic Contractor(s) shall coordinate with the Mechanical Contractor to ensure sufficient allowance is made in their tender offer to provide a fit for purpose unit/system.

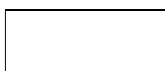
The floor standing variable speed drives shall be of the free-standing floor mounted type with a floor minimum IP rating of 42 (insect proofed enclosure). The standing variable speed drives shall be constructed with a minimum of **2mm mild steel** which will rest on a **mild steel rigid channel** and shall be bolted down in position by means

CONTRACT
Part C3: Scope of Works

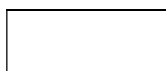
A326
Variations & Additions to Standard & Particular Specifications
C3.4.3



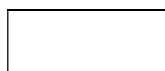
Employer



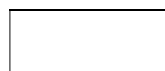
Witness 1



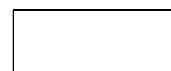
Witness 2



Contractor



Witness 1



Witness 2



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of M16 high tensile steel bolts grouted into the concrete floor, the bolts shall be inside the board.

The panel door shall be provided with a locking system suitable for padlocking. The locking system shall consist of a **mild steel** 3-way locking mechanism locking the door at the top, middle and bottom. The unit doors shall be capable of being opened at least 110 degrees.

The board shall be provided with readily removable, sectionalized, rigidly supported **unpainted 3CR12** cable end support gland plates along the entire length of the board and at least 230 mm above floor level.

Sufficient provision for ventilation and heat dissipation as per the equipment ratings and manufacturers requirements shall be allowed for. The contractor shall prove to the Engineer by means of Anemometer or Differential that the requirements and manufacturer's requirements are met.

Screwed-on engraved labels in English shall be provided below all switchgear and equipment on and in the panels, to facilitate identification. All unpainted parts shall be plated for corrosion resistance.

- Supply:** 1 x 150mm² 4 core Cu PVC SWA PVC cable [one core for earth] plus 1 x 150mm² 3 core Cu PVC SWA PVC cable in parallel from the Main MCC High Lift Pump feeder panels 1A, 1B, 2A & 2B to each variable frequency drive panel.
- Colour:** Painted Light Orange – B26 (SANS 1091:2012) external.
- Fault Level:** 65kA.
- Sectioning:** Multi-section, Form 3b or Form 4 to SANS IEC 60439.
- Future:** N/A.
- Cable Entry:** Incoming and Outgoing – Bottom. MCC gland plates shall be 3CR12 stainless steel unpainted or aluminium
- Base:** Single 100x50x6mm thick channel iron base with mitred corners and cross-bracing between every 2nd tier.

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Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

C3.4.3

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QTY	DESCRIPTION	IDENTIFICATION
Four [x4]	Panels comprising the following	High Lift Pump 1A, 1B, 2A & 2B
1	355kW continuous current rated TP door interlocked motor protection MCCB [thermal magnetic] with opening / closing release contacts including adjustable electronic trip relay. The motor circuit breaker shall be IEC 60947 certified and shall have type 2 coordinated capabilities complete spreaders, door interlock and all accessories. door interlock and all accessories. (Estimated and shall be coordinated with mechanical contractor to ensure correct supplies to mechanical equipment): Plus	Variable Speed Drive Tier Main Breaker
Set	Continuous current rated current transformers: Plus	Current inputs
3	2 Amp HRC fuse holders and fused links: Plus	Voltage inputs
1	<p>355kW (3) phase heavy duty vector control variable frequency drive complete with 1) Programmable cards, 2) Communication card & 3) Encoder interface card. The variable speed drive shall come complete with braking, resistors, line chokes, filters, additional EMC input filters and all necessary harmonic sinus filters all shall be inclusive. Equal or similar to Altivar Process ATV900.</p> <p>The following minimum protection parameters shall be available on the Variable frequency drive:</p> <ul style="list-style-type: none"> • Thermal • Output Phase loss • Input phase loss • Drive overheat • Over voltage • Under voltage 	Variable Speed Drive

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

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QTY	DESCRIPTION	IDENTIFICATION
	<ul style="list-style-type: none"> • Frequency meter • Locked rotor • Phase rotation • Under current • Torque detection for motor on bridge • Speed or torque control • Braking unit via re-injection to the line supply • Integrated Motor Overload Protection • Metering • Real Time Clock • Motor Winding Heater Function • Diagnostic Faults and Alarms • Automatic Tuning of Motor Parameters • Protection and diagnostics [Amps, volts, kW, kWh, MW, MWH, elapsed time, power factor, motor thermal capacity usage] • Alarms [Overload, underload, undervoltage, overvoltage, unbalance, jam, stall, and ground fault] • Pump Control [starting and stopping period. Starting time is adjustable. Stopping time is adjustable]. • Onboard RTD detection and alarm • Continuous heavy duty VSD Drive application <p>: Plus</p> <p>Communications module must be provided, communication links with PLC/DCS Units. The communication interface must comply with either of the following [Network Communications]:</p> <ol style="list-style-type: none"> a) Profibus-DP b) Profinet c) Industrial Ethernet 	

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Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

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Contractor

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QTY	DESCRIPTION	IDENTIFICATION
	d) Modbus TCP/IP • Under no circumstances, shall the use of proprietary protocols be allowed: Plus (Estimated and shall be coordinated with mechanical contractor to ensure correct supplies to mechanical equipment): Plus	
1	6Amp continuous current rated SP MCB: Plus	Ventilation fans supply
All	A separate door mountable display and programming control unit shall be front door mounted.	Separate display unit for VSD Drives with all parameters
All	Communications module must be provided, communication links with PLC/DCS Units. The communication interface must comply with either of the following: a) Profibus-DP b) Profinet c) Industrial Ethernet d) Modbus TCP/IP Under no circumstances, shall the use of proprietary protocols be allowed: Plus	Communication module for VSD
1	Turn knob speed adjustment by means of current source (4-20mA): Plus	Manual speed control
1	Set of Stop/Start push buttons: Plus	Stop/Start Push Buttons

CONTRACT
Part C3: Scope of Works

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Witness 1

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Contractor

Witness 1

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QTY	DESCRIPTION	IDENTIFICATION
1	Mains operated timer to limit starts per hour: Plus	Limit Starts
All	Extraction fans in panel door for cooling of variable speed drives in accordance with manufacturers specifications: Plus	Fans for Soft Starter
1	Digital Running hour meter: Plus	Running Hour Meter
1	Pump sets will be operated as two duty and two standby units. A timer shall be provided for duty rotation of pump sets after a 24-hour period of time. In the event of a pump failure the duty cycle must be transferred to the next available pump set. Timer will be disabled in the event when one pump set is out of commission: Plus	Timer control in manual mode, Serie pumps
1	Duty rotation timer and flip-flop relay that will rotate duty cycle between duty pump sets and standby pump sets on a daily basis. If standby pump set is not available duty pump set will remain in operation: Plus	Duty rotation in manual mode [Series pumps and if one set if out the entire set must be bypassed].
1	Starting delay timer for sequence starting on motors: Plus	Sequence starting
9	Front panel mounted (48x48mm) digital microprocessor based local soft key programmable RTD controllers with non-volatile EEPROM based memory and 9mm high 8-character two-line display unit. A "lock" facility shall permits browsing of the monitored parameters without unauthorised changes. An isolated retransmit 4-20mA facility shall be available on the unit for SCADA system motor temperature display: Plus	All protection to be monitored for example, temperature DE, NDE, and vibration etc.
1	Manual-off-auto-remote selector switch: Plus	Selector Switch

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
1	10Amp continuous current rated SP MCB cascaded with main circuit breaker: Plus	Heater supply
1	Ammeters scaled 0-10Amp: Plus	Heater ammeter
1	Pressure delay timer to prevent pump set to trip during start-up: Plus	Start delay timer during start-up
1	Indication light that shows trip indication of pressure sensor: Plus	Pressure trip Indication light
1	Reset push button for Pressure trip condition: Plus	Pressure trip reset button
1	High performance surface mounted strobe and siren combination for pre-starting conditions warning: Plus	Pre-Start Siren & Strobe
1	Pre-Start delay timer to prevent pump sets from starting until Pre-Start Siren and Strobe finished: Plus	Start Delay timer during start-up
All	All equipment necessary for remote motor status, speed monitoring and control.	Control and monitoring
All	Interlocks which include all relays and auxiliary contacts which are necessary and required as described below:	Relays, timers and interlocks
All	Interlock timer shall be provided for duty rotation of after a 24-hour period of time [this will be confirmed as one set of pumps must operate more than the others]. Timer will be disabled in the event when motor is out of commission: Plus	Duty rotation for timer

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QTY	DESCRIPTION	IDENTIFICATION
All	Interlock with emergency stop to trip and lock out the starter, available standby pump set to become duty pump set : Plus	Emergency stop
All	Interlock motors to prevent simultaneously starting of all motors in the automatic mode of operation after a power failure: Plus	Delay for automatic starting
All	Interlock pump set in manual as well as automatic mode of operation with level control system. A predetermined low level will stop the duty motor: Plus	Level protection
All	Interlock motor sets as four duties and zero standby unit in manual as well as automatic mode of operation: Plus	Interlocks duty and standby.
All	Extraction fans in panel door for cooling of soft starter in accordance with manufacturers specifications. If the Fans do not work in manual as well as automatic mode of operation, the motor must interlocked not be able to start. Unhealthy status will display on indication: Plus	Extraction fan interlocks
All	Interlock motor with pressure sensors in common delivery and common suction pump line in automatic mode of operation. Predetermined low pressure will stop the duty motor sets and predetermined high pressure will stop the duty motor sets. If a predetermined pressure is not obtained the duty motor sets, will stop and will ramp down. During start up and shut down this function must be bypassed for a predetermined period. Motor sets will only be able to start once pressure trip has manually been reset: Plus	Pressure sensors
All	Interlock high lift pump sets [train] with strobe and siren in automatic and manual mode of operation. Siren and	Pre-start siren and strobe

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Contractor

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Witness 2



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QTY	DESCRIPTION	IDENTIFICATION
	strobe will sound for predetermined time. Automatic and manual mode of operation will be that the siren and strobe will first be finished, and normal starting procedure will occur: Plus	
All	All RTD sensors shall be interlocked in manual and in automatic mode of operation to protect motors.	RTD Protection
All	Extraction fans in panel door for cooling of variable frequency drive starter in accordance with manufacturers specifications. If the Fans do not work in manual as well as automatic mode of operation, the motor must interlocked not be able to start. Unhealthy status will be displayed on indication: Plus	Extraction fan interlocks
All	Interlock motor with no-flow sensor in suction pipeline. During start up this function must be bypassed for a predetermined period of time: Plus	No-flow sensor
All	Interlock high lift pump sets [train] with strobe and siren in automatic and manual mode of operation. Siren and strobe will sound for predetermined time. Automatic and manual mode of operation will be that the siren and strobe will first be finished, and normal starting procedure will occur: Plus	Pre-start siren and strobe
All	Interlock with common delivery pipeline actuator in automatic mode of operation to only open once an predetermined pressure has been obtained by the pressure sensor. The predetermined pressure shall be interlocked with the opening of the actuator: Plus	Actuator interlocks
All	Interlock pump sets as described under operation of plant [PSEPLC-15]	

CONTRACT
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C3.4.3

Employer

Witness 1

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Contractor

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RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSEMCC-8.C MODIFICATIONS AND ADDITIONS TO EXISTING MAIN MOTOR CONTROL CENTRE INCOMER NO.1 AND NO.2

Type: These specification shall be considered as minimum design requirement in terms of the Contractor's Tender offer. The Electrical and Electronic Contractor(s) shall coordinate with the Mechanical Contractor to ensure sufficient allowance is made in their tender offer to provide a fit for purpose unit/system. The existing Masterpact Merlin Gerin NW25 H1 air-circuit breakers and associated equipment in each incomer and bus section shall be removed and replaced with new motorised breakers.

Careful planning, methodologies and shall be necessary to limit the supply outages to a minimum to prevent plant operation disruptions as far as possible. The contractor shall submit a detail method statement of the shutdown and detailed program to the Engineer for approval before any work may commence. It is the responsibility of the contractor to submit the method statement at the start of the contract. The Contractor will only be allowed to shut down the plant from 20:00, the replacing of the existing breakers shall only occur after hours, and the contractor shall plan as such.

Careful planning, methodologies shall also be required for electrical equipment transport and entry to all the buildings.

The floor standing change over a shall be of the free-standing floor mounted type with a floor minimum IP rating of 42 (insect proofed enclosure). The standing change over a shall be constructed with a minimum of **2mm mild steel** which will rest on a **mild steel rigid channel** and shall be bolted down in position by means of M16 high tensile steel bolts grouted into the concrete floor, the bolts shall be inside the board.

The panel door shall be provided with a locking system suitable for padlocking. The locking system shall consist of a **mild steel** 3-way locking mechanism locking the door at the top, middle and bottom. The unit doors shall be capable of being opened at least 110 degrees.

CONTRACT
Part C3: Scope of Works

A335
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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The board shall be provided with readily removable, sectionalized, rigidly supported **unpainted 3CR12** cable end support gland plates along the entire length of the board and at least 230 mm above floor level.

Sufficient provision for ventilation and heat dissipation as per the equipment ratings and manufacturers requirements shall be allowed for. The contractor shall prove to the Engineer by means of Anemometer or Differential that the requirements and manufacturer's requirements are met.

Screwed-on engraved labels in English shall be provided below all switchgear and equipment on and in the panels, to facilitate identification. All unpainted parts shall be plated for corrosion resistance.

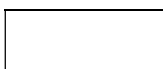
- Supply:** Existing
Colour: Painted Light Orange – B26 (SANS 1091:2012) external.
Fault Level: 65kA.
Sectioning: Multi-section, Form 3b or Form 4 to SANS IEC 60439.
Future: N/A.
Cable Entry: Incoming and Outgoing – Bottom. MCC gland plates shall be 3CR12 stainless steel unpainted.
Base: Single 100x50x6mm thick channel iron base with mitred corners and cross-bracing between every 2nd tier.

QTY	DESCRIPTION	IDENTIFICATION
Two	Panels comprising the following	Incomer No.1 & No.2
1	2500Amp continuous current rated TP Air Circuit Breaker. The motor circuit breaker shall be IEC 60947 certified and coordination capabilities complete spreaders, door interlock and all accessories equal or similar to MasterPact MTZ. Control unit with adjustable overload and short circuit protection with time discrimination MicroLogic 5.0 X minimum unit,	Incomer Main Breaker from Transformer No.1 and No.2

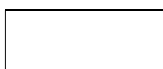
CONTRACT
Part C3: Scope of Works

A336
Variations & Additions to Standard & Particular Specifications

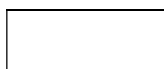
C3.4.3



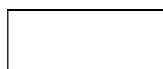
Employer



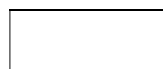
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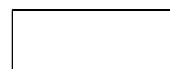
Witness 2



Contractor



Witness 1



Witness 2

RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	<p>Electrical operating mechanism for remote closing of circuit breaker, 231V AC operation,</p> <p>The Accessories shall come complete with the following items:</p> <ul style="list-style-type: none"> • Fixed version connection kits • Spreaders • Connection Adapters • Interphase barriers • Arc cutte screen • Mounting Brackets • Carriage switch • Combined connected / closed contacts • On/off indication contacts • Ready to close contact • Mechanical operation counter • Programmable contacts • Fault-trip indication contact • Automatic reset option • Electric reset button • Diagnostic and communicating voltage release / undervoltage • Opening Voltage Release / undervoltage • Electric Closing Pushbuttons • Gear motor • Remote on / off • Electric Motor and Lithium Battery • Door interlock, • Safety shutters, off locking, on / off position interlocking, • Key interlock 	

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	The Breakers shall be interlocked Electrically and mechanically interlocked not to parallel the system. Plus (Estimated and shall be coordinated with mechanical contractor to ensure correct supplies to mechanical equipment): Plus	
Sum	The Contractor shall allow for the complete removal of the existing Schneider Masterpact Merlin Gerin NW25 H1 air-circuit breakers, back plane, front door and associated equipment.	Complete Removal
4	3000Amp tint copper bus bars [appearance shall be aluminium], suitable clamps shall be used, and no drilling shall be allowed on the busbars [cubic system shall be used]: Plus	3 Phase + N
1	2500Amp tint copper bus bars [appearance shall be aluminium], suitable clamps shall be used, and no drilling shall be allowed on the busbars [cubic system shall be used]: Plus	Earth
4	315Amp continuous current rated HRC fuse holders and fused links: Plus	Surge arrestors connection fuses
1	Three Phase combined class 1&2 surge arrestor unit connection type 2 as per SANS 10142-1 2009 equal or similar to DEHNgard DV M TT 255 with remote indicator panel & remote signalling contacts connected to the SCADA: Plus	Surge arrestor plus signals
3	2Amp continuous current rated HRC fuse holders and fused links: Plus	Indicator Lamp Protection

CONTRACT
Part C3: Scope of Works

A338
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
3	Robust LED indicator lamps connected load side of the circuit breaker.	Indicators for 3 Phase (Red, White and Blue Indications)
1	Front panel mounted "chicken switch" socket for switching of circuit breaker from a safe distance [Tender shall select all components to preferred manufacturers]	Chicken switch
1	Relay for under voltages, phase sequence, and phase loss in three phase Plus	Protection relay
1	<p>Front panel mounted LCD digital display supply network analyser comprising of combined voltage, current, maximum demand power measurement and power factor correction measurement complete with Communications module must be provided, communication links with PLC/DCS Units. The communication interface must comply with either of the following:</p> <ul style="list-style-type: none"> a) Profibus-DP b) Profinet c) Industrial Ethernet d) Modbus TCP/IP <p>Under no circumstances, shall the use of proprietary protocols be allowed. The network analyser shall equal or similar to Schneider Electric P8000 be complete with CT's and HRC Fuses: Plus</p>	Accessories For Air Circuit Breaker
All	Relays, auxiliary contacts, indicating lights, wiring and reset buttons necessary for the following	Interlocks
	<ul style="list-style-type: none"> Mechanical and electrical interlocks that all busbars fed from Transformer No 1 	

CONTRACT
Part C3: Scope of Works

A339
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	<ul style="list-style-type: none"> Mechanical and electrical interlocks that all busbars fed from Transformer No 2 	
	<ul style="list-style-type: none"> Mechanical and electrical interlocks that Busbar 1 fed from Transformer No 1; Busbar 2 fed from Transformer No 2 	
	<ul style="list-style-type: none"> Mechanical and electrical interlocks that prevent paralleling the system. 	
	<ul style="list-style-type: none"> Mechanical and electrical interlocks that prevent Eskom / Generator to be on at the same time. 	
One	Panels comprising the following	Busbar Section
1	<p>2500Amp continuous current rated TP Air Circuit Breaker. The motor circuit breaker shall be IEC 60947 certified and coordination capabilities complete spreaders, door interlock and all accessories. Control unit with adjustable overload and short circuit protection with time discrimination micrologic unit,</p> <p>Electrical operating mechanism for remote closing of circuit breaker, 231V AC operation,</p> <p>The Accessories shall come complete with the following items:</p> <ul style="list-style-type: none"> Fixed version connection kits Spreaders Connection Adapters Interphase barriers Arc cut screen Mounting Brackets Carriage switch Combined connected / closed contacts On/off indication contacts 	Bus Section

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	<ul style="list-style-type: none"> • Ready to close contact • Mechanical operation counter • Programmable contacts • Fault-trip indication contact • Automatic reset option • Electric reset button • Diagnostic and communicating voltage release / undervoltage • Opening Voltage Release / undervoltage • Electric Closing Pushbuttons • Gear motor • Remote on / off • Electric Motor and Lithium Battery • Door interlock, • Safety shutters, off locking, on / off position interlocking, • Key interlock <p>The Breakers shall be interlocked Electrically and mechanically interlocked not to parallel the system.</p> <p>Plus (Estimated and shall be coordinated with mechanical contractor to ensure correct supplies to mechanical equipment): Plus</p>	
Sum	The Contractor shall allow for the complete removal of the existing Schneider Masterpact Merlin Gerin NW25 H1 air-circuit breakers, back plane, front door and associated equipment.	Complete Removal
Sum	The Contractor shall allow for the complete removal of the existing Schneider Masterpact Merlin Gerin NW25 H1 air-	Complete Removal

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	circuit breakers, back plane, front door and associated equipment.	
4	3000Amp tint copper bus bars [appearance shall be aluminium], suitable clamps shall be used, and no drilling shall be allowed on the busbars [cubic system shall be used]: Plus	3 Phase + N
1	2500Amp tint copper bus bars [appearance shall be aluminium], suitable clamps shall be used, and no drilling shall be allowed on the busbars [cubic system shall be used]: Plus	Earth
6	2Amp continuous current rated HRC fuse holders and fused links: Plus	Indicator Lamp Protection Left and Right Busbars
Set	2500 / 1Amp Class 0.5 Current Transformers	Current Transformers
3	Robust LED indicator lamps connected load side of the circuit breaker.	Indicators for 3 Phase (Red, White and Blue Indications) Left and Right Busbars
1	Front panel mounted "chicken switch" socket for switching of circuit breaker from a safe distance [Tender shall select all components to preferred manufacturers]	Chicken switch
All	Relays, auxiliary contacts, indicating lights, wiring and reset buttons necessary for the following	Interlocks
	<ul style="list-style-type: none"> Mechanical and electrical interlocks that all busbars fed from Transformer No 1 	

CONTRACT
Part C3: Scope of Works

A342
Variations & Additions to Standard & Particular Specifications C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	<ul style="list-style-type: none">Mechanical and electrical interlocks that all busbars fed from Transformer No 2	
	<ul style="list-style-type: none">Mechanical and electrical interlocks that Busbar 1 fed from Transformer No 1; Busbar 2 fed from Transformer No 2	
	<ul style="list-style-type: none">Mechanical and electrical interlocks that prevent paralleling the system.	
	<ul style="list-style-type: none">Mechanical and electrical interlocks that prevent Eskom / Generator to be on at the same time.	
	<ul style="list-style-type: none">Adjustable timer for load	
	<ul style="list-style-type: none">All relays and functions to monitor both Incomer No.1 & No.2	

PSEMCC-8.D MODIFICATIONS AND ADDITIONS TO EXISTING MAIN MOTOR CONTROL CENTRE ADDITION WITH A STANDBY GENERATOR INCOMER PANEL

Type: These specification shall be considered as minimum design requirement in terms of the Contractor's Tender offer. The Electrical and Electronic Contractor(s) shall coordinate with the Mechanical Contractor to ensure sufficient allowance is made in their tender offer to provide a fit for purpose unit/system.

Careful planning, methodologies and shall be necessary to limit the supply outages to a minimum to prevent plant operation disruptions as far as possible. The contractor shall submit a detail method statement of the shutdown and detailed program to the Engineer for approval before any work may commence. It is the responsibility of the contractor to submit the method statement at the start of the contract. The Contractor will only be allowed to shut down the plant from 20:00, the replacing and addition of the existing breakers shall only occur after hours, and the contractor shall plan as such.

Careful planning, methodologies shall also be required for electrical equipment transport and entry to all the buildings.

CONTRACT
Part C3: Scope of Works

A343
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

The floor standing change over a shall be of the free-standing floor mounted type with a floor minimum IP rating of 42 (insect proofed enclosure). The standing change over a shall be constructed with a minimum of **2mm mild steel** which will rest on a **mild steel rigid channel** and shall be bolted down in position by means of M16 high tensile steel bolts grouted into the concrete floor, the bolts shall be inside the board.

The panel door shall be provided with a locking system suitable for padlocking. The locking system shall consist of a **mild steel** 3-way locking mechanism locking the door at the top, middle and bottom. The unit doors shall be capable of being opened at least 110 degrees.

The board shall be provided with readily removable, sectionalized, rigidly supported **unpainted 3CR12** cable end support gland plates along the entire length of the board and at least 230 mm above floor level.

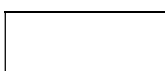
Sufficient provision for ventilation and heat dissipation as per the equipment ratings and manufacturers requirements shall be allowed for. The contractor shall prove to the Engineer by means of Anemometer or Differential that the requirements and manufacturer's requirements are met.

Screwed-on engraved labels in English shall be provided below all switchgear and equipment on and in the panels, to facilitate identification. All unpainted parts shall be plated for corrosion resistance.

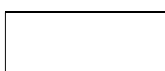
- Supply:** 8 x 185mm² 4C Cu PVC SWA PVC cables in parallel plus a 8 x 70mm² Kwena copper cable from Standby Generator.
- Colour:** Painted Light Orange – B26 (SANS 1091:2012) external.
- Fault Level:** 65kA.
- Sectioning:** Multi-section, Form 3b or Form 4 to SANS IEC 60439.
- Future:** N/A.
- Cable Entry:** Incoming and Outgoing – Bottom. MCC gland plates shall be 3CR12 stainless steel unpainted.
- Base:** Single 100x50x6mm thick channel iron base with mitred corners and cross-bracing between every 2nd tier.

CONTRACT
Part C3: Scope of Works

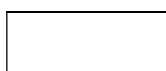
A344
Variations & Additions to Standard & Particular Specifications C3.4.3



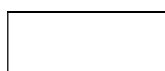
Employer



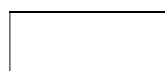
Witness 1



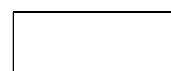
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
One	Panels comprising the following	Generator Incomer
1	<p>2500Amp continuous current rated TP Air Circuit Breaker with the motor circuit breaker shall be IEC 60947 certified and coordination capabilities complete spreaders, door interlock and all accessories equal or similar to MasterPact MTZ. Control unit with adjustable overload and short circuit protection with time discrimination MicroLogic 5.0 X minimum unit,</p> <p>Electrical operating mechanism for remote closing of circuit breaker, 231V AC operation,</p> <p>The Accessories shall come complete with the following items:</p> <ul style="list-style-type: none"> • Fixed version connection kits • Spreaders • Connection Adapters • Interphase barriers • Arc cut screen • Mounting Brackets • Carriage switch • Combined connected / closed contacts • On/off indication contacts • Ready to close contact • Mechanical operation counter • Programmable contacts • Fault-trip indication contact • Automatic reset option • Electric reset button • Diagnostic and communicating voltage release / undervoltage 	Income from standby generator

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	<ul style="list-style-type: none"> • Opening Voltage Release / undervoltage • Electric Closing Pushbuttons • Gear motor • Remote on / off • Electric Motor and Lithium Battery • Door interlock, • Safety shutters, off locking, on / off position interlocking, • Key interlock <p>The Breakers shall be interlocked Electrically and mechanically interlocked not to parallel the system.</p> <p>Plus (Estimated and shall be coordinated with mechanical contractor to ensure correct supplies to mechanical equipment): Plus</p>	
1	<p>Front panel mounted LCD digital display supply network analyser comprising of combined voltage, current, maximum demand power measurement and power factor correction measurement complete with Communications module must be provided, communication links with PLC/DCS Units. The communication interface must comply with either of the following:</p> <ul style="list-style-type: none"> e) Profibus-DP f) Profinet g) Industrial Ethernet h) Modbus TCP/IP <p>Under no circumstances, shall the use of proprietary protocols be allowed. The network analyser shall equal or similar to Schneider Electric P8000 be complete with CT's and HRC Fuses: Plus</p>	Accessories For Air Circuit Breaker

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

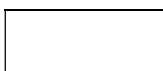
BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

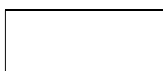
QTY	DESCRIPTION	IDENTIFICATION
1	<p>Front panel mounted LCD digital display Generator Change over Controller which shall have the capability to detect from two sources [Incomer No.1 & No.2]. The automatic or manual switching of the load from the main line to a stand-by or emergency secondary and vice versa. The changeover shall have two outputs for the “automatic” and/or “manual” control for motorised circuit breakers. The unit shall come complete with communications module must be provided, communication links with PLC/DCS Units. The communication interface must comply with either of the following:</p> <ul style="list-style-type: none"> a) Profibus-DP b) Profinet c) Industrial Ethernet d) Modbus TCP/IP <p>Under no circumstances, shall the use of proprietary protocols be allowed. The changeover shall be equal or similar to Levato ATL 800 complete with CT's and HRC Fuses and all connections between Incomer No.1 and No.2: Plus</p>	
All	The Change-over shall be equipped with communication, software, timers, relays and contacts. All available data shall be communicated on the PLC and SCADA network communication platform with remote control capabilities.	Timer / Relays and contacts
1	2500Amp tint copper bus bars [appearance shall be aluminium], suitable clamps shall be used, and no drilling shall be allowed on the busbars [cubic system shall be used]: Plus	Earth

CONTRACT
Part C3: Scope of Works

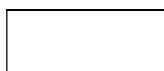
A347
Variations & Additions to Standard & Particular Specifications



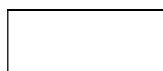
Employer



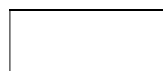
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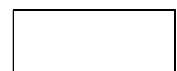
Witness 2



Contractor



Witness 1



Witness 2

RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
4	3000Amp tint copper bus bars [appearance shall be aluminium], suitable clamps shall be used, and no drilling shall be allowed on the busbars [cubic system shall be used]: Plus	3 Phase + N connected to the existing MCC panel. Contractor to allow for all modifications and site work to complete this installation.
4	315Amp continuous current rated HRC fuse holders and fused links: Plus	Surge arrestors connection fuses
1	Three Phase combined class 1&2 surge arrestor unit connection type 2 as per SANS 10142-1 2009 equal or similar to DEHNgard DV M TT 255 with remote indicator panel & remote signalling contacts connected to the SCADA: Plus	Surge arrestor plus signals
3	2Amp continuous current rated HRC fuse holders and fused links: Plus	Indicator Lamp Protection
3	Robust LED indicator lamps connected load side of the circuit breaker.	Indicators for 3 Phase (Red, White and Blue Indications)
1	Front panel mounted "chicken switch" socket for switching of circuit breaker from a safe distance [Tender shall select all components to preferred manufacturers]	Chicken switch
1	Relay for under voltages, phase sequence, phase failure and phase loss in three phase equal or similar to Schneider Electric Relays: Plus	Protection relay
1	Selector Switch Manual / Automatic / Off selector Switch	Manual / Automatic / Off selector

CONTRACT
Part C3: Scope of Works

A348
Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
1	Schneider Electric Digital DIN Rail Time Switch. The timer shall be used to start the generator during high consumption on the Eskom line and keep the generator running for adjustable period of time.	Only during manual mode of operation
Set	2500 / 1Amp Class 0.5 Current Transformers	Current Transformers
All	Relays, auxiliary contacts, indicating lights, wiring and reset buttons necessary for the following	Interlocks
	<ul style="list-style-type: none"> Mechanical and electrical interlocks that all busbars fed from Transformer No 1 	
	<ul style="list-style-type: none"> Mechanical and electrical interlocks that all busbars fed from Transformer No 2 	
	<ul style="list-style-type: none"> Mechanical and electrical interlocks that Busbar 1 fed from Transformer No 1; Busbar 2 fed from Transformer No 2 	
	<ul style="list-style-type: none"> Mechanical and electrical interlocks that prevent paralleling the system. 	
	<ul style="list-style-type: none"> Mechanical and electrical interlocks that prevent Eskom / Generator to be on at the same time. 	
	<ul style="list-style-type: none"> PLC Timer in Automatic mode and digital timer in manual mode of operation 	
One	Panel comprising the following: (Panel door shall be purple powder coated and situated at Generator)	PLC Equipment as specified under PLC descriptions
One	Panel comprising the following: (Panel door shall be purple powder coated and situated at Generator)	UPS for PLC Equipment as specified under PLC

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSEPLC PROGRAMMABLE LOGIC CONTROLLERS

PSEPLC-1 SCOPE

Programmable Logic Controllers shall be provided in Motor control centres (MCC) and distribution boards (DB) as specified in the following locations:

No.	DESCRIPTION	LOCATION
A	Modifications and Additions to Existing Main MCC PLC	RGS Filter, CW Sump & Pump Hall Building
B	Telemetry Outstation Control Room PLC	Bospoort To Vaalkop / Bospoort North HLPL Link Chamber
C	Telemetry Outstation Control Room PLC	Bospoort Water Treatment Works
D	Standby Generator PLC	Standby Generator PLC

A detailed C&I design must be submitted by the Tenderer that includes the following returnable documentation during detail design.

- Loop diagrams
- Hoop-up diagram
- Logic diagrams
- Cable schedules
- O&M Manuals
- Instrument Index
- Cable layouts
- Piping and instrumentation diagrams
- C&I data sheets and technical schedules
- Control system philosophy
- Control system network layout
- RTU, instrumentation and communication specifications and technical details

CONTRACT
Part C3: Scope of Works

A350
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSEPLC-6.A MODIFICATIONS AND ADDITIONS TO EXISTING MAIN MCC PLC

Supplied and installed under this contract shall be additional I/O cards for the Existing Quantum PLC.

Type: CPU and I/O modules

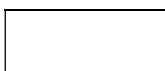
Protocol: Fibre ring network with Ethernet

Equipment will be the following:

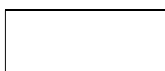
QTY	DESCRIPTION	IDENTIFICATION
One	Panel comprising the following: (Panel door shall be purple powder coated)	PLC
1	6Amp continuous current rated SP door interlocked protection MCCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Main Circuit Breaker PLC
1	230V/24DC stabilized power supply for 24V DC inputs to PLC input modules. (Power supply shall have adequate capacity for the application) (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Power Supply
1	Industrial 100/1000Mb managed switch module to suit the application, complete with at least 8 x fiber optic ports, PLC, switch shall be from the same manufacturer: Plus	Communications with Fiber Optic cable
Sum	The Contractor shall allow for the complete removal of the existing Schneider quantum PLC, I/O, surge arrestors, UPS, industrial managed switch, back plane, termination system in the existing Main MCC at Bospoort WTW. The new backplane will be built and tested off site while the	Existing equipment

CONTRACT
Part C3: Scope of Works

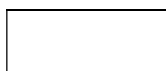
A351
Variations & Additions to Standard & Particular Specifications
C3.4.3



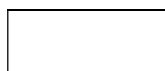
Employer



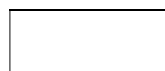
Witness 1



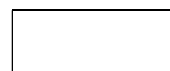
Witness 2



Contractor



Witness 1



Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
1	<p>installation and commission will occur on site [Bospoort Water Treatment Plant]. The contractor will backup and download the existing PLC program at Bospoort WTW and convert the existing PLC program and deploy it into the new PLC. Complete re-commissioning of the old program must be done after the conversion. All required conversion software must be supplied by the contractor.</p> <p>The existing Input and Outputs are as follows:</p> <ul style="list-style-type: none"> a) Digital Input – 128 b) Digital Output – 16 c) Analogue Input – 24 d) Analogue Output – 8 e) RTD's – 32 <p>The contractor shall allow all necessary work on site to complete and integrate the new / old PLC on site.</p> <p>PLC processor unit complete with CPU base plate, bus terminators, Ethernet communication with I/O modules that will satisfy the application with at least the following specifications, shall be minimum M580 range from Schneider Electric:</p> <ul style="list-style-type: none"> 1. Program (MB) - 64 MB integrated minimum 2. Data storage (GB) – 4GB minimum 3. I/O Multi-rack configuration capability, 4. The minimum communication service: bandwidth management, Ethernet TCP/IP Data Editor, Ethernet TCP/IP Modbus TCP messaging, Ethernet TCP/IP Rack Viewer, Ethernet TCP/IP SNMP network administrator, Ethernet TCP/IP Network management (NMT) CANopen Process Data Object (PDO) 	PLC CPU

CONTRACT
Part C3: Scope of Works

A352
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	<p>CANopen Service Data Object (SDO) CANopen Special functions (SYNC, EMCY, TIME) CANopen,</p> <p>5. Ethernet port,</p> <p>6. Maximum number of discrete I/O channels shall be capable of 35% spare</p> <p>7. Maximum number of analog shall be capable of 35% spare</p> <p>8. Maximum number of analog I/O shall be capable of 35% spare</p> <p>9. Memory description: 64 MB integrated internal RAM</p> <p>10. Shall comply with the following standards: IEC 61131-2 UL 508 EN 61131-2 CSA C22.2 No 142 CSA C22.2 No 213 Class I Division 2</p> <p>Provide 35% Spare CPU capacity for plant (Estimated and shall be confirmed by contractor and all calculations shall be supplied to the Engineer for approval): Plus</p>	
All	High performance signal modules for digital and analog I/O plus provide 30% Spare I/O capacity for plant equal or similar to Schneider Electric: Plus	Input and Output modules
All	Interposing relays for surge protection of field statuses to PLC: Plus	Surge Protection
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	All

CONTRACT
Part C3: Scope of Works

A353
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	All signals shall be protected with digital and analog Surge arrestor modules equal or similar to Blitzductor from DEHNguard. All Digital and Analogue signals leaving the main structure and are outside the main lighting and earthing protection must be protected via signal arrestors similar and equal to Blitzconductor from Dehnguard. For tender purposes the tenderer shall allow for all I/O to protected as detailed below: Plus	Surge Protection for all signals
One	Panel comprising the following: [Existing, Contractor to allow to remove the existing UPS equipment and replace with new] (Panel door shall be purple powder coated)	UPS supply
1	16Amp sized continuous current rated SP + N door interlocked protection MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Main Circuit Breaker UPS
4	125Amp continuous current rated HRC fuse holders and fused links: Plus	Surge arrestors connection fuses
1	Single Phase Class 2 Surge protection unit connection type 2 as per SANS 10142-1 equal or similar to DEHNguard: Plus	Surge arrestor plus signals
1	Selector switch for normal/UPS power selection: Plus	Maintenance purposes
1	A UPS that will provide battery standby power for at least three hours during a power failure must be supplied and installed under this contract: Plus	UPS with 3-hour back-up
All	Relays and contactors for automatic transfer to UPS power once the UPS power is restored: Plus	Automatic change over

CONTRACT
Part C3: Scope of Works

A354
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	All
All	UPS monitoring functions as specified: Plus	
1	6Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	PLC supply
1	6Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	HMI supply
1	6Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Telemetry supply
1	6Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Generator Change Over supply
One	Panel comprising the following: (Panel door shall be purple powder coated) [Existing, Contractor to allow to remove the existing HMI equipment and replace with new]	HMI
1	6Amp continuous current rated SP door interlocked protection MCB (Estimated and shall be confirmed by	Main Circuit Breaker PLC

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	contractor and all calculations shall be supplied to Engineer for approval): Plus	
1	230V/24DC stabilized power supply for 24V DC inputs to PLC input modules. (Power supply shall have adequate capacity for the application) (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Power Supply
1	Ethernet field bus connections: Plus	Connections
1	Human machine interface with 22" Inch advanced touchscreen panel HD LCD colour touch screen with sufficient flash memory, soft function and static function keys and Ethernet communication port. Software as may be required must be provided: Plus	HMI
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	Wiring ducts
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Software programming for indication of the following monitoring functions on the HMI display and all I/O as indicated in schedule of supervisory and control I/O's underneath. All mimics will be supplied to the Engineer for approval.	Programming
All	1. Alarm history page: Plus	Alarm history
All	2. Alarm setup page: Plus	Setup page

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	3. Graphic displays shall be used for variable parameter indications: Plus	Displays
All	4. Animated mimic displays shall be used for equipment displays: Plus	Displays
All	5. Password protected settings: Plus	Protection
All	6. All motors, blowers and pumps information protected settings, control and monitoring functions: Plus	Displays
All	7. All Instrumentation settings, monitoring and control functions: Plus	Displays
All	8. All valves, actuators and control valves open / close / trip conditions settings, monitoring and control functions: Plus	Displays
All	9. All monitoring and control functions as indicated schedule of supervisory and control I/O's underneath: Plus	Displays

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSEPLC-6.A SCHEDULE OF SUPERVISORY AND CONTROL I/O'S FOR MODIFICATIONS AND ADDITIONS TO EXISTING MAIN MCC PLC

DESCRIPTION	RTD IN	ANALOG IN	ANALOG OUT	24V DC IN	24V DC OUT	VOLT FREE OUT	NETWORK LINK		
							SCADA	HMI	PLANT
High Lift Pump No.1 – No.4 healthy				4			4	4	4
High Lift Pump No.1 – No.4 trip					4		4	4	4
High Lift Pump No.1 – No.4 run/stop				4	4		8	8	8
High Lift Pump No.1 – No.4 E-Stop				4			4	4	4
High Lift Pump No.1 – No.4 Manual / Auto / Off				12			12	12	12
High Lift Pump No.1 – No.4 DE bearings motor	4		4		3		9	9	9
High Lift Pump No.1 – No.4 NDE bearings motor	4		4		3		9	9	9
High Lift Pump No.1 – No.4 Winding temperatures motor	12		12		12		36	36	36
High Lift Pump No.1 – No.4 DE bearings	4		4		4		12	12	12
High Lift Pump No.1 – No.4 NDE bearings	4		4		4		12	12	12
High Lift Pump No.1 – No.8 Pressure		8	8		8		24	24	24
High Lift Pump Flow Meter		1	1		1		3	3	3
High Lift Pump No.1 – No.4 No-Flow Meter				4	4		8	8	8
Existing Bospoort Reservoirs [MW]		2	2		2		6	6	6
New Bospoort Reservoirs		2	2		2		6	6	6
Delivery Pump Set No.1 – No.2 Actuator healthy				2			2	2	2
Delivery Pump Set No.1 – No.2 Actuator trip				2			2	2	2
Delivery Pump Set No.1 – No.2 Actuator open / close				4	4		8	8	8
Delivery Pump Set No.1 – No.2 Actuator Remote / Manual				4	4		8	8	8

CONTRACT
Part C3: Scope of Works

A358
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

DESCRIPTION	RTD IN	ANALOG IN	ANALOG OUT	24V DC IN	24V DC OUT	VOLT FREE OUT	NETWORK LINK		
							SCADA	HMI	PLANT
Generator healthy				1					
Generator trip				1					
Generator run/stop				1	1				
Generator E-Stop				1					
Generator bulk fuel tank level Analogue Monitor / Alarm / Trip at generator and bulk fuel tank		2		2	2				
Generator Engine and Alternator temperature	2						2	2	2
Generator Engine and Alternator [All windings] temperature Trip / Alarm	6			2	2		10	10	10
Generator Engine water level Alarm / Trip				1	1		2	2	2
Generator Engine Oil Level Alarm / Trip				1	1		2	2	2
Generator Alternator Charging Operational [display charging]		1		1	1		3	3	3
Generator Engine Temperature	1						1	1	1
Generator Normal/Fail				2			2	2	2
Generator Low Battery				1	1		2	2	2
Generator DC voltage below 12 Volt				1	1		2	2	2
Generator Overload				1	1		1	1	1
Generator circulation Pump Run / Stop / Healthy Statuses				3	3		6	6	6
All Generator information shall be displayed on HMI in Main MCC	All	All	All	All	All	All	All	All	All
Power Analyzer values to be captured in PLC and displayed on plant and SCADA, HMI and distributed through plant and linked to other power analyzers– Apparent Power, Power, Reactive	All	All	All	All	All	All	All	All	All

CONTRACT
Part C3: Scope of Works

A359
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

DESCRIPTION	RTD IN	ANALOG IN	ANALOG OUT	24V DC IN	24V DC OUT	VOLT FREE OUT	NETWORK LINK		
							SCADA	HMI	PLANT
Power, line and phase Voltages, Line and phase Currents, Power Factor, all billing information shall be displayed on both incomers [No.1 & No.2] and generator									
Contractor to allow for additional programming for configuring plant all signals from Bospoort to Vaalkop / Bospoort North HLPL link chamber, Existing Bospoort reservoir, new Bospoort reservoir and Bospoort north to Thlabane communication towers	All	All	All	All	All	All	All	All	All
Contractor to allow for additional programming for configuring plant to original status & Spare	8	4	4	4	4	4	28	28	28

PSEPLC-6.B TELEMETRY OUSTATION CONTROL ROOM PLC [BOSPOORT TO VAALKOP / BOSPOORT NORTH HLPL LINK CHAMBER]

The Bospoort to Vaalkop / Bospoort North HLPL Link Chamber PLC, supplied and installed under this contract, shall communicate via telemetry to the Bospoort Water treatment Works.

The PLC equipment shall be installed in a separate panel inside the control room.

Type: CPU and I/O modules

Protocol: Ethernet

Equipment will be the following:

CONTRACT

Part C3: Scope of Works

A360

Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
One	Panel comprising the following: (Panel door shall be purple powder coated)	UPS supply
1	10Amp sized continuous current rated SP door interlocked protection MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Main Circuit Breaker UPS
2	125Amp continuous current rated HRC fuse holders and fused links: Plus	Surge arrestors connection fuses
1	Single Phase Class 2 Surge protection unit connection type 2 as per SANS 10142-1 equal or similar to DEHNgard. DG M TT 275: Plus	Surge arrestor plus signals
1	Selector switch for normal/UPS power selection: Plus	Maintenance purposes
1	A UPS that will provide battery standby power for at least three hours during a power failure must be supplied and installed under this contract: Plus	UPS with 3-hour back-up
All	Relays and contactors for automatic transfer to UPS power once the UPS power is restored: Plus	Automatic change over
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	All
All	UPS monitoring functions as specified: Plus	

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
1	10Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	PLC supply
1	10Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	HMI supply
1	10Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Telemetry supply
1	10Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Alarm system supply
One	Panel comprising the following: (Panel door shall be purple powder coated)	PLC
1	6Amp continuous current rated SP door interlocked protection MCCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Main Circuit Breaker PLC
1	230V/24DC stabilized power supply for 24V DC inputs to PLC input modules. (Power supply shall have adequate capacity for the application) (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Power Supply
1	PLC processor unit complete with CPU, base plate, bus terminators, Ethernet communication with I/O modules that will satisfy the application with at least the following specifications:	PLC CPU

CONTRACT
Part C3: Scope of Works

A362
Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	1. 1024 I/O Multi-rack configuration capability, 2. 256 I/O multi-rack configuration capability, 3. The minimum communication service: bandwidth management, Ethernet TCP/IP Data Editor, Ethernet TCP/IP Modbus TCP messaging, Ethernet TCP/IP Rack Viewer, Ethernet TCP/IP SNMP network administrator, Ethernet TCP/IP Network management (NMT) CANopen Process Data Object (PDO) CANopen Service Data Object (SDO) CANopen Special functions (SYNC, EMCY, TIME) CANopen, 4. Ethernet port, 5. Memory description: 4096 kB internal RAM, 256 kB internal RAM for data, 3584 kB internal RAM for program constants and symbols and shall be supplied with additional memory, and 6. Shall comply with the following standards: IEC 61131-2 UL 508 EN 61131-2 CSA C22.2 No 142 CSA C22.2 No 213 Class I Division 2 Equal and similar to BMXP3420302 M340 from Schneider Electric. Provide 35% Spare CPU capacity for plant (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	
All	High performance signal modules for digital and analog I/O plus provide 10% Spare I/O capacity for plant: Plus	Input and Output modules
All	Interposing relays for surge protection of field statuses to PLC: Plus	Surge Protection

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	All
All	All signals shall be protected with digital and analog Surge arrestor modules equal or similar to Blitzductor from DEHNguard.	Surge Protection for all signals
One	Panel comprising the following: (Panel door shall be purple powder coated)	HMI
1	6Amp continuous current rated SP door interlocked protection MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Main Circuit Breaker PLC
1	230V/24DC stabilized power supply for 24V DC inputs to PLC input modules. (Power supply shall have adequate capacity for the application) (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Power Supply
1	Ethernet field bus connections: Plus	Connections
1	Human machine interface with 7.5" Inch advanced touchscreen panel 320 x 240 pixels LCD colour touch screen with sufficient flash memory, soft function and static function keys and Ethernet communication port. Software as may be required must be provided: Plus	HMI

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	Wiring ducts
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Software programming for indication of the following monitoring functions on the HMI display and all I/O as indicated in schedule of supervisory and control I/O's underneath. All mimics will be supplied to the Engineer for approval.	Programing
All	1. Alarm history page: Plus	Alarm history
All	2. Alarm setup page: Plus	Setup page
All	3. Graphic displays shall be used for variable parameter indications: Plus	Displays
All	4. Animated mimic displays shall be used for equipment displays: Plus	Displays
All	5. Password protected settings: Plus	Protection
All	6. All motors, blowers and pumps information protected settings, control and monitoring functions: Plus	Displays
All	7. All Instrumentation settings, monitoring and control functions: Plus	Displays
All	8. All valves, actuators and control valves open / close / trip conditions settings, monitoring and control functions: Plus	Displays

CONTRACT
Part C3: Scope of Works

A365
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	9. All monitoring and control functions as indicated schedule of supervisory and control I/O's underneath: Plus	Displays
One	Panel comprising the following: (Panel door shall be purple powder coated)	Alarm System
1	6Amp continuous current rated SP door interlocked protection MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval) : Plus	Main Circuit Breaker PLC
1	Stabilized transformer / power supply for (Power supply shall have adequate capacity for the application) (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval) : Plus	Power / transformer Supply
All	Big metal box enclosure box from equal and similar Paradox including Micro SD card loaded with Paradox TM50 keypad software and all accessories to complete the installation: Plus	Accessories
1	Backup battery 7Amp Hour,12-volt lead acid	Back-up battery
1	Alarm control panel unit complete with base plate, bus terminators, Ethernet communication, dual SMS module that will satisfy the application with at least the following specifications:	Control Panel
	StayD Mode, Built-in transceiver (433MHz), 32 zones (any of which can be wireless), 32 users and 32 remote controls (one per user), 2 partitions, 4-wire communication bus (connect up to 15 keypads), Supports REM3 hand-held remote keypad, Supports up to 8 K32RF / K37 wireless keypads,	

CONTRACT
Part C3: Scope of Works

A366
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	<p>Supports up to 2 RPT1 wireless repeaters, Supports PCS100, PCS200 and PCS250 series SMS modules, Supports IP100, IP150 Internet Module, Supports VDMP3 Plug-in voice dialer, Supports 16 PGMs (any of which can be wireless), Supports Insite Gold application, In-field firmware upgrade via 307USB and Babyware, Menu-driven programming for the Installer, Master and Maintenance codes, Multiple telephone numbers for event reporting: 3 monitoring, 5 for Personal Dialing and 1 for pager, Patented 2 opto coupler dialer circuit - the most reliable dialer in the industry (US Patents 5751803, RE39406), Calendar with Daylight savings Time, New Sleep arming method, Push button power reset, RF Jamming Supervision, 9.6k baud communication with Babyware and 256 events buffered</p> <p>Equal or similar to Paradox MG5050 including Paradox PCS250 SMS module connects directly to the control panel.: Plus</p>	
1	Keypad equal or similar to Paradox K32: Plus	Keypads
1	Wireless Passive equal or similar PMD75 from Paradox: Plus	Keypads
All	Wireless door open / close contact: Plus	All panel doors, gate and main control room door.
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	Wiring ducts
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	Contractor will be responsible for the application for sim card and contract made out to client and applications fees which will be able to send all the required info and data for 1 year subscription.	Sim card

PSEPLC-6.B SCHEDULE OF SUPERVISORY AND CONTROL I/O'S FOR TELEMETRY OUSTATION CONTROL ROOM PLC [BOSPOORT TO VAALKOP / BOSPOORT NORTH HLPL LINK CHAMBER]

DESCRIPTION	RTD IN	ANALOG IN	ANALOG OUT	24V DC IN	24V DC OUT	VOLT FREE OUT	NETWORK LINK		
							SCADA	HMI	PLANT
UPS Normal/Fail				2			2	2	2
UPS Low Battery				1			1	1	1
UPS DC voltage below 190 Volt				1			1	1	1
UPS Main Supply / UPS Power				2			2	2	2
Power Mains Live / Off					2		2	2	2
Alarm System Normal/Fail				2			2	2	2
Alarm System Low Battery				1			1	1	1
Alarm System DC voltage below 190 Volt				1			1	1	1
Alarm System Main Supply / Battery Power				2			2	2	2
Remote Activating Alarm System				1	1		2	2	2
Control Room Alarm Triggered				1		1	2	2	2
Control Room Door Open / Close						2	2	2	2
Panel Doors Open / Close						10	10	10	10

CONTRACT
Part C3: Scope of Works

A368
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

DESCRIPTION	RTD IN	ANALOG IN	ANALOG OUT	24V DC IN	24V DC OUT	VOLT FREE OUT	NETWORK LINK		
							SCADA	HMI	PLANT
Gate Open / Close						1	1	1	1
Actuator No.1 Healthy				1			1	1	1
Pressure Relief Valve No.1 – No.3 Trip				3			3	3	3
Pressure Relief Valve No.1 – No.3 Open / Close				3	3		6	6	6
Pressure Relief Valve No.1 – No.3 Remote / Manual				6			6	6	6
Pressure Relief Valve No.1 – No.3 Modulating Control			3				3	3	3
Turbine Flow Meter No.1 – No.3		3					3	3	3
Tamper Outstation Door Cubicles						5	5	5	5
Turbine Flow meter Totalized flow measurement [captured every day at selectable / programmable predetermined / time]		3					3	3	3
Contractor to allow 10% Spare capacity for future	All	All	All	All	All	All	All	All	All

PSEPLC-6.C TELEMETRY OUSTATION CONTROL ROOM PLC FOR EXISTING BOSPOORT RESERVOIRS (MW)

The existing Bospoort Water Treatment Reservoir PLC, supplied and installed under this contract, shall communicate via radio to the Bospoort Water Treatment Plant System.

The PLC equipment shall be installed in a separate panel.

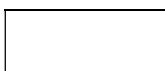
Type: CPU and I/O modules

Protocol: Ethernet

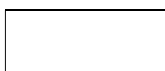
Equipment will be the following:

CONTRACT
Part C3: Scope of Works

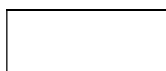
A369
Variations & Additions to Standard & Particular Specifications
C3.4.3



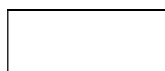
Employer



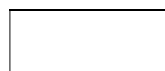
Witness 1



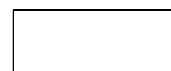
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
One	Panel comprising the following: (Panel door shall be purple powder coated)	UPS supply
1	10Amp sized continuous current rated SP door interlocked protection MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Main Circuit Breaker UPS
2	125Amp continuous current rated HRC fuse holders and fused links: Plus	Surge arrestors connection fuses
1	Single Phase Class 2 Surge protection unit connection type 2 as per SANS 10142-1 equal or similar to DEHNgard. DG M TT 275: Plus	Surge arrestor plus signals
1	Selector switch for normal/UPS power selection: Plus	Maintenance purposes
1	A UPS that will provide battery standby power for at least three hours during a power failure must be supplied and installed under this contract: Plus	UPS with 3-hour back-up
All	Relays and contactors for automatic transfer to UPS power once the UPS power is restored: Plus	Automatic change over
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	All
All	UPS monitoring functions as specified: Plus	

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
1	10Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	PLC supply
1	10Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	HMI supply
1	10Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Telemetry supply
1	10Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Alarm system supply
One	Panel comprising the following: (Panel door shall be purple powder coated)	PLC
1	6Amp continuous current rated SP door interlocked protection MCCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Main Circuit Breaker PLC
1	230V/24DC stabilized power supply for 24V DC inputs to PLC input modules. (Power supply shall have adequate capacity for the application) (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Power Supply
1	PLC processor unit complete with CPU, base plate, bus terminators, Ethernet communication with I/O modules that will satisfy the application with at least the following specifications:	PLC CPU

CONTRACT
Part C3: Scope of Works

A371
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	<ol style="list-style-type: none"> 1. 1024 I/O Multi-rack configuration capability, 2. 256 I/O multi-rack configuration capability, 3. The minimum communication service: bandwidth management, Ethernet TCP/IP Data Editor, Ethernet TCP/IP Modbus TCP messaging, Ethernet TCP/IP Rack Viewer, Ethernet TCP/IP SNMP network administrator, Ethernet TCP/IP Network management (NMT) CANopen Process Data Object (PDO) CANopen Service Data Object (SDO) CANopen Special functions (SYNC, EMCY, TIME) CANopen, 4. Ethernet port, 5. Memory description: 4096 kB internal RAM, 256 kB internal RAM for data, 3584 kB internal RAM for program constants and symbols and shall be supplied with additional memory, and 6. Shall comply with the following standards: IEC 61131-2 UL 508 EN 61131-2 CSA C22.2 No 142 CSA C22.2 No 213 Class I Division 2 <p>Equal and similar to BMXP3420302 M340 from Schneider Electric. Provide 35% Spare CPU capacity for plant (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus</p>	
All	High performance signal modules for digital and analog I/O plus provide 10% Spare I/O capacity for plant: Plus	Input and Output modules

CONTRACT
Part C3: Scope of Works

A372
Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	Interposing relays for surge protection of field statuses to PLC: Plus	Surge Protection
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	All
All	All signals shall be protected with digital and analog Surge arrestor modules equal or similar to Blitzductor from DEHNguard.	Surge Protection for all signals
One	Panel comprising the following: (Panel door shall be purple powder coated)	HMI
1	6Amp continuous current rated SP door interlocked protection MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval) : Plus	Main Circuit Breaker PLC
1	230V/24DC stabilized power supply for 24V DC inputs to PLC input modules. (Power supply shall have adequate capacity for the application) (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval) : Plus	Power Supply
1	Ethernet field bus connections: Plus	Connections
1	Human machine interface with 7.5" Inch advanced touchscreen panel 320 x 240 pixels LCD colour touch screen with sufficient flash memory, soft function and static function	HMI

CONTRACT
Part C3: Scope of Works

A373
Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	keys and Ethernet communication port. Software as may be required must be provided: Plus	
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	Wiring ducts
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Software programming for indication of the following monitoring functions on the HMI display and all I/O as indicated in schedule of supervisory and control I/O's underneath. All mimics will be supplied to the Engineer for approval.	Programming
All	1. Alarm history page: Plus	Alarm history
All	2. Alarm setup page: Plus	Setup page
All	3. Graphic displays shall be used for variable parameter indications: Plus	Displays
All	4. Animated mimic displays shall be used for equipment displays: Plus	Displays
All	5. Password protected settings: Plus	Protection
All	6. All motors, blowers and pumps information protected settings, control and monitoring functions: Plus	Displays
All	7. All Instrumentation settings, monitoring and control functions: Plus	Displays

CONTRACT
Part C3: Scope of Works

A374
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	8. All valves, actuators and control valves open / close / trip conditions settings, monitoring and control functions: Plus	Displays
All	9. All monitoring and control functions as indicated schedule of supervisory and control I/O's underneath: Plus	Displays
One	Panel comprising the following: (Panel door shall be purple powder coated)	Alarm System
1	6Amp continuous current rated SP door interlocked protection MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval) : Plus	Main Circuit Breaker PLC
1	Stabilized transformer / power supply for (Power supply shall have adequate capacity for the application) (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval) : Plus	Power / transformer Supply
All	Big metal box enclosure box from equal and similar Paradox including Micro SD card loaded with Paradox TM50 keypad software and all accessories to complete the installation: Plus	Accessories
1	Backup battery 7Amp Hour, 12-volt lead acid	Back-up battery
1	Alarm control panel unit complete with base plate, bus terminators, Ethernet communication, dual SMS module that will satisfy the application with at least the following specifications: StayD Mode, Built-in transceiver (433MHz), 32 zones (any of which can be wireless), 32 users and 32 remote controls (one	Control Panel

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	per user), 2 partitions, 4-wire communication bus (connect up to 15 keypads), Supports REM3 hand-held remote keypad, Supports up to 8 K32RF / K37 wireless keypads, Supports up to 2 RPT1 wireless repeaters, Supports PCS100, PCS200 and PCS250 series SMS modules, Supports IP100, IP150 Internet Module, Supports VDMP3 Plug-in voice dialer, Supports 16 PGMs (any of which can be wireless), Supports Insite Gold application, In-field firmware upgrade via 307USB and Babyware, Menu-driven programming for the Installer, Master and Maintenance codes, Multiple telephone numbers for event reporting: 3 monitoring, 5 for Personal Dialing and 1 for pager, Patented 2 opto coupler dialer circuit - the most reliable dialer in the industry (US Patents 5751803, RE39406), Calendar with Daylight savings Time, New Sleep arming method, Push button power reset, RF Jamming Supervision, 9.6k baud communication with Babyware and 256 events buffered Equal or similar to Paradox MG5050 including Paradox PCS250 SMS module connects directly to the control panel.: Plus	
1	Keypad equal or similar to Paradox K32: Plus	Keypads
1	Wireless Passive equal or similar PMD75 from Paradox: Plus	Keypads
All	Wireless door open / close contact: Plus	All panel doors, gate and main control room door.
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	Wiring ducts

CONTRACT
Part C3: Scope of Works

A376
Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Contractor will responsible for the application for sim card and contract made out to client and applications fees which will be able to send all the required info and data for 1 year subscription.	Sim card

PSEPLC-6.C SCHEDULE OF SUPERVISORY AND CONTROL I/O'S FOR TELEMETRY OUSTATION CONTROL ROOM PLC [FOR EXISTING BOSPOORT RESERVOIRS (MW)]

DESCRIPTION	RTD IN	ANALOG IN	ANALOG OUT	24V DC IN	24V DC OUT	VOLT FREE OUT	NETWORK LINK		
							SCADA	HMI	PLANT
UPS Normal/Fail				2			2	2	2
UPS Low Battery				1			1	1	1
UPS DC voltage below 190 Volt				1			1	1	1
UPS Main Supply / UPS Power				2			2	2	2
Power Mains Live / Off					2		2	2	2
Alarm System Normal/Fail				2			2	2	2
Alarm System Low Battery				1			1	1	1
Alarm System DC voltage below 190 Volt				1			1	1	1
Alarm System Main Supply / Battery Power				2			2	2	2
Remote Activating Alarm System				1	1		2	2	2
Control Room Alarm Triggered				1		1	2	2	2

CONTRACT
Part C3: Scope of Works

A377
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

DESCRIPTION	RTD IN	ANALOG IN	ANALOG OUT	24V DC IN	24V DC OUT	VOLT FREE OUT	NETWORK LINK		
							SCADA	HMI	PLANT
Control Room Door Open / Close						2	2	2	2
Panel Doors Open / Close						1	1	1	1
Gate Open / Close						1	1	1	1
Actuator No.1 Healthy				1			1	1	1
Turbine Flow Meter No.1 – No.2		2					2	2	2
Level Sensors Meter No.1 – No.2		2					2	2	2
Tamper Outstation Door Cubicles						1	1	1	1
Turbine Flow meter Totalized flow measurement [captured every day at selectable / programmable predetermined / time]		2					2	2	2
Contractor to allow 10% Spare capacity for future	All	All	All	All	All	All	All	All	All

PSEPLC-6.D STANDBY GENERATOR PLC

Type: Equipment specified below shall also serve the purpose of setting minimum standard required for the project and the Electrical and Electronic Contractor shall coordinate with the mechanical contractor to allow for all mechanical equipment.

The motor control centre or distribution board shall be manufactured accordance to Particular Specification.

The PLC enclosure shall be of the free-standing floor mounted type with a minimum IP rating of 52 (insect proofed enclosure). The motor control centre or distribution board shall be constructed with a minimum of 2mm 3CR12 stainless steel which will rest on a 304 stainless steel rigid channel and shall be bolted down in position by means of M16 high tensile stainless-steel bolts grouted into the concrete floor, the bolts shall be inside the board.

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

The panel door shall be provided with a locking system suitable for padlocking. The locking system shall consist of a 3CR12 stainless steel 3-way locking mechanism locking the door at the top, middle and bottom. The unit doors shall be capable of being opened at least 110 degrees.

The board shall be provided with readily removable, sectionalized, rigidly supported unpainted 3CR12 cable end support gland plates along the entire length of the board and at least 230 mm above floor level.

Sufficient provision for ventilation and heat dissipation as per the equipment ratings and manufacturers requirements shall be allowed for. The contractor shall prove to the Engineer by means of Anemometer or Differential that the requirements and manufacturer's requirements are met.

Screwed-on engraved labels in English shall be provided below all switchgear and equipment on and in the panels, to facilitate identification. All unpainted parts shall be plated for corrosion resistance.

Special racking in and out mechanism shall be designed by the Contractor [similar to a medium voltage circuit breaker racking tool] which will assist the operators in removing the entire backplane of a panel. All the motor control centre panels shall be designed to fit the tool. Massive drive has come to assist operators in removing heavy equipment easily without difficulty. Backplanes shall be fastened with easily removable bolts to ensure that the machine can remove the plane. Under the scope of the motor control centre the contractor shall allow one racking tool.

Supply: 6mm² 3C CU PVC SWA PVC cable plus 10mm² Kwena copper cable feeder plus all twisted PVC, Non-Woven Tape + alu Foil (Industrial CAT6) cables from Generator plus Fibre Connections from Motor Control Centre. Contractor to price all equipment as specified below, it will be decided at later stage what will be required.

Colour: Painted Light Orange – B26 (SANS 1091:2012) external, White arc-free internal (see Painting and Finishing).

Fault Level: 6kA.

Sectioning: Multi-section, Form 3b or Form 4 to SANS IEC 60439.

Future: 30% for future extensions space.

CONTRACT
Part C3: Scope of Works

A379
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Cable Entry: Incoming and Outgoing – Bottom. MCC gland plates shall be 3CR12 sheet steel, unpainted.

Base: Single 100x50x6mm thick channel iron base with mitred corners and cross-bracing between every 2nd tier, hot-dipped galvanised.

Equipment: I/O modules and HMI

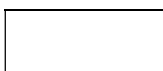
Protocol: Ethernet

Equipment will be the following:

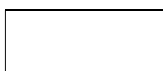
QTY	DESCRIPTION	IDENTIFICATION
One	Panel comprising the following: (Panel door shall be purple powder coated)	PLC
1	6Amp continuous current rated SP door interlocked protection MCCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Main Circuit Breaker PLC
1	230V/24DC stabilized power supply for 24V DC inputs to PLC input modules. (Power supply shall have adequate capacity for the application) (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Power Supply
1	Industrial 100/1000Mb managed switch module to suit the application, complete with at least 4 x fiber optic ports, PLC, switch shall be from the same manufacturer: Plus	Communications with Fiber Optic cable
1	PLC processor unit complete with CPU base plate, bus terminators, Ethernet communication with I/O modules that will satisfy the application with at least the following specifications, shall be minimum M340 range from Schneider Electric: 1. Program (MB) - 64 MB integrated minimum 2. Data storage (GB) – 4GB minimum	PLC CPU

CONTRACT
Part C3: Scope of Works

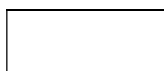
A380
Variations & Additions to Standard & Particular Specifications
C3.4.3



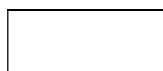
Employer



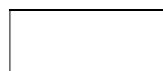
Witness 1



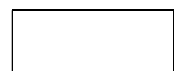
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	<p>3. I/O Multi-rack configuration capability,</p> <p>4. The minimum communication service: bandwidth management, Ethernet TCP/IP Data Editor, Ethernet TCP/IP Modbus TCP messaging, Ethernet TCP/IP Rack Viewer, Ethernet TCP/IP SNMP network administrator, Ethernet TCP/IP Network management (NMT) CANopen Process Data Object (PDO) CANopen Service Data Object (SDO) CANopen Special functions (SYNC, EMCY, TIME) CANopen,</p> <p>5. Ethernet port,</p> <p>6. Maximum number of discrete I/O channels shall be capable of 35% spare</p> <p>7. Maximum number of analog shall be capable of 35% spare</p> <p>8. Maximum number of analog I/O shall be capable of 35% spare</p> <p>9. Memory description: 64 MB integrated internal RAM</p> <p>10. Shall comply with the following standards: IEC 61131-2 UL 508 EN 61131-2 CSA C22.2 No 142 CSA C22.2 No 213 Class I Division 2</p> <p>Provide 35% Spare CPU capacity for plant (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus</p>	
All	High performance signal modules for digital and analog I/O plus provide 30% Spare I/O capacity for plant equal or similar to Schneider Electric: Plus	Input and Output modules
All	Interposing relays for surge protection of field statuses to PLC: Plus	Surge Protection

CONTRACT
Part C3: Scope of Works

A381
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	All
All	All signals shall be protected with digital and analog Surge arrestor modules equal or similar to Blitzductor from DEHNguard. All Digital and Analogue signals leaving the main structure and are outside the main lighting and earthing protection must be protected via signal arrestors similar and equal to Blitzconductor from Dehnguard. For tender purposes the tenderer shall allow for all I/O to protected as detailed below: Plus	Surge Protection for all signals
One	Panel comprising the following: [Existing, Contractor to allow to remove the existing UPS equipment and replace with new] (Panel door shall be purple powder coated)	UPS supply
1	16Amp sized continuous current rated SP + N door interlocked protection MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Main Circuit Breaker UPS
4	125Amp continuous current rated HRC fuse holders and fused links: Plus	Surge arrestors connection fuses
1	Single Phase Class 2 Surge protection unit connection type 2 as per SANS 10142-1 equal or similar to DEHNguard: Plus	Surge arrestor plus signals
1	Selector switch for normal/UPS power selection: Plus	Maintenance purposes

CONTRACT
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RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
1	A UPS that will provide battery standby power for at least three hours during a power failure must be supplied and installed under this contract: Plus	UPS with 3-hour back-up
All	Relays and contactors for automatic transfer to UPS power once the UPS power is restored: Plus	Automatic change over
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	All
All	UPS monitoring functions as specified: Plus	
1	6Amp continuous current rated SP MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	PLC supply
One	Panel comprising the following: (Panel door shall be purple powder coated)	HMI
1	6Amp continuous current rated SP door interlocked protection MCB (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Main Circuit Breaker PLC
1	230V/24DC stabilized power supply for 24V DC inputs to PLC input modules. (Power supply shall have adequate capacity for the application) (Estimated and shall be confirmed by contractor and all calculations shall be supplied to Engineer for approval): Plus	Power Supply

CONTRACT
Part C3: Scope of Works

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RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
1	Ethernet field bus connections: Plus	Connections
1	Human machine interface with 15" Inch advanced touchscreen panel HD LCD colour touch screen with sufficient flash memory, soft function and static function keys and Ethernet communication port. Software as may be required must be provided: Plus	HMI
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	Wiring ducts
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Software programming for indication of the following monitoring functions on the HMI display and all I/O as indicated in schedule of supervisory and control I/O's underneath. All mimics will be supplied to the Engineer for approval.	Programming
All	1. Alarm history page: Plus	Alarm history
All	2. Alarm setup page: Plus	Setup page
All	3. Graphic displays shall be used for variable parameter indications: Plus	Displays
All	4. Animated mimic displays shall be used for equipment displays: Plus	Displays
All	5. Password protected settings: Plus	Protection

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Part C3: Scope of Works

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	6. All motors, blowers and pumps information protected settings, control and monitoring functions: Plus	Displays
All	7. All Instrumentation settings, monitoring and control functions: Plus	Displays
All	8. All valves, actuators and control valves open / close / trip conditions settings, monitoring and control functions: Plus	Displays
All	9. All monitoring and control functions as indicated schedule of supervisory and control I/O's underneath: Plus	Displays

PS EPLC-6.D SCHEDULE OF SUPERVISORY AND CONTROL I/O'S FOR STANDBY GENERATOR PLC

DESCRIPTION	RTD IN	ANALOG IN	ANALOG OUT	24V DC IN	24V DC OUT	VOLT FREE OUT	NETWORK LINK		
							SCADA	HMI	PLANT
Generator healthy				1					
Generator trip				1					
Generator run/stop				1	1				
Generator E-Stop				1					
Generator bulk fuel tank level Analogue Monitor / Alarm / Trip at generator and bulk fuel tank		2		2	2				
Generator Engine and Alternator temperature	2						2	2	2
Generator Engine and Alternator [All windings] temperature Trip / Alarm	6			2	2		10	10	10

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

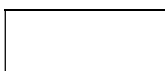
DESCRIPTION	RTD IN	ANALOG IN	ANALOG OUT	24V DC IN	24V DC OUT	VOLT FREE OUT	NETWORK LINK		
							SCADA	HMI	PLANT
Generator Engine water level Alarm / Trip				1	1		2	2	2
Generator Engine Oil level Alarm / Trip				1	1		2	2	2
Generator Alternator Charging Operational [display charging]		1		1	1		3	3	3
Generator Engine Temperature	1						1	1	1
Generator Normal/Fail				2			2	2	2
Generator Low Battery				1	1		2	2	2
Generator DC voltage below 12 Volt				1	1		2	2	2
Generator Overload				1	1		1	1	1
Generator circulation Pump Run / Stop / Healthy Statuses				3	3		6	6	6
All Generator information shall be displayed on HMI in Main MCC	All	All	All	All	All	All	All	All	All
Power Analyzer values to be captured in PLC and displayed on plant and SCADA, HMI and distributed through plant and linked to other power analyzers— Apparent Power, Power, Reactive Power, line and phase Voltages, Line and phase Currents, Power Factor, all billing information shall be displayed on both incomers [No.1 & No.2] and generator	All	All	All	All	All	All	All	All	All
Contractor to allow for additional programming for configuring plant to original status & Spare	8	4	4	4	4	4	28	28	28

PSEPLC-15 OPERATION OF PLANT

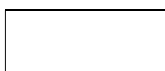
CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

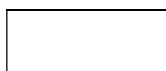
C3.4.3



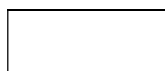
Employer



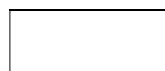
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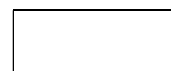
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

The final control philosophy of the plant will be the responsibility of the Contractor. The operation description of the plant below only services as brief description of the works and minimum requirement in terms of the Contract.

PS EPLC-15.A HIGH LIFT PUMP STATION

The existing four Bospoort high lift pump sets [4 pumps] are connected in series and operate as two series duty configuration and two series standby configuration. This contract includes the upgrade of the exiting high lift pump sets [from 12M/l a day to 24M/l a day].

Part of this contract will include the upgrading of the existing soft starters from 225kW to variable speed drives 355kW [Estimated - the electrical contractor must confirm the new exact motor starter with the mechanical contractor].

Manual – Timers and relays
Automatic – PLC control

An electronic pre-start warning siren shall be supplied and installed under this contract and shall be activated for a period of five seconds before the starting of a pump which is set in either automatic or manual modes of operation. The siren shall be installed in a position that will provide an audible warning to maintenance staff for safety reasons. Only the High Lift pump sets will have to be equipped with this siren.

The motor starting sequence for the series set shall be as follows:

- a) Suction motor will start and at full speed,
- b) The delivery motor will start and at full speed the actuator will open.

The variable frequency drives shall be programmed in manual and in automated mode of operation to ramp up the motor speed to reduce the starting current to a minimum [all shall be similar programmed]. In the event that series motors receive the stop or manual stop command, the delivery motor will be the first to ramp down to limit the water surge to the maximum allowable. Once the delivery motor has stopped, only then will the shutdown procedure for the suction motor proceed. The suction motor will ramp down to limit the water surge to a maximum and once the motor has stopped, only then can the actuator [should close].

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Part C3: Scope of Works

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C3.4.3

Employer

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Contractor

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

The pump sets shall be interlocked to prevent both pump sets to be in operation simultaneously in both manual and automatic modes of operation. In manual mode of operation, the operator must select which pump set will be used and the normal start normal procedure will be exactly similar to the Automated PLC mode of operation, an hardwire PLC interlock shall be added to ensure the PLC operates the starting and stopping of the plant.

- [Pump Set No.1 [Pump No.1-No.2], or
- Pump Set No.2 [Pump No.3-No.4], or
- Automatic Mode

The duty cycle of these pump sets must be rotated after each duty cycle in manual and automatic mode of operation. The pump sets shall be interlocked with the water level in the relevant section of the clear water reservoir that is located next to the pump station.

The Tenderer shall provide for all the wiring of the following protection devices in manual as well as automated mode of operation:

- 3 x Winding RTD's [Red, White and Blue phase]
- NDE Bearing RTD on motor
- NDE Bearing RTD on pump
- DE Bearing RTD on motor
- DE Bearing RTD on pump
- Thrust Bearing RTD's on pump
- Vibration sensors x, y and z axis
- Anti-condensation heater
- No flow switch in suction lines
- Pressures sensor in common delivery pipelines

No-flow sensors [equal or similar to Endress and Hauser] shall be supplied and installed under the electrical scope of the work in the suction pipeline of each of the four high lift pump sets. The sensors monitor for no flow conditions and will be interlocked with the pump sets for protection purposes. Sockets for mounting these sensors will be provided under the mechanical section of the work and the electrical shall coordinate with mechanical contractor that all stubs with blank flanges be added.

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Employer

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Contractor

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Supplied and installed under this contract will be electronic pressure transducers to monitor the common suction pipe and the delivery pressure of each pump. The pressure transducer will serve a dual function of producing an alarm at predetermined high/low pressures as well as trip the pump-sets via the PLC at high-high/low-low pressures.

All protection devices must be interlocked with the pump set control circuitry and must trip or prevent the pump from starting up if a protection device is in a trip condition. The trip condition shall be displayed on the HMI unit and SCADA system. Possible causes for this fault condition must be included on the SCADA system for maintenance staff assistance.

PS EPLC-15.B BOSPOORT TO VAALKOP / BOSPOORT NORTH HLPL LINK CHAMBER AND BOSPOORT NORTH TO: THLABANE PIPELINE; BOITEKONG PIPELINE AND BOITEKONG NETWORK CHAMBER

Civil Contractor will construct the valve chambers while the mechanical Contractor will install the following equipment at the locations below listed:

Bospoort to Vaalkop / Bospoort North HLPL Link Chamber:

- a) Four flow control valves [all accessories will be included with the valves to control] and
- b) Three turbine flow meters [only turbine].

Now:

- a) Bospoort Water Treatment Works to Bospoort Reservoirs [Magalies Water] until predetermined full level.
- b) When the Bospoort Reservoirs [Magalies Water] are at predetermined full level then the valves must close and then water must be diverted to the existing Bospoort pipeline.

Future:

- a) Bospoort Water Treatment Works to Bospoort North Reservoirs until predetermined full level.
- b) When Bospoort North Reservoirs are at a predetermined full level then valves will close and divert the water to Bospoort Reservoirs [Magalies Water] until at a predetermined full level.
- c) When the Bospoort Reservoirs [Magalies Water] are at predetermined full level then the valves must close and then water must be diverted to the existing Bospoort pipeline.

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Part C3: Scope of Works

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Also:

- a) Should Bospoort Reservoirs [Magalies Water] be at a predetermined full level then the control valve must open to pump to Bospoort North Reservoirs.

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Contractor

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RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSEPTM TELEMETRY SYSTEM

PSEPTM-1 SCOPE OF WORKS

The standard Conditions of Contract is a FIDIC Yellow book and the contractor shall design, execute the complete the works in accordance with the contract.

Drawing 1890.11.00.WPA.21.U001 shows the proposed locations of the masts including the control rooms. Earthing and lightning protection, palisade fence, masts, telemetry systems and control room form part of this Contract. The bulk earth works will be done under the civil contract.

The scope of work for the Telemetry entails Point-to-Point (PTP) and Point-to-Multipoint (PMP) links. All the PTP and PMP links shall be designed utilizing the latest equipment technologies available. It must also be noted that the equipment selected shall conform to the rugged terrain requirements of the greater Rustenburg area.

These PTP links transmit large amounts of data and voice in both directions between links. These types of links also place a high requirement on data encryption, which provides a certain level of comfort to the end user. These types of links therefore conform to both the stringent data encryption and high-speed data transmission requirements of secure and reliable Microwave Radio Network design philosophy.

The design of the PTP Radio Network shall be done according to the particular specification and all international standards referenced in particular specification.

PSEPTM-6 OUTSTATION CABINETS

All outstation cubicles shall comply with the requirements for motor control centres and distribution boards in the Particular Specifications.

Outdoor outstations shall be constructed from 3CR12 stainless steel, powder coated frame mounted and with front access. The lockable front door shall be equipped with a tamperproof lock protection cover.

The telemetry equipment cubical shall be of sufficient size to accommodate double the number of I/O modules installed under this contract.

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Battery termination box with LED voltage indicators. Sufficient space shall be provided for a second battery installation in future,

Field junction box with all field cables and wiring connected to DYN rail mounted termination blocks.

The field termination box shall be of sufficient size for termination of all hard-wired field equipment, monitoring and control requirements. At least 20% spare terminals for future connections shall be provided.

All of the Telemetry links to Networks shall conform to the following minimum technical requirements.

PSEPTM-6.A TELEMETRY OUTSTATION CONTROL ROOM [BOSPOORT TO VAALKOP / BOSPOORT NORTH HLPL LINK CHAMBER]

Type: Outdoor outstation shall be constructed from 3CR12 stainless steel, powder coated frame mounted and with front access only. All outstation cubicles shall comply with the requirements for motor control centres and distribution boards in the Particular Specifications.

Supply: 1 x 16mm² 3 core Cu PVC SWA PVC cable plus 1 x 10mm² kwena copper earth cable from the Eskom connection.

Colour: Electric orange

Fault level: 5kA

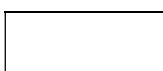
Equipment will be the following:

QTY	DESCRIPTION	IDENTIFICATION
One	Panel comprising of the following:	Incomer Section
1	60Amp continuous current rated SP distribution MCB with electronic trip, monitoring relays with automatic reset and all accessories: Plus	Main Circuit Breaker

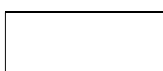
CONTRACT
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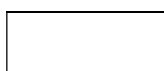
C3.4.3



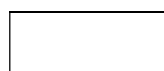
Employer



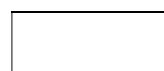
Witness 1



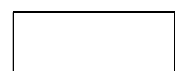
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
Set	80/1Amp continuous current rated current transformer: Plus	Current inputs
1	Ammeter scaled 0-80Amp: Plus	Ammeter
1	3 Position Selector switch	R-W-B phase indication
3	2Amp HRC fuse holders and fused links: Plus	Voltage inputs
1	<p>Front panel mounted LCD digital display supply network analyser comprising of combined voltage, current, maximum demand power measurement and power factor correction measurement complete with Communications module must be provided, communication links with PLC/DCS Units. The communication interface must comply with either of the following:</p> <ul style="list-style-type: none"> • Profibus-DP • Profinet • Industrial Ethernet • Modbus TCP/IP <p>Equal or similar to Power Logic PM800: Plus</p> <p>Under no circumstances, shall the use of proprietary protocols be allowed: Plus</p>	Power Analyser
4	80Amp continuous current rated copper bus bars: Plus	3 Phase + N
1	50Amp continuous current rated copper bus bar: Plus	Earth
1	Three Phase combined class 1&2 surge arrestor unit connection type 2 as per SANS 10142-1 equal or similar to DV M TT 2P 255	Surge arrestor plus signals

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Part C3: Scope of Works

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	with remote indicator panel & remote signalling contacts connected to the SCADA: Plus	
3	2Amp continuous current rated HRC fuse holders and fused links: Plus	Indicator Lamp Protection
3	Robust LED indicator lamps connected load side of the circuit breaker: Plus	Indicators for 3 Phase (Red, White and Blue Indications)
1	20Amp SP + N earth leakage with overload protection: Plus	Earth Leakage
1	10Amp continuous current rated SP MCB: Plus	Area Lighting
1	16Amp continuous current rated SP Contactor: Plus	Area lighting contactor
1	5Amp continuous current rated SP MCB: Plus	Coil Protection
1	Time switch equal and similar Schneider electric ITA digital with 100 hour standby capacity.	Digital Timer Switch
All	Continuous current rated thermal magnetic motor circuit breakers with adjustable current setting and auxiliary contact (monitor trip condition): plus	All valves which must be coordinated with the mechanical contractor
All	Continuous current rated SP MCB: Plus	All flow meters which must be coordinated with mechanical contractor
1	10Amp continuous current rated SP MCB: Plus	Lighting

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
1	Continuous current rated SP MCB that will satisfy the application: Plus	UPS Feeder
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	Wiring ducts
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Panel comprising the following: (Panel door shall be purple powder coated)	Telemetry equipment as specified below
All	Panel comprising the following: (Panel door shall be purple powder coated)	UPS for PLC Equipment as specified under PLC

PSEPTM-6.B TELEMTRY OUTSTATION CONTROL ROOM [BOSPOORT RESERVOIRS [MEGALIES WATER]

Type: Outdoor outstation shall be constructed from 3CR12 stainless steel, powder coated frame mounted and with front access only. All outstation cubicles shall comply with the requirements for motor control centres and distribution boards in the Particular Specifications.

Supply: 1 x 16mm² 3 core Cu PVC SWA PVC cable plus 1 x 10mm² kwen copper earth cable from the Eskom connection.

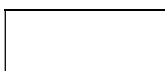
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Fault level: 5kA

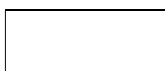
Equipment will be the following:

CONTRACT
Part C3: Scope of Works

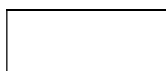
A395
Variations & Additions to Standard & Particular Specifications C3.4.3



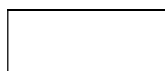
Employer



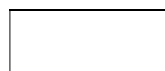
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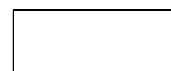
Witness 2



Contractor



Witness 1



Witness 2

RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
One	Panel comprising of the following:	Incomer Section
1	60Amp continuous current rated SP distribution MCB with electronic trip, monitoring relays with automatic reset and all accessories: Plus	Main Circuit Breaker
Set	80/1Amp continuous current rated current transformer: Plus	Current inputs
1	Ammeter scaled 0-80Amp: Plus	Ammeter
1	3 Position Selector switch	R-W-B phase indication
3	2Amp HRC fuse holders and fused links: Plus	Voltage inputs
1	<p>Front panel mounted LCD digital display supply network analyser comprising of combined voltage, current, maximum demand power measurement and power factor correction measurement complete with Communications module must be provided, communication links with PLC/DCS Units. The communication interface must comply with either of the following:</p> <ul style="list-style-type: none"> • Profibus-DP • Profinet • Industrial Ethernet • Modbus TCP/IP <p>Equal or similar to Power Logic PM800: Plus</p> <p>Under no circumstances, shall the use of proprietary protocols be allowed: Plus</p>	Power Analyser
4	80Amp continuous current rated copper bus bars: Plus	3 Phase + N

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Part C3: Scope of Works

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Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
1	50Amp continuous current rated copper bus bar: Plus	Earth
1	Three Phase combined class 1&2 surge arrestor unit connection type 2 as per SANS 10142-1 equal or similar to DV M TT 2P 255 with remote indicator panel & remote signalling contacts connected to the SCADA: Plus	Surge arrestor plus signals
3	2Amp continuous current rated HRC fuse holders and fused links: Plus	Indicator Lamp Protection
3	Robust LED indicator lamps connected load side of the circuit breaker: Plus	Indicators for 3 Phase (Red, White and Blue Indications)
1	20Amp SP + N earth leakage with overload protection: Plus	Earth Leakage
1	10Amp continuous current rated SP MCB: Plus	Area Lighting
1	16Amp continuous current rated SP Contactor: Plus	Area lighting contactor
1	5Amp continuous current rated SP MCB: Plus	Coil Protection
1	Time switch equal and similar Schneider electric ITA digital with 100 hour standby capacity.	Digital Timer Switch
All	Continuous current rated thermal magnetic motor circuit breakers with adjustable current setting and auxiliary contact (monitor trip condition): plus	All valves which must be coordinated with the mechanical contractor
All	Continuous current rated SP MCB: Plus	All flow meters which must be coordinated

CONTRACT
Part C3: Scope of Works

A397
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
		with mechanical contractor
1	10Amp continuous current rated SP MCB: Plus	Lighting
1	Continuous current rated SP MCB that will satisfy the application: Plus	UPS Feeder
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	Wiring ducts
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Panel comprising the following: (Panel door shall be purple powder coated)	Telemetry equipment as specified below
All	Panel comprising the following: (Panel door shall be purple powder coated)	UPS for PLC Equipment as specified under PLC

PSEPTM-6.B TELEMETRY OUTSTATION CONTROL ROOM [BOSPOORT WATER TREATMENT PLANT]

Type: Outdoor outstation shall be constructed from 3CR12 stainless steel, powder coated frame mounted and with front access only. All outstation cubicles shall comply with the requirements for motor control centres and distribution boards in the Particular Specifications.

Supply: 1 x 16mm² 3 core Cu PVC SWA PVC cable plus 1 x 10mm² kwen copper earth cable from the Eskom connection.

Colour: Electric orange

Fault level: 5kA

CONTRACT
Part C3: Scope of Works

A398
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Equipment will be the following:

QTY	DESCRIPTION	IDENTIFICATION
One	Panel comprising of the following:	Incomer Section
1	32Amp continuous current rated SP + N distribution MCB with electronic trip, monitoring relays with automatic reset and all accessories: Plus	Main Circuit Breaker
Set	32/1Amp continuous current rated current transformer: Plus	Current inputs
1	Ammeter scaled 0-80Amp: Plus	Ammeter
1	3 Position Selector switch	R-W-B phase indication
3	2Amp HRC fuse holders and fused links: Plus	Voltage inputs
1	<p>Front panel mounted LCD digital display supply network analyser comprising of combined voltage, current, maximum demand power measurement and power factor correction measurement complete with Communications module must be provided, communication links with PLC/DCS Units. The communication interface must comply with either of the following:</p> <ul style="list-style-type: none"> • Profibus-DP • Profinet • Industrial Ethernet • Modbus TCP/IP <p>Equal or similar to Power Logic PM800: Plus</p> <p>Under no circumstances, shall the use of proprietary protocols be allowed: Plus</p>	Power Analyser

CONTRACT
Part C3: Scope of Works

A399
Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
4	80Amp continuous current rated copper bus bars: Plus	3 Phase + N
1	50Amp continuous current rated copper bus bar: Plus	Earth
1	Three Phase combined class 1&2 surge arrestor unit connection type 2 as per SANS 10142-1 equal or similar to DV M TT 2P 255 with remote indicator panel & remote signalling contacts connected to the SCADA: Plus	Surge arrestor plus signals
3	2Amp continuous current rated HRC fuse holders and fused links: Plus	Indicator Lamp Protection
3	Robust LED indicator lamps connected load side of the circuit breaker: Plus	Indicators for 3 Phase (Red, White and Blue Indications)
1	20Amp SP + N earth leakage with overload protection: Plus	Earth Leakage
1	10Amp continuous current rated SP MCB: Plus	Area Lighting
1	16Amp continuous current rated SP Contactor: Plus	Area lighting contactor
1	5Amp continuous current rated SP MCB: Plus	Coil Protection
1	Time switch equal and similar Schneider electric ITA digital with 100 hour standby capacity.	Digital Timer Switch
All	Continuous current rated thermal magnetic motor circuit breakers with adjustable current setting and auxiliary contact (monitor trip condition): plus	All valves which must be coordinated with the mechanical contractor

CONTRACT
Part C3: Scope of Works

A400
Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	Continuous current rated SP MCB: Plus	All flow meters which must be coordinated with mechanical contractor
1	10Amp continuous current rated SP MCB: Plus	Lighting
1	Continuous current rated SP MCB that will satisfy the application: Plus	UPS Feeder
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	Wiring ducts
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals
All	Panel comprising the following: (Panel door shall be purple powder coated)	Telemetry equipment as specified below
All	Panel comprising the following: (Panel door shall be purple powder coated)	UPS for PLC Equipment as specified under PLC

PSEPTM-19 OUTSTATIONS HARDWARE

An outdoor-type enclosure as specified above shall be provided for each telemetry outstations. Hardware shall be as follows:

PSEPTM-19.A TELEMETRY OUTSTATION CONTROL ROOM [BOSPOORT TO VAALKOP / BOSPOORT NORTH HLPL LINK CHAMBER]

The telemetry equipment shall be installed in a separate panel inside the outstation cabinet.

CONTRACT
Part C3: Scope of Works

A401
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Protocol: Ethernet

Equipment will be the following:

QTY	DESCRIPTION	IDENTIFICATION
One	Panel comprising the following: (Panel door shall be purple powder coated)	Telemetry Hardware
1	10Amp continuous current rated SP door interlocked protection MCCB: Plus	Main Circuit Breaker PLC
All	230V/24DC stabilized power supply for 24V DC inputs to telemetry system. (Power supply shall have adequate capacity for the application): Plus	
All	Ethernet communication with I/O modules that will satisfy the application: Plus	All communications
All	Interposing relays for surge protection of field statuses to Telemetry, equipment and mast: Plus	Interposing relays
All	Termination blocks necessary for signal cable connections from motors and instrumentation: Plus	Termination blocks
All	Ethernet radios transceivers supporting 360–512 MHz, shall be 5.0 W RF power. The Ethernet radios shall be robust/secure two-way wireless communications in extremely challenging outdoor industrial environments. The Ethernet Radios shall have the following features: Multi-hop repeater and gateway functionality Gather-scatter and block mapping Modbus TCP and RTU I/O gateway DNP3 remote I/O and DNP3 TCP gateway Internal programmable data and event logging with remote access	Radio transceiver

CONTRACT
Part C3: Scope of Works

A402
Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	Configurable digital, pulse, and analog I/O to 14-bit resolution 360–512 MHz frequency licensed bands 10 mW to 5 W RF power (Shall be set to 5W) Radio data rates from 4800 bps to 19.2 kbps 12.5 kHz and 25.0 kHz channel bandwidth options: Plus	
All	Ethernet communication cable link: Plus	Communication
All	All equipment leaving the control room Signal & Data Surge protection unit suitable for the application equal or similar to Blitzductor XT from DEHNgard.	Signal & Data Surge Protection
All	Antenna adequate capacity for the application. Antenna shall be designed, calculated, supplied, installed and commissioned by the Contractor. The antenna communication shall have protected with surge arrestor.	Antenna
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	Wiring ducts
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals

PSEPTM-19.B TELEMETRY OUTSTATION CONTROL ROOM [BOSPOORT RESERVOIRS [MAGALIES WATER]]

The telemetry equipment shall be installed in a separate panel inside the outstation cabinet.

Protocol: Ethernet

Equipment will be the following:

CONTRACT
Part C3: Scope of Works

A403
Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
One	Panel comprising the following: (Panel door shall be purple powder coated)	Telemetry Hardware
1	10Amp continuous current rated SP door interlocked protection MCCB: Plus	Main Circuit Breaker PLC
All	230V/24DC stabilized power supply for 24V DC inputs to telemetry system. (Power supply shall have adequate capacity for the application): Plus	
All	Ethernet communication with I/O modules that will satisfy the application: Plus	All communications
All	Interposing relays for surge protection of field statuses to Telemetry, equipment and mast: Plus	Interposing relays
All	Termination blocks necessary for signal cable connections from motors and instrumentation: Plus	Termination blocks
All	Ethernet radios transceivers supporting 360–512 MHz, shall be 5.0 W RF power. The Ethernet radios shall be robust/secure two-way wireless communications in extremely challenging outdoor industrial environments. The Ethernet Radios shall have the following features: Multi-hop repeater and gateway functionality Gather-scatter and block mapping Modbus TCP and RTU I/O gateway DNP3 remote I/O and DNP3 TCP gateway Internal programmable data and event logging with remote access Configurable digital, pulse, and analog I/O to 14-bit resolution 360–512 MHz frequency licensed bands 10 mW to 5 W RF power (Shall be set to 5W)	Radio transceiver

CONTRACT
Part C3: Scope of Works

A404
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
	Radio data rates from 4800 bps to 19.2 kbps 12.5 kHz and 25.0 kHz channel bandwidth options: Plus	
All	Ethernet communication cable link: Plus	Communication
All	All equipment leaving the control room Signal & Data Surge protection unit suitable for the application equal or similar to Blitzductor XT from DEHNgard.	Signal & Data Surge Protection
All	Antenna adequate capacity for the application. Antenna shall be designed, calculated, supplied, installed and commissioned by the Contractor. The antenna communication shall have protected with surge arrestor.	Antenna
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	Wiring ducts
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	All Terminals

PSEPTM-19.C TELEMETRY OUTSTATION CONTROL ROOM [BOSPOORT WATER TREATMENT PLANT]

The telemetry equipment shall be installed in a separate panel inside the outstation cabinet.

Protocol: Ethernet

Equipment will be the following:

CONTRACT

Part C3: Scope of Works

A405

Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

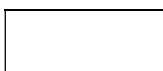
BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

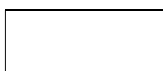
QTY	DESCRIPTION	IDENTIFICATION
One	Panel comprising the following: (Panel door shall be purple powder coated)	Telemetry Hardware
1	10Amp continuous current rated SP door interlocked protection MCCB: Plus	Main Circuit Breaker PLC
All	230V/24DC stabilized power supply for 24V DC inputs to telemetry system. (Power supply shall have adequate capacity for the application): Plus	
All	Ethernet communication with I/O modules that will satisfy the application: Plus	All communications
All	Interposing relays for surge protection of field statuses to Telemetry, equipment, and mast: Plus	Interposing relays
All	Termination blocks necessary for signal cable connections from motors and instrumentation: Plus	Termination blocks
All	<p>Ethernet radios transceivers supporting 360–512 MHz, shall be 5.0 W RF power. The Ethernet radios shall be robust/secure two-way wireless communications in extremely challenging outdoor industrial environments. The Ethernet Radios shall have the following features:</p> <p>Multi-hop repeater and gateway functionality Gather-scatter and block mapping Modbus TCP and RTU I/O gateway DNP3 remote I/O and DNP3 TCP gateway Internal programmable data and event logging with remote access Configurable digital, pulse, and analog I/O to 14-bit resolution 360–512 MHz frequency licensed bands 10 mW to 5 W RF power (Shall be set to 5W)</p>	Radio transceiver

CONTRACT
Part C3: Scope of Works

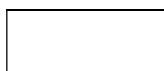
A406
Variations & Additions to Standard & Particular Specifications



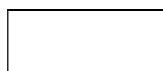
Employer



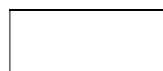
Witness 1



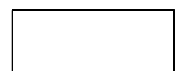
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	Radio data rates from 4800 bps to 19.2 kbps 12.5 kHz and 25.0 kHz channel bandwidth options: Plus	Communication
All	Ethernet communication cable link: Plus	Signal & Data Surge Protection
All	All equipment leaving the control room Signal & Data Surge protection unit suitable for the application equal or similar to Blitzductor XT from DEHNguard.	Antenna
All	Antenna adequate capacity for the application. Antenna shall be designed, calculated, supplied, installed and commissioned by the Contractor. The antenna communication shall have protected with class surge 1 & 2 surge arrestor.	Wiring ducts
All	Halogen free wiring ducts, covers, fix-O-Rapid, rapid clip for din rails, rapid clip for base plate shall be used: Plus	All Terminals
All	Termination blocks necessary for signal cable connections from motors and instrumentation equal and similar to Weidmuller: Plus	

CONTRACT
Part C3: Scope of Works

A407
Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSECIS ELECTRICAL DISTRIBUTION SYSTEM

PSECIS-1 SCOPE OF WORKS

Equipment shall be provided as specified and indicated on the drawings on the site of the Works.

PSECIS-2 PRESSURE TRANSMITTERS

Electronic pressure transducers reading the pressure in suction or delivery pipelines must be supplied and installed under this contract. The suction pressure transducers will serve as a dual function of producing an alarm at low suction pressure and trip the pump-set via the PLC and will be **hardwired** to the motor panel. The alarm will be triggered when the pump suction pressure drops to 1,3 times the 3% NPSH of the pump and will power the pumps down through the normal shut down procedure when the pressure drops to 1,1 times the 3% head loss at cavitation level.

Pressure transmitters shall be equal and similar to particular specification as specified.

PSECIS-2.A HIGH LIFT PUMP DELIVERY AND SUCTION SIDE PRESSURE AND COMMON DILVERY LINE OF PIPE LINE [X9]

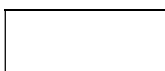
- Type:** Outdoor powder coated 3CR12 steel frame mounted with lockable front door and transparent window for meter reading purposes. Transparent window must be covered with top hinged powder coated 3CR12 cover for ultraviolet protection of controller.
- Supply:** 2.5mm² x 3 core PVC SWA PVC cable plus 10mm² bare copper earth plus 1mm² x 4pr twisted PVC SWA PVC (individually and overall screened) from Main MCC
- Colour:** Electric orange
- Fault level:** 5kA

Equipment will be the following:

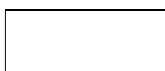
QTY	DESCRIPTION	IDENTIFICATION
1	10Amp continuous rated SP MCB: Plus	Main

CONTRACT
Part C3: Scope of Works

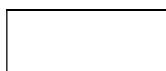
A408
Variations & Additions to Standard & Particular Specifications C3.4.3



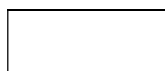
Employer



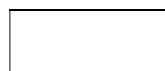
Witness 1



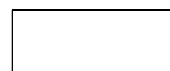
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	Single-phase class 2 surge arrestor unit connection type 2 as per SANS 10142-1 equal or similar to Dehnguard. DVMTT255 with remote indicator panel & remote signalling contacts connected to the SCADA: Plus	Surge arrestor
2	Supply and install absolute and gauge pressure sensor and probes. The Transmitter shall be equal or similar to Cerabar PMC71 from Endress and Hauser with extended probes to the pipeline. The transmitter will be installed inside the enclosure.: Plus	Controller
All	Pipe connections to pipeline and coordination with mechanical contractor: Plus	Mechanical Contractor coordination
All	Terminals and interconnecting monitoring and control wiring: Plus	Connection and monitoring
All	Signal & Data Surge protection unit suitable for the application equal or similar to Blitzductor XT from DEHNguard..	Signal & Data Surge Protection
All	Earthing and bonding across the probes.	Earthing

PSECIS-3 NO-FLOW SENSORS

The electromagnetic flow monitor shall be pipe socket mounted and shall be easy to calibrate for specific no-flow conditions and shall be reliable in service.

The no-flow sensor shall be steel pipe mounted and shall be supplied complete with a weld stub to ensure correct immersion into the measuring liquid. The weld stub shall be adapted according to the flow measuring pipe diameter.

CONTRACT
Part C3: Scope of Works

A409
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Pressure transmitters shall be equal and similar to particular specification.

PSECIS-3.A HIGH LIFT PUMP SUCTION SIDE NO-FLOW [X4]

Type: Pipe mounted
Supply: 10mm² bare copper earth plus 1mm² x 2pr twisted PVC SWA PVC (individually and overall screened) from Main MCC

Equipment will be the following:

QTY	DESCRIPTION	IDENTIFICATION
1	Supply and install No-flow sensor on the pipe suction. The no-flow sensor shall be equal and similar to Magphant Electromagnetic flow meter from Endress and Hauser.: Plus	Controller
All	Pipe connections to pipeline and coordination with mechanical contractor: Plus	Mechanical Contractor coordination
All	Terminals and interconnecting monitoring and control wiring: Plus	Connection and monitoring
All	Signal & Data Surge protection unit suitable for the application equal or similar to Blitzductor XT from DEHNguard..	Signal & Data Surge Protection
All	Earthing and bonding across the probes.	Earthing

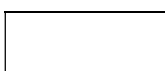
PSECIS-3 FLOW METER EQUIPMENT

Magnetic and turbine type flow meters will be supplied and installed by the mechanical or civil contractor. The above-mentioned flow meter controllers as free issue items will have to be installed under this contract in flow meter kiosks complete with a supply of electricity, surge protection and earthing system.

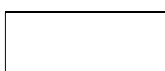
CONTRACT
Part C3: Scope of Works

A410
Variations & Additions to Standard & Particular Specifications

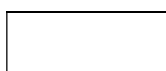
C3.4.3



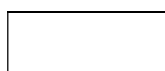
Employer



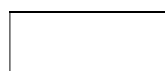
Witness 1



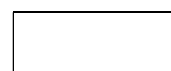
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Clamp on flow meters will be supplied and installed under this contract. The Contractor shall coordinate with the mechanical contractor if all requirements are met regarding the clamp on flow meters.

PSECIS-3.A BOSPOORT TO VAALKOP / BOSPOORT NORTH HLPL LINK CHAMBER [X3]

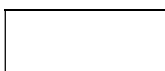
- Type:** Outdoor powder coated 3CR12 steel frame mounted with lockable front door and transparent window for meter reading purposes. Transparent window must be covered with top-hinged powder coated 3CR12 cover for ultraviolet protection of controller.
- Supply:** 2.5mm² x 3 core PVC SWA PVC cable plus 10mm² bare copper earth plus 1mm² x 4pr twisted PVC SWA PVC (individually and overall screened) from the outstation distribution board.
- Colour:** Electric orange
- Fault level:** 5kA

Equipment will be the following:

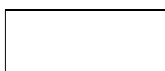
QTY	DESCRIPTION	IDENTIFICATION
1	10Amp Continues Rated SP MCB: Plus	Main
All	Single Phase class 2 surge arrestor unit connection type 2 as per SANS 10142-1 equal or similar to Dehnguard. DVMTT255 with remote indicator panel & remote signalling contacts connected to the SCADA: Plus	Surge arrestor
1	Meinecke type FM1 D/K frequency converter complete with opto-pulser at flow meter position: Plus	Controller
1	Front panel mounted LCD instantaneous flow display: Plus	Display
All	Terminals and interconnecting monitoring and control wiring equal and similar to Weidmuller: Plus	Connection and monitoring

CONTRACT
Part C3: Scope of Works

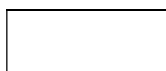
A411
Variations & Additions to Standard & Particular Specifications C3.4.3



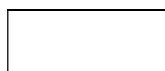
Employer



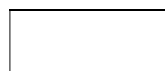
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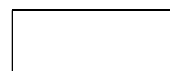
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
All	Signal & Data Surge protection unit suitable for the application equal or similar to Blitzductor XT from DEHNgard..	Signal & Data Surge Protection

PSECIS-4 ELECTRONIC LEVEL CONTROL

Electronic intelligent level transducers shall be supplied and installed on grade 3CR12 stainless steel brackets and will be a ball type level sensor as indicated.

Field mounted level sensors shall be installed complete with local surge protection and earthing systems. The level controllers shall be installed inside kiosk and mounted as specified. Stainless steel brackets, onto which the level sensors shall be screwed, shall be bolted to a concrete wall; their mounting brackets being modified accommodate the insertion of the level sensors.

PSECIS-4.A BOSPOORT RESERVOIRS [MEGALIES WATER] RESERVOIR LEVEL KIOSK [X1]

Type: Outdoor powder coated 3CR12 steel frame mounted with lockable front door and transparent window for meter reading purposes. Transparent window must be covered with top hinged powder coated 3CR12 cover for ultraviolet protection of level controller.

Supply: 2.5mm² x 3 core PVC SWA PVC cable plus 10mm² bare copper earth plus 1mm² x 4pr twisted PVC SWA PVC (individually and overall screened) from the outstation distribution board.

Colour: Electric orange

Fault level: 5kA

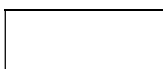
Equipment will be the following:

QTY	DESCRIPTION	IDENTIFICATION
1	10Amp Continues Rated SP MCB: Plus	Main
All	Single Phase class 2 surge arrestor unit connection type 2 as per SANS 10142-1 equal or similar to Dehnguard. DVMTT255	Surge arrestor

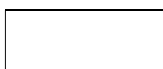
CONTRACT
Part C3: Scope of Works

A412
Variations & Additions to Standard & Particular Specifications

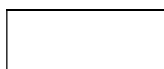
C3.4.3



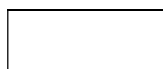
Employer



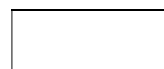
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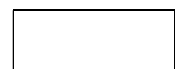
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
2	with remote indicator panel & remote signalling contacts connected to the SCADA: Plus Ultrasonic level controller equal and similar to DLM MCU901WX-A and transducer equal and similar to MSP900SH sensor unit mounted on grade 3CR12 stainless steel bracket inside a ventilated grade 3CR12 stainless steel enclosure on top of clear water reservoir for level measurement including cabling and all accessories: Plus	Level Controller & Transducer will be installed remotely on reservoirs while controller will be installed in the control room.
All	Terminals and interconnecting monitoring and control wiring equal and similar to Weidmuller: Plus	Connection and monitoring
All	Signal & Data Surge protection unit suitable for the application equal or similar to Blitzductor XT from DEHNgard..	Signal & Data Surge Protection

CONTRACT
Part C3: Scope of Works

A413
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSEG&M GENERAL AND MISCELLANEOUS

PSEG&M-3 EMERGENCY STOP PUSH BUTTONS AND WEATHERPROOF ISOLATORS

Grade 316 stainless steel pedestal mounted emergency stop stations shall be provided at all motor installations as specified.

Emergency stop pedestals at submersible pump sets shall be installed on a wider than normal grade 304 stainless steel emergency stop pedestal that will house the motor cable terminations as specified in the Particular Specification.

PSEG&M-8 NOTICES AND DANGER PLATES

This specification deals with the provision of Notices, Danger Plates and signage as required in terms of the Occupational Health and Safety Act No. 85 of 1993, as well as any other notices that may be required by law or by the nature of the finished Works.

All notices, danger plates, signage and building names signage ie ["Inlet Works"] on equipment shall be supplied under this contract and it is the Contractor's responsibility to familiarize themselves with the applicable standards referred to in the Particular Specifications and supply all necessary signage.

PSEG&M-8.2 MATERIALS AND FINISH

Outdoor signs shall be either of vitreous enamel or of cast aluminium with raised or embossed letters.

The colours and sizes of letters and background colour shall be in accordance with requirements of SANS 0140 and as approved by the Engineer.

Symbolic signs shall conform to the requirements of SANS 1186.

The following building names shall be added under the Notices and Danger Plates:

- Bospoort Water Treatment Works (1 sign)
- Bospoort to Vaalkop / Bospoort North HLPL Link Chamber (1 sign)

CONTRACT
Part C3: Scope of Works

A414
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

- Bospoort Reservoirs [Magalies Water] (1 sign)

PSEG&M-9 FIRE EXTINGUISHERS

The supply and installation of 5kg CO₂ and powder fire extinguishers in all pump stations and treatment plant buildings shall be done in accordance with the requirements of the Local Authority. Each fire extinguisher shall have an extinguisher cabinet, mounting bracket, tags, seals, inspection label, tags, and double-sided signage above the extinguisher.

The following locations shall be fitted with fire extinguishers:

- Bospoort Water Treatment Works (1 Unit, mounted next to telemetry cubicle)
- Bospoort to Vaalkop / Bospoort North HLPL Link Chamber (1 Unit, mounted next to telemetry cubicle)
- Bospoort Reservoirs [Magalies Water] (1 Unit, mounted next to telemetry cubicle)

CONTRACT
Part C3: Scope of Works

A415
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PS ESGS STANDBY GENERATOR

PSESGS-1 SCOPE

This specification, read together with the applicable Particular Specifications included under section C3.4.2.2 covers the performance specifications, design parameters, manufacture, supply and delivery to site, installation, testing, adjustment and commissioning of the generator to be provided under this Contract.

The preferred make of equipment offered shall be the **Schneider range of equipment so as to standardise with equipment that is already on site**. All components shall correspond with preferred manufacturer. The generator preferred shall be either Volvo, Cummins, Scania, Perkins, CAT or John Deere.

Equipment shall be as follows:

Controller shall be	–	Lavato
Change over shall include	–	Voltage, frequency, undervoltage, phase rotation relay with timer from Schneider electric
Equipment	–	Schneider Electric
Timers and relays	–	Schneider Electric
AMF & Change Over	–	Motorized by equal or similar to Schneider Electric
AMF & Change Over panel	–	Shall be built by the MCC manufacturer at the same standard Motor Control Centre particular Specification.
AMF & Changeover	–	Yes
PLC	–	Yes, minimum Schneider Electric M340

PSESGS-3 GENERATOR DETAILS

The contractor shall make sure that the space provided for the generator and plinth dimensions are sufficient for the generator offered under this contract, will be an outdoor type.

An automatic mains failure and change over system shall be provided for and the generator set shall be housed within container [See Drawings]. All electrical equipment associated with starting and stopping of the set, protection of the set, indications and starting battery charger shall be provided.

CONTRACT
Part C3: Scope of Works

A416
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Weatherproof Purpose Modified standard ISO container [See drawings], enclosing the generating set completely with its Control Panel, Switch Gear and a Weatherproof Purpose Modified standard ISO container for Fuel Tank. Suitably treated, painted and bolted to the duplex base frame and mounted on concrete plinth [done by civil sub-contractor and provisional amount left in BOQ]

Suitable openings are provided for fresh air inlet, hot air outlet, all manufactured from steel and screened with wire mesh to prevent the ingress of birds and rodents.

Lockable-hinged doors are provided on both sides fitted with container door camlocks for access to the generating set, the control panel, connection arrangements and service parts.

The size has been determined and the Generator shall be as follows:

Containerized Standby Generator Size	–	2.5MVA
Containerized Bulk Fuel Tank	–	10 000 liter
Voltage	–	400V

Bospoort Water Treatment plant has Eskom voltage fluctuations during high demand periods, on the overhead line. The generator shall start during low voltage / voltage fluctuations for adjustable period of time.

PSESGS-7.2 COMPOSITION OF THE STANDBY GENERATOR SYSTEM

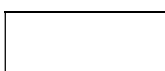
The following additional components shall be incorporated into the system to have a complete containerized standby generator and containerized bulk fuel tank.

Item	Description	Model	Specification
1	Primary filter/water separator	DFF0036	6-micron nominal, 15 micron absolute 40 l/min max. Manual water drain
2	Circulation pump	CMA 050	0.37 kW 3~
3	ALGAE-X	LGX – 3000	13 – 50 l/min

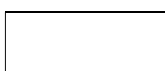
CONTRACT
Part C3: Scope of Works

A417
Variations & Additions to Standard & Particular Specifications

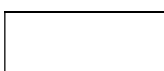
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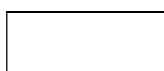
Employer



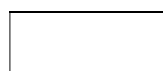
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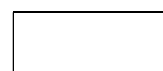
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Item	Description	Model	Specification
4	Secondary filter	P16-6416 (head) P56-0584 (element)	15 microns 130 l/min max. Water block
5	Flow meter	K400 pulser	
6	Globe valve	1"	
7	PLC	Schneider Electric M340 minimum	

Primary filter/water separator

The Primary Filter/Water Separator is located before the pump. The body contains a filter element, which filters the diesel fuel down to 6 micron (nominal) and removes any entrained water. A plug at the bottom of the unit allows separated water, which settles at the bottom of the body, to be drained. A manual air bleed on the flanged lid allows air to be bled from the filter/water separator.

Flow: 40 l/min (max.)
Pressure: 5 bar (max.)
Temperature: -10°C to 70°C

Circulation pump

The circulation pump is located after the primary filter. The pump is a single impeller centrifugal type, driven by a TEFC 2 pole electric motor.

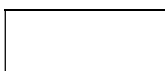
The pump runs on a timer and periodically draws fuel from the bulk tank, circulates it through the series of filters and returns the fuel back into the same tank.

Suction: 1" BSP
Discharge: 1" BSP
P1: 0.63 kW
P2: 0.37 kW
Absorbed current: 1.4 A
Flow: 0 – 90 l/min
Head: 20 – 10.5 m

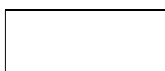
CONTRACT
Part C3: Scope of Works

A418
Variations & Additions to Standard & Particular Specifications

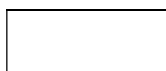
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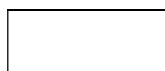
Employer



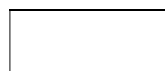
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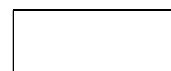
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Algae – X

The Algae – X magnetic fuel conditioner stabilizes and conditions the diesel fuel.

The fuel conditioner has no moving parts, requires no electrical connection and requires no maintenance.

Due to the magnetic internal parts of the fuel conditioner, it is mounted on a non-ferrous bracket.

Secondary Filter

The Secondary Filter assembly is positioned after the fuel conditioner. It is made up of 2 parts:

- The filter head
- Spin on filter element

The water block properties of the filter element remove any emulsified and dissolved water.

Globe Valve

A globe valve is positioned at the end of the system. Its function is to throttle the flow of diesel fuel to within the acceptable range of the fuel conditioner.

The valve is set during commissioning and is to be left in this position between filter replacements. It might be necessary to adjust the valve after filter element or other component replacements.

PLC

Minimum Schneider Electric M340 PLC controls the basic functions of the system shall be supplied – See PLC section in this Contract. All signals, alarms and commands are routed through the PLC.

The PLC starts and runs the circulation pump for a period of 12 hours once per week automatically. If this is not completed an alarm will be generated and displayed on HMI System at Main MCC.

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Containers for generator and bulk fuel tank

The shelter is a standard ISO Sea Freight container per ISO 1496 and must be converted for the explicit use of housing a diesel generator set for the proper operating conditions of the equipment. The shelter shall be sealed to resist water ingress to IP54.

The exterior envelope size of the container:

Generator

Height	Length	Width
2.7m	12m	2.35m

Bulk Fuel Tank

Height	Length	Width
2.7m	6m	2.35m

The interior envelope size of the shelter equipment compartment shall be derived from sufficient insulation thickness to provide a minimum insulating factor of R10 or better.

Wall sections: All wall sections must meet an insulation factor of -R10 or better and adhere to ISO 1496-1. Interior walls shall be insulated with suitable material (minimum 50mm thickness) and cover with sonic liner.

Floor: The floor section shall consist of standard ISO flooring. Cover with a commercial grade aluminum plates or equivalent material with easy to clean properties.

Roof: The roof shall have an anti-skid surface; Ceiling must meet an insulation factor of R10 or better.

Generator Access

The generator must be accessible for maintenance from two doors on either side of the container.

Generator Ventilation

The generator requires ventilation to the outside of the container for intake, exhaust and hot air dissipation. Install to suit equipment. The generator ventilation system is to be designed for a maximum rise in temperature of 10°C over the ambient temperature.

CONTRACT
Part C3: Scope of Works

A420
Variations & Additions to Standard & Particular Specifications C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Equipment Cutouts

Cutouts for cable feeders, generator air intake and outlet, and exhaust cut-outs will be required. Also, generator supply line feed through is required through the bulkhead. Sizes and locations to suit equipment install.

Exterior Finish

All exterior surfaces including walls, roof, doors, under belly and exposed hardware require a rust inhibitive paint, beige or desert sand in colour. Sign writing or logo application for external finish is *N/A*.

PSESGS-4 GENERATOR SIGNALS

The following additional equipment shall be available in order to monitor the following items from the Generator, however it not only limited to the below referenced items.

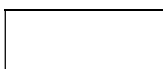
The Contractor shall allow for all items to be displayed on the HMI:

Generator healthy
Generator trip
Generator run/stop
Generator E-Stop
Generator bulk fuel tank level Analogue Monitor / Alarm / Trip
Generator Engine and Alternator temperature
Generator Engine and Alternator temperature Trip / Alarm
Generator Engine water level Alarm / Trip
Generator Engine Oil Level Alarm / Trip
Generator Alternator Charging Operational
Generator Engine Temperature
Generator Normal/Fail
Generator Low Battery
Generator DC voltage below 12 Volt
Generator Low Oil level
Generator Overload

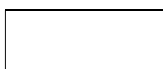
CONTRACT
Part C3: Scope of Works

A421
Variations & Additions to Standard & Particular Specifications

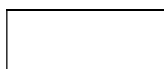
C3.4.3



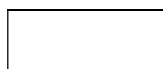
Employer



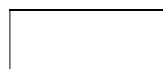
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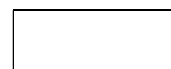
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

Generator circulation Pump Run / Stop / Healthy Statuses
All Generator information shall be displayed on HMI in Main MCC
Power Analyzer values to be captured in PLC and displayed on plant and HMI and distributed through plant and linked to other power analyzers– Apparent Power, Power, Reactive Power, line and phase Voltages, Line and phase Currents, Power Factor, all billing information.

CONTRACT
Part C3: Scope of Works

A422
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PS EELS EARTHING AND LIGHTNING PROTECTION

PSEELS-1 SCOPE

This specification, read together with the applicable Particular Specifications included under section C3.4.2.2, covers the performance specifications, design parameters, manufacture, supply and delivery to site, installation, testing, adjustment and commissioning of the all earthing and lightning protection equipment to be provided under this Contract.

PSEELS-6 AIR-TERMINATION SYSTEM

The Contractor shall use an air-termination system, and shall be composed combination of the following elements:

- Rods.
- Stretched wires.
- Meshed conductors.
- Any exposed conductors shall be done with Kwena anti – theft conductors.
- All bonding which are exposed shall be done with Kwena anti – theft conductors.

PSEELS-10 INTERNAL & EXTERNAL LIGHTNING PROTECTION SYSTEM

Class 1 earthing and lighting protection shall be provided at the following locations:

- Bospoort Water Treatment Works [proposed mast tower and antenna].
- Bospoort to Vaalkop / Bospoort North HLPL Link Chamber [mast, control room and antenna].
- Bospoort Reservoirs [Magalies Water] [mast, control room and antenna].
- Containerised Generator and Fuel Tank.

The lighting protection shall be done by a qualified specialist. They will be required to submit approved drawings and all associated calculations. Lighting protection certificate (COC) for each building and structure shall be completed, approved and registered by the Engineer and only then submitted to the Engineer for approval.

All exposed external earthing and bonding shall be done with **Kwena Anti-Theft Cable**.

CONTRACT
Part C3: Scope of Works

A423
Variations & Additions to Standard & Particular Specifications C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSESPL ELECTRICAL INSTALLATION IN BUILDINGS AND ON STRUCTURES

PSESPL-1 SCOPE

The scope for the distribution board sections shall include everything required to provide a complete small power distribution and lighting system. The design of the distribution board shall allow for single and three phase supplies to equipment on site.

PSESPL-4 LIGHT FITTINGS

Note: All luminaires must be approved by the Engineers prior to the installation of or any order being placed. Only light fittings as well as all light fitting components carrying the SABS mark of approval

Type A : **19W LED** Enclosed dust, moisture, vandal and corrosion proof luminaire. The luminaire shall be made of a high-pressure die-cast marine grade aluminium body with a robust clear polycarbonate diffuser. The luminaire shall bear the SANS 60598-2-1 safety mark. Equal or similar to Roughguard from Beka.

Type B : **19W LED** Enclosed dust, moisture, vandal and corrosion proof luminaire. The luminaire shall be made of a high-pressure die-cast marine grade aluminium body with a robust clear polycarbonate diffuser. The luminaire shall bear the SANS 60598-2-1 safety mark. Equal or similar to Roughguard from Beka plus 1hour EMG maintained (emergency).

Type C : **55W LED** Enclosed dust, moisture, vandal and corrosion proof luminaire. The luminaire shall be made of a high-pressure die-cast marine grade aluminium body with a robust clear polycarbonate diffuser. The luminaire shall bear the SANS 60598-2-1 safety mark. Equal or similar to Roughguard from Beka.

Type D : **55W LED** Enclosed dust, moisture, vandal and corrosion proof luminaire. The luminaire shall be made of a high-pressure die-cast marine grade aluminium body with a robust clear polycarbonate diffuser. The luminaire

CONTRACT
Part C3: Scope of Works

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Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

shall bear the SANS 60598-2-1 safety mark. Equal or similar to Roughguard from Beka plus 1hour EMG maintained (emergency).

- Type E** : **40W LED** enclosed dust, moisture, vandal and corrosion proof **Zone 2** luminaire. The luminaire shall consist of an Injection-moulded, flame retardant polycarbonate with a robust clear polycarbonate diffuser and shall be designed to operate LED's of up to 65W, and fluorescent lamps up to 80W. The luminaire shall bear the SANS 60598-2-1 safety mark. Equal or similar to Vapourline from Beka.
- Type F** : **40W LED** enclosed dust, moisture, vandal and corrosion proof **Zone 2** luminaire. The luminaire shall consist of an Injection-moulded, flame retardant polycarbonate with a robust clear polycarbonate diffuser and shall be designed to operate LED's of up to 65W, and fluorescent lamps up to 80W. The luminaire shall bear the SANS 60598-2-1 safety mark. Equal or similar to Vapourline from Beka plus 1hour EMG maintained (emergency).
- Type G** : **65W LED** enclosed dust, moisture, vandal and corrosion proof **Zone 2** luminaire. The luminaire shall consist of an Injection-moulded, flame retardant polycarbonate with a robust clear polycarbonate diffuser and shall be designed to operate LED's of up to 65W, and fluorescent lamps up to 80W. The luminaire shall bear the SANS 60598-2-1 safety mark. Equal or similar to Vapourline from Beka.
- Type H** : **65W LED** enclosed dust, moisture, vandal and corrosion proof **Zone 2** luminaire. The luminaire shall consist of an Injection-moulded, flame retardant polycarbonate with a robust clear polycarbonate diffuser and shall be designed to operate LED's of up to 65W, and fluorescent lamps up to 80W. The luminaire shall bear the SANS 60598-2-1 safety mark. Equal or similar to Vapourline from Beka plus 1hour EMG maintained (emergency).
- Type I** : **18W LED Bulkhead** warm white enclosed dust, moisture, vandal and corrosion proof luminaire. The luminaire shall consist of a high-pressure die-cast marine grade aluminium body with a robust clear polycarbonate diffuser and shall be designed to operate 18W LED's lamps. The luminaire shall bear the SANS 60598-2-1 safety mark. Equal or similar to Bekabulk.

CONTRACT
Part C3: Scope of Works

A425
Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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- Type J** : **18W LED Bulkhead** warm white enclosed dust, moisture, vandal and corrosion proof luminaire. The luminaire shall consist of a high-pressure die-cast marine grade aluminium body with a robust clear polycarbonate diffuser and shall be designed to operate 18W LED's lamps. The luminaire shall bear the SANS 60598-2-1 safety mark. Equal or similar to Bekabulk plus 1hour EMG maintained (emergency).
- Type K** : **18W LED Bulkhead** warm white enclosed dust, moisture, vandal and corrosion proof and **Zone 2** luminaire. The luminaire shall consist of a high-pressure die-cast marine grade aluminium body with a robust clear polycarbonate diffuser and shall be designed to operate 18W LED's lamps. The luminaire shall bear the SANS 60598-2-1 safety mark. Equal or similar to Bekabulk.
- Type L** : **18W LED Bulkhead** warm white enclosed dust, moisture, vandal and corrosion proof and **Zone 2** luminaire. The luminaire shall consist of a high-pressure die-cast marine grade aluminium body with a robust clear polycarbonate diffuser and shall be designed to operate 18W LED's lamps. The luminaire shall bear the SANS 60598-2-1 safety mark. Equal or similar to Bekabulk plus 1hour EMG maintained (emergency).
- Type M** : **53W LED Street Light** Manufactured from marine grade aluminium allows for corrosion resistance and optimal thermal management. A silicon sponge gasket fixed into a groove to seal the spigot base casting to the LED engine casting to IP66. The high-impact clear glass protector allows for impact resistance of IK08 with the option of Polycarbonate protector with an impact resistance of IK10. Equal or similar to LEDLUME-MINI from Beka.
- Type N** : **216W LED Floodlight** warm white enclosed dust, moisture, vandal and corrosion proof luminaire. The luminaire shall be die-cast aluminium gear and optical housing for the lamp and control gear with a polycarbonate diffuser. It shall be designed to operate LED light sources between 108W and 216W. Equal or similar to LEDflood from Beka.

CONTRACT
Part C3: Scope of Works

A426
Variations & Additions to Standard & Particular Specifications C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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- Type O** : **216W LED Highbay** warm white enclosed dust, moisture, vandal and corrosion proof luminaire. The luminaire shall be die-cast aluminium gear and optical housing for the lamp and control gear with a polycarbonate diffuser. It shall be designed to operate LED light sources between 108W and 216W. Equal or similar to LEDbay-midi from Beka.
- Type P** : **216W LED Highbay** warm white enclosed dust, moisture, vandal and corrosion proof luminaire. The luminaire shall be die-cast aluminium gear and optical housing for the lamp and control gear with a polycarbonate diffuser. It shall be designed to operate LED light sources between 108W and 216W. Equal or similar to LEDbay-midi from Beka plus 1hour EMG maintained (emergency).

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSESPL-A BOSPOORT TO VAALKOP / BOSPOORT NORTH HLPL LINK CHAMBER

PSESPL-A.1 LIGHT SWITCHES

NUMBER	DESCRIPTION	LOCATION
S1	One lever 16Amp surface mounted light. Manufactured from tough impact resistant thermoplastic which provides strength and durability. The light switch will be housed inside weatherproof protection IP55 rated enclosure. The enclosure shall have protective membrane, which will allow the operator to comfortably operate the switch through the membrane. Equal or similar to Schneider Electric IP55 weatherproof range.	1.25m above final floor level

PSESPL-A.2 SOCKET OUTLETS

NUMBER	DESCRIPTION	LOCATION
P1-P3	20Amp surface mounted Double switch socket outlet. Manufactured from tough impact resistant thermoplastic which provides strength and durability. The switch socket outlet will be housed inside weatherproof protection IP55 rated enclosure. The enclosure shall have protective membrane, which will allow the operator to comfortably operate the switch through the membrane. Equal or similar to Schneider Electric IP55 weatherproof range.	1.35m above final floor level

PSESPL-A.4 LIGHT FITTINGS

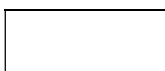
Light fittings shall be equal and similar to the requirements of the general technical specification as specified under.

NUMBER	LOCATION	TYPE
L01	Luminaries fitted against roof	A
L02 – L05	Luminaries fitted against concrete against structure 2300mm AFFL	I

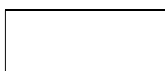
CONTRACT
Part C3: Scope of Works

A428
Variations & Additions to Standard & Particular Specifications

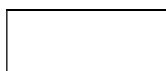
C3.4.3



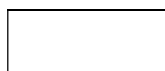
Employer



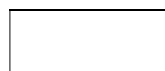
Witness 1



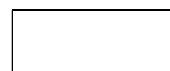
Witness 2



Contractor



Witness 1



Witness 2



RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSESPL-A.6 BOSAL CONDUIT

QTY	DESCRIPTION	MOUNTED
All	25mm Bosal conduit including all accessories: Plus	Surface mounted
All	25mm conduit saddles and all accessories: Plus	Surface mounted
All	Solid Coupling Galvanized & Female Threaded Adaptor Galvanized & Male Threaded Adaptor Galvanized	Surface mounted
All	Round Conduit box plus cover and all accessories	Surface mounted

PSESPL-A.7 PRATLEY JUNCTION BOXES OR GCC BOXES

QTY	DESCRIPTION	MOUNTED
All	Pratley Ex e/n Ezee-Fit Junction Box plus corrosion resistant cover which will suite the application.	Surface Mounted

PSESPL-A.8 WIRING CABLE

QTY	DESCRIPTION	MOUNTED
All	The Engineer will not reference all the cables. It is the responsibility of Contractor to allow for all wiring for all the equipment as specified above. Single core and multicore cable shall be 600 / 1000V SANS 1011 complaint. These cables are only a guide and Contractors must make due allowance for all cabling to complete the works in its entirety.	Surface and flush mounted

PSESPL-B BOSPOORT RESERVOIRS [MEGALIES WATER]

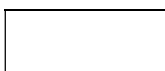
PSESPL-B.1 LIGHT SWITCHES

NUMBER	DESCRIPTION	LOCATION
S1	One lever 16Amp surface mounted light. Manufactured from tough impact resistant thermoplastic which provides strength and durability The light switch will housed inside weatherproof protection IP55 rated enclosure. The enclosure shall have protective membrane, which will allow	1.25m above final floor level

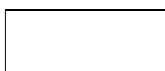
CONTRACT
Part C3: Scope of Works

A429
Variations & Additions to Standard & Particular Specifications

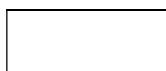
C3.4.3



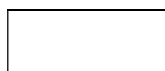
Employer



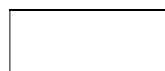
Witness 1



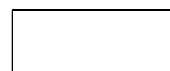
Witness 2



Contractor



Witness 1



Witness 2

RUSTENBURG WATER SERVICES TRUST

BID NO: RWST 2021/02

BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

NUMBER	DESCRIPTION	LOCATION
	the operator to comfortably operate the switch through the membrane. Equal or similar to Schneider Electric IP55 weatherproof range.	

PSESPL-B.2 SOCKET OUTLETS

NUMBER	DESCRIPTION	LOCATION
P1-P3	20Amp surface mounted Double switch socket outlet. Manufactured from tough impact resistant thermoplastic which provides strength and durability. The switch socket outlet will be housed inside weatherproof protection IP55 rated enclosure. The enclosure shall have protective membrane, which will allow the operator to comfortably operate the switch through the membrane. Equal or similar to Schneider Electric IP55 weatherproof range.	1.35m above final floor level

PSESPL-B.4 LIGHT FITTINGS

Light fittings shall be equal and similar to the requirements of the general technical specification as specified under.

NUMBER	LOCATION	TYPE
L01	Luminaries fitted against roof	A
L02 – L05	Luminaries fitted against concrete against structure 2300mm AFFL	I

PSESPL-B.6 BOSAL CONDUIT

QTY	DESCRIPTION	MOUNTED
All	25mm Bosal conduit including all accessories: Plus	Surface mounted
All	25mm conduit saddles and all accessories: Plus	Surface mounted
All	Solid Coupling Galvanized & Female Threaded Adaptor Galvanized & Male Threaded Adaptor Galvanized	Surface mounted

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	MOUNTED
All	Round Conduit box plus cover and all accessories	Surface mounted

PSESPL-B.7 PRATLEY JUNCTION BOXES OR GCC BOXES

QTY	DESCRIPTION	MOUNTED
All	Pratley Ex e/n Ezee-Fit Junction Box plus corrosion resistant cover which will suite the application.	Surface Mounted

PSESPL-B.8 WIRING CABLE

QTY	DESCRIPTION	MOUNTED
All	The Engineer will not reference all the cables. It is the responsibility of Contractor to allow for all wiring for all the equipment as specified. Single core and multicore cable shall be 600 / 1000V SANS 1011 complaint. These cables are only a guide and Contractors must make due allowance for all cabling to complete the works in its entirety.	Surface and flush mounted

PSESPL-C STANDBY GENERATOR AND BULK FUEL

PSESPL-C.1 LIGHT SWITCHES

NUMBER	DESCRIPTION	LOCATION
S1 – S4	One lever 16Amp 2-way surface mounted light. Manufactured from tough impact resistant thermoplastic which provides strength and durability The light switch will be housed inside weatherproof protection IP55 rated enclosure. The enclosure shall have protective membrane, which will allow the operator to comfortably operate the switch through the membrane. Equal or similar to Schneider Electric IP55 weatherproof range.	1.25m above final floor level

CONTRACT
Part C3: Scope of Works

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Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSESPL-C.2 SOCKET OUTLETS

NUMBER	DESCRIPTION	LOCATION
P1-P4	20Amp surface mounted Double switch socket outlet. Manufactured from tough impact resistant thermoplastic which provides strength and durability. The switch socket outlet will be housed inside weatherproof protection IP55 rated enclosure. The enclosure shall have protective membrane, which will allow the operator to comfortably operate the switch through the membrane. Equal or similar to Schneider Electric IP55 weatherproof range.	1.35m above final floor level

PSESPL-C.4 LIGHT FITTINGS

Light fittings shall be equal and similar to the requirements of the general technical specification as specified under.

NUMBER	LOCATION	TYPE
L01 – L10	Luminaries fitted against concrete against structure 2300mm AFFL	C [8 lights in generator and 2 lights for fuel]
L011 – L020	Luminaries fitted against concrete against structure 2300mm AFFL	D [8 lights in generator and 2 lights for fuel]

PSESPL-C.6 BOSAL CONDUIT

QTY	DESCRIPTION	MOUNTED
All	25mm Bosal conduit including all accessories: Plus	Surface mounted
All	25mm conduit saddles and all accessories: Plus	Surface mounted
All	Solid Coupling Galvanized & Female Threaded Adaptor Galvanized & Male Threaded Adaptor Galvanized	Surface mounted
All	Round Conduit box plus cover and all accessories	Surface mounted

CONTRACT
Part C3: Scope of Works

A432
Variations & Additions to Standard & Particular Specifications
C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSESPL-C.7 PRATLEY JUNCTION BOXES OR GCC BOXES

QTY	DESCRIPTION	MOUNTED
All	Pratley Ex e/n Ezee-Fit Junction Box plus corrosion resistant cover which will suite the application.	Surface Mounted

PS ESPL-C.8 WIRING CABLE

QTY	DESCRIPTION	MOUNTED
All	The Engineer will not reference all the cables. It is the responsibility of Contractor to allow for all wiring for all the equipment as specified above. Single core and multicore cable shall be 600 / 1000V SANS 1011 complaint. These cables are only a guide and Contractors must make due allowance for all cabling to complete the works in its entirety.	Surface and flush mounted

PSESPL-C6.2 LOCAL WALL MOUNTED DISTRIBUTION BOARD (SURFACE MOUNTED TYPE)

Type: These specification shall be considered as minimum design requirement in terms of the Contractor's Tender offer. The Electrical and Electronic Contractor(s) shall coordinate with the Civil Contractor to ensure sufficient allowance is made in their tender offer to provide a fit for purpose unit/system.

The distribution board shall be manufactured accordance to Particular Specification. The equipment referenced below does not relieve the contractor of his responsibilities in terms of quality, dimensions and proper functioning of the system.

The motor control centre board or distribution board shall be of the surface mounted type with a minimum IP rating of 42 (insect proofed enclosure). The motor control centre or distribution board shall be constructed with a minimum of 2mm 3CR12 stainless steel and shall be bolted into position by means of M16 high tensile stainless-steel bolts grouted into the wall, the bolts shall be inside the board.

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

The panel door shall be provided with a locking system suitable for padlocking. The locking system shall consist of a 3CR12 stainless steel 3-way locking mechanism locking the door at the top, middle and bottom. The unit doors shall be capable of being opened at least 110 degrees.

The board shall be provided with readily removable, sectionalized, rigidly supported unpainted 316 cable end support gland plates along the entire length of the board.

Sufficient provision for ventilation and heat dissipation as per the equipment ratings and manufacturers requirements shall be allowed for. Screwed-on engraved labels in English shall be provided below all switchgear and equipment on and in the panels, to facilitate identification. All unpainted parts shall be plated for corrosion resistance.

Supply Normal: 35mm² 4C Cu PVC SWA PVC cable plus 25mm² Bare Copper Earth Cable from the Main MCC.

Colour: Painted Light Orange – B26 (SANS 1091:2012) external, White arc-free internal (see Painting and Finishing).

Fault Level: 6kA [45kA Main MCC] – Cascading Distribution Breakers shall be added in MCC to reduce at DB to 6kA.

Sectioning: Multi-section, Form 3b or Form 4 to SANS IEC 60439.

Future: 30% for future extensions space.

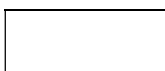
Cable Entry: Incoming and Outgoing – Top and Bottom 3CR12 Unpainted.

QTY	DESCRIPTION	IDENTIFICATION
One	Panels comprising the following [Orange]	Incomer
1	60Amp continuous current rated TP (triple pole) MCCB circuit breaker complete sufficient auxiliary contacts to monitor if open or closed position. Equal or similar to Schneider Electric: Plus	Main Circuit Breaker
Set	80/1 Amp current transformer: Plus	Current inputs

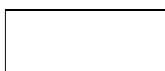
CONTRACT
Part C3: Scope of Works

A434
Variations & Additions to Standard & Particular Specifications

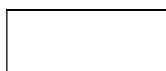
C3.4.3



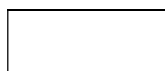
Employer



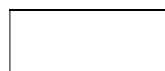
Witness 1



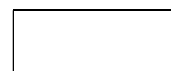
Witness 2



Contractor



Witness 1



Witness 2

RUSTENBURG WATER SERVICES TRUST

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
3	2 Amp HRC fuse holders and fused links: Plus	Voltage inputs
1	Front panel mounted LCD digital display supply network analyzer comprising of combined voltage, current, maximum demand power measurement and power factor correction measurement complete with network card: Plus	Network analyser
4	80Amp tint copper bus bars [appearance shall be aluminium], suitable clamps shall be used, and no drilling shall be allowed on the busbars [cubic system shall be used]: Plus	3 Phase + N
1	40Amp tint copper bus bars [appearance shall be aluminium], suitable clamps shall be used, and no drilling shall be allowed on the busbars [cubic system shall be used]: Plus	Earth
4	125Amp continuous current rated HRC fuse holders and fused links: Plus	Surge arrestors connection fuses
1	Three Phase Class 2 surge arrestor unit connection type 2 as per SANS 10142-1 equal or similar to DEHNguard DG M TT 275 FM: Plus	Surge arrestor plus signals
3	2Amp continuous current rated HRC fuse holders and fused links: Plus	Indicator Lamp Protection
3	Robust LED indicator lamps connected load side of the circuit breaker.	Indicators for 3 Phase (Red, White and Blue Indications)
1	Relay for under voltages, phase sequence, and phase loss in three phases Plus	Protection relay

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2

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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
One	Panels comprising the following [Orange]	Distribution Section
1	63Amp SP + N earth leakage without overload protection: Plus	Earth Leakage for each phase [one for each phase]
2	20Amp continuous current rated SP MCB: Plus	Socket Circuits
1	63Amp TP + N earth leakage with overload protection: Plus	Earth Leakage for welding socket [one for each phase]
2	10Amp continuous current rated SP MCB: Plus	Lighting Circuit allowances
1	16Amp continuous current rated TP MCB: Plus	Electrocutor Circuit
1	30Amp continuous current rated TP Type2 Coordinated Contactor: Plus	Electrocutor Circuit contactor, type 2 coordination
1	6Amp continuous current rated SP MCB: Plus	Electrocutor Circuit
1	6Amp continuous current rated SP MCB: Plus	Electrocutor Circuit Coil Protection

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

QTY	DESCRIPTION	IDENTIFICATION
1	Time switch equal and similar Schneider electric ITA digital with 100 hour standby capacity: Plus	Electrocutor Circuit Digital Timer Switch
3	10Amp continuous current rated SP MCB: Plus	Electrocutor Circuits
1	20Amp continuous current rated SP + N MCB: Plus	Access Control Feeder
1	20Amp continuous current rated SP + N MCB: Plus	Fire Detection Feeder

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2



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BOSPOORT WATER SUPPLY SCHEME: BOSPOORT PUMP STATION UPGRADE

PSEMCA MULTICORE CABLES AND EARTHWIRES

PSEMCA-1 SCOPE

1. All earth wires shall be bare copper conductors, unless otherwise specified and cables shall be as specified.
2. These cables are only a guide and Contractors must make allowance for all cabling to complete the works in its entirety.
3. Before ordering cables, the contractor shall obtain the correct cable lengths by measuring required cable routes on site.

PSEMCA-8 CABLE TRAYS AND CABLE LADDERS

All cable trays and cable ladders shall be galvanised steel. Cable trays will only be acceptable for cable supports where small cables are involved.

Vertically installed cable ladders are preferred wherever possible.

PSEMCA-9 INSTALLATION OF CABLES

It is the responsibility of the Contractor, as this is a design and build contract, to ensure the correct supply and signal cabling is specified and utilized for the relevant electrical and electronic equipment.

In order to support the cable sections, the following information and documentation should be supplied before project implementation:

1. Equipment schedules (motor, valves, etc.).
2. Instrumentation list.
3. Motor List.
4. Cable Schedules.

CONTRACT
Part C3: Scope of Works

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Variations & Additions to Standard & Particular Specifications

C3.4.3

Employer

Witness 1

Witness 2

Contractor

Witness 1

Witness 2