SARS MUSINA WAREHOUSE

LOADING BAY

ELECTRICAL INSTALLATION SPECIFICATION

AUGUST 2015

SUPPLY AND INSTALLATION OF ELECTRICAL SERVICES FOR THE REFURBISHMENT OF THE MUSINA WAREHOUSE LOADING BAY

PROJECT SPECIFICATION FOR THE SUPPLY AND INSTALLATION OF THE ELECTRICAL SERVICES

DETAIL SPECIFICATION

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Client: SARS Facilities
Project: Musina Warehouse Loading Bay
Services: Electrical Services

1 GENERAL

This project entails the electrical installation for a new loading bay at the existing Warehouse building for SARS at Musina, adjacent to the Musina Military Base.

The existing building comprises of a ground floor with double volume area areas covered with a concrete soffit (store room and ablutions). The warehouse area is currently not in use. The balance of the site has an administration and generator building.

2 SCOPE OF WORK

The scope of the electrical installation for the existing building shall comprise:

- Electrical distribution board modifications and new installations;
- Low voltage cabling and cable terminations;
- Luminaire installation;
- Replacement of lamps of the existing luminaires on the warehouse building perimeter;
- Installation of wiring ducts;
- Labelling and nomenclature on sockets and light switches;
- Site supervision;
- Witnessed testing;
- Production of as-built drawings;
- 12 months maintenance and guarantee on balance of materials and workmanship, and;
- The issuing a certificate of compliance for modifications to DB-2.

The successful Contractor is to allow for a detailed audit of the existing installation in conjunction with the Engineer and provide a detailed programme of equipment/electrical installation within two weeks after award of contract.

3 SITE CONDITIONS

The site building is located in Musina adjacent to the Military Base.

Potable water and toilet facilities are available at the site.

The Main Low Voltage Board is currently not supplied with power. DB-2 is connected to the main Low Voltage board by a cable from the existing Main Low Voltage Board. The Electrical Contractor will have to supply generator power for work done by him including testing of DBs until another party connects power to the main low voltage Board.

All equipment and materials shall be designed to operate at the following ambient conditions:

Altitude above sea level:	600m
Average ambient air temperature:	29.6℃ (max)
	15.4℃ (min)
Extreme air temperature:	46℃ (max)
	0 ℃ (min)
Humidity:	49-59% (avg)
Corrosion:	Mild
Dust:	High

4 STANDARD SPECIFICATIONS, REGULATIONS AND CODES

4.1 The latest edition, including all amendments up to date of tender of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

- The general conditions of contract shall be as dictated by the principal contract.
- The applicable SABS code of Practice for the Wiring of Premises shall be SANS 10142-1:2003 amendment 8.
- Reference to Occupational Health and Safety Act shall be taken as referring to the Occupational Health and Safety Act 85, 1993 and regulations as amended.
- SANS 10098-1: Public lighting Part 1: The lighting of public thoroughfares.
- SANS 10098-2: Public lighting Part 2: The lighting of certain specific areas of streets and highways.
- SANS 60269-6: Low-voltage fuses Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems.
- SANS 156: Moulded-case circuit-breakers.
- SANS 10313:2010: Protection against lightning — Physical damage to structures and life hazard.
- SANS 10225: The design and construction of lighting masts.
- SANS 60598-2-3: Luminaires - Part 2-3: Particular requirements – Luminaires for road and street lighting.
- For lighting structures and lightning protection: any steel components shall be hot dip galvanized to SANS EN 10240:1997 (SANS 32).
- Equipment used shall originate from Suppliers which have been certified in accordance with SABS ISO 9001 (ISO 9001) or SABS ISO 9002 (ISO 9002) for quality assurance. Copies of certificates of approval shall be provided by the Tenderers with their tenders.

The Standard Electrical Specification shall be read in conjunction with the Project Specification

5 CONSTRUCTION PROGRAM

The Contractor's programme shall be co-ordinated with that of the Principal Contractor. The Contractor shall take note of the accelerated construction programme.

6 QUALITY OF MATERIALS

6.1 All materials used shall be new except where otherwise indicated.

6.2 Material shall be installed as per the Manufacturers instructions.

6.3 All material shall comply with the relevant SANS specifications.

6.4 All materials shall be unconditionally guaranteed for a minimum period of 12 months.

6.5 The Contractor shall replace any materials that are found to be defective during the 12 months defects liability period. Note that this requirement includes lamp replacement.

6.6 Samples of equipment offered shall be submitted for formal approval by the Engineer prior to procurement.

7 COMPETENCE OF PERSONNEL, WORKMANSHIP AND STAFF

7.1 All work shall be executed and supervised by suitably qualified staff. Only "ACCREDITED PERSONS" shall be permitted to carry out and supervise electrical work on site.

7.2 The Contractor shall at all times have an adequate number of employees available during the construction period to ensure that the electrical work does not delay the construction program.

8 STORAGE

8.1 The Contractor shall provide adequate and safe storage for all materials. Safe storage space on the construction site can be negotiated with the main contractor.

9 CO-ORDINATION OF SERVICES ON SITE

9.1 The Contractor shall be responsible for the on site co-ordination with the Principal Contractor and other Sub-contractors. Due allowance shall be made for this liaison and on-site co-ordination in the tender price.

10 FINISHING AND TIDYING

10.1 Progressive and systematic finishing and tidying will form an essential part of this Contract. On no account will soil, rubble, materials, equipment or unfinished operations be allowed to accumulate in such a manner as to impede the activities of Others. In the event of this occurring, the Client will have the right to withhold payment for as long as may be necessary in respect of the relevant Works in the area(s) concerned, without thereby prejudicing the rights of Others to institute claims against the Contractor on the ground of unnecessary obstruction.

10.2 Finishing and tidying shall therefore not be left to the end of the Contract, but shall be a continuous operation.

11 CABLE INSTALLATION

11.1 All power cables shall have stranded copper conductors, and shall be of the 600/1 000V PVC/SWA/PVC type. Power cables shall comply with SANS 1574 Part 1; 3; 4 & 5.

11.2 All cable terminations shall be done with crimped cable lugs.

11.3 Where sleeves are not specified, power cables shall be laid directly in the ground. Minimum laying depths shall be 800 mm below final ground level, unless otherwise specified, and routes shall be as indicated on the drawings.

11.4 Tenderers shall base their rates on hand excavation to minimise risk of damage to any existing services.

11.5 All trenching, including excavations, bedding layers, shoring and prevention of water logging, drainage of excavations, backfilling and compaction of trenches form part of this contract. The Contractor shall be deemed to have allowed for the laying of cables, terminal boxes, glands and termination of cables. Trenches shall be compacted to a minimum of 93% of modified AASHTO density during backfilling.

11.6 Tenderers shall be aware that other services might be installed along the same routes as the cables. The Contractor shall, before commencing with any excavations, peg out the proposed cable route and obtain the Engineers approval.

11.7 Positions of concrete cable markers shall be pegged on site in collaboration with the Engineer. The wording of the stamped aluminum labels shall be provided by the Engineer.

11.8 Sleeve connections have been provided by Others.

12 DISTRIBUTION BOARDS

12.1 Modifications to the existing distribution board shall be required as part of this project.

12.2 The existing DB affected by the renovations are listed below.

- DB-2 (Generator section only)

12.3 Modifications to the above DBs include, but are not limited to, the following items:

- Relabeling of all DBs
- Installation of additional circuit breakers and contactors, as per the single line diagram
- Faceplate cutouts and repainting (powder coating)

12.4 No on-site faceplate modifications (cutting) and painting will be permitted – all modifications and powder coating shall be done in a factory by a reputable distribution board manufacturer. Sheet metal work shall be measured on site and manufactured off-site. Tray or busbar modifications will be allowed.

12.5 Where the Contractor deems the DB modifications too substantial for on-site modifications, disconnecting and removing of the entire DB shall be considered by the Engineer. This shall be done and approved in writing by the Engineer on a case-by-case basis.

12.6 All new circuit breakers and isolators shall be Merlin Gerin from the Manufacturer Schneider Electric to match the existing installation.

12.7 New sub distribution board supply circuit breakers shall be supplied complete with extended spread connection terminals suitable for multiple cable connections. All cable terminations shall be done with crimped cable lugs.

12.8 Shop drawings shall be submitted to the Engineer for formal approval, before any manufacturing commences. Tenderers shall take note of the existing electrical cupboards dimensions and DB sizes and construction type. All new DBs shall match the existing form factors employed.

12.9 All distribution boards must be inspected and accepted by the Engineer in the factory prior to dispatching.

12.10 The Engineer will provide the exact wording of the engraved labeling requirements during the factory inspection.

13 LIGHTING INSTALLATION

13.1 Luminaires

13.2 The new luminaires for the building shall be supplied by the Contractor after the engineer has approved of samples provided by the Contractor. Tenderers shall allow for the installation cost of the various types of luminaires in the schedule of quantities.

13.2.1 The luminaires shall be wired via 20mmø conduit connected to new P8000 trunking that must be installed at approximately 4.8m AFFL. The trunking must be suspended from the purlins/trusses using purpose made purlin clamps and M8 threaded rods.

13.2.2 Luminaires shall be supplied without fly leads.

13.3 Light switches

13.3.1 Light switches shall be rated at 16A, similar or approved equal to Clipsal S2000 range, complete with white cover plates to match the existing installation.

13.3.2 The switching and control philosophy shall be provided by the Client prior to construction commences.

14 POWER OUTLETS

14.1 Wall-mounted socket outlets shall be from the Clipsal S2000 range to match the existing installation.

14.2 All socket outlets shall be supplied and installed complete with cradles and white socket outlet cover plates for normal power. Red socket outlet cover plates for UPS power shall be used.

14.3 Single and double socket outlets shall each be mounted in a flush-mounted horizontal 100x100x50mm wall box or in power skirting.

14.4 At back-to back socket outlets, galvanized 100x100x50 wall boxes pre-fitted with conduit interconnections, shall be used.

14.5 Lighting Duct

14.5.1 5A un-switched socket outlets are not required.

15 WIRING

15.1 Wiring shall bear the SABS mark and shall be stranded copper or solid copper conductors to match the existing installation. UPS wiring (L&N) shall have a different sheath colour than normal power

15.2 Joints of any kind will not be permitted in wiring. No more than two single or 1 three phase circuit may be drawn into any 20mm conduit.

15.3 All conductors shall be marked by suitable cable markers indicating the circuit (e.g. L1 on both live and neutral conductors) at both ends.

Circuit	**Minimum conductor (size)**	
	Phase (mm^2)	**Earth (mm^2)**
Lighting power supply	2,5 or *4,0mm* (as stated on the single line diagram)	2,5 bare (normal supply)
Motion sensor wiring	1,5mm^2	1,5mm^2 bare
Switched socket outlets & Isolators	4,0	2,5 bare

16 POWER SKIRTING, CABLE TRAYS, TRUNKING AND CONDUIT

16.1 Ducting and wire-ways

16.1.1 Steel ducts, where required, shall be the hot dip galvanized type complete with elbows, splice connectors, elbows, tees, etc. The sizes shall be as specified on the relevant drawings.

16.1.2 Surface mounted ducting shall be secured by means of 8 x 40mm “Fischer” anchors with oversize galvanized fender washers.

16.1.3 Ducts shall only be fitted with purpose made accessories, splices, bends etc.

16.1.4 All wiring ducts shall be fitted with galvanized steel or powder coated covers after cable installation.

16.1.5 PVC glue must be used with the indoor PVC conduit installation. Conduit shall bear the SABS mark.

16.1.6 Galvanized steel conduit shall be employed on all external conduit runs or as indicated on the drawings.

17 EARTHING AND BONDING

17.1 The Electrical Contractor is to ensure that the installations covered in this document are effectively earthed and bonded in accordance with the requirements of the SABS 0313.

Wire ways and trays shall be solidly bonded with 6mm nuts and bolts.

18 LABELING OF CIRCUITS

18.1.1 All outlets, isolators and light switches shall be labelled with engraved labels on the cover plates. The label shall indicate the supply DB and circuit number (e.g. DB-1-L5).

18.2 Wiring inside the DB shall be bear Gravoplast or equal and approved alternative, labels.

Plastic (Brother-type) labels are not acceptable.

19 SITE TESTS AND COMMISSIONING

19.1 The following minimum site tests of the new electrical installation shall be carried out by the Contractor and the results presented to the Engineer:

- Insulation resistance between all conductors and earth
- Insulation resistance between all conductors and neutral
- Insulation resistance between all 3 phase conductors (Separate tests for UPS and normal power circuits)
- Polarity of light switches
- Earth leakage protection on normal power circuits

19.2 After submission of the test results, the Contractor shall notify that the installation is complete, tested and in working order. The Client and/or the Engineer will witness the re-testing of the installation.

20 CERTIFICATE OF COMPLIANCE

20.1 All work covered under this contract, must be executed by a qualified and fully representative person. Only persons registered as an “installation electrician” will be accepted to carry out the installation work.

20.2 Following completion of the contract, the Contractor shall submit to the Engineer a Certificate of Compliance - in terms of present legislation - prior to final payment being processed.

20.3 One Certificate is required for DB-2, and the Certificate shall cover the DB the new lighting circuits that were connected to the DB under this contract.

21 AS-BUILT DRAWINGS AND DOCUMENTATION

21.1 The Contractor shall prepare as-built drawings of his completed installation – including conduit routes.

21.2 The Contractor shall also prepare a comprehensive set of Operations and Maintenance (O+M) manuals for approval by the Engineer. The following shall be included as a minimum:

- Cover page
- Index
- Contractor contact details
- Call out procedure
- Manuals and Specifications of all the installed equipment
- Installed equipment warrantee details including supplier contact information
- Commissioning data
- Certificates of Compliance
- Operator guides and procedures
- As-built drawings

22 DEFECTS LIABILITY PERIOD

22.1 The equipment and installation supplied under this contract shall be guaranteed for a period of twelve months, or as stated, from date of acceptance by the Engineer in all respects and commissioned for continuous service. The tender price shall include for the above.

22.2 The defects liability will be for a period of twelve months, calculated from the date of issue of the Certificate of completion by the Engineer.

22.3 Do note that the 12 month maintenance period includes lamp replacement.

23 PREAMBLE TO SCHEDULE OF QUANTITIES

The Schedules of Quantities form part and must be read in conjunction with the specifications and drawings which contain the full description of the work to be done and material and equipment to be used.

The total tender sum in the tender form shall constitute the contract price of the successful Tenderer. Tenderers are advised to check their item extensions and total additions, as no claim for arithmetical errors will be considered. The Employer or his Agent may correct the tendered schedule in terms of any arithmetical errors.

Black ink shall be used. No alteration, erasure or addition is to be made in the text of the Schedule of Quantities. Should any alteration, erasure or addition be made, it will not be recognised, but the original wording of the schedule of quantities will be adhered to. Line items not completed, shall be regarded as R null rated.

The priced Schedule of Quantities of the successful Tenderer will be checked and the Engineer reserves the right to call for reasonable adjustments to any individual price and to rectify any discrepancies whilst the rates, as submitted, remain unaltered.

The responsibility for accuracy of the quantities written into the Schedules remains with the party who prepared the Schedules. The Tenderer shall be relieved of the responsibility of measuring quantities at tender stage, and the tender sum submitted shall be in respect of the quantities set out in the Schedules, although he will be required to make his assessment of items such as brackets, fixings, etc from details as stated in the Schedules and Specifications and shall include in the item prices for such small installation materials as are required for the complete installation in accordance with the Specification.

The Contractor and Employer agree that the total of any schedule or schedules, including variations by way thereto or deductions there from, represents a fair and accurate quantification of the items set out in the Schedules and the parties may agree final payment on that basis. In the event of any disputes as to quantities, then the disputed item or items shall be adjusted where necessary.

The quantities in these Schedules of Quantities are not to be used for ordering purposes.

Variations in the scope and extent of the work included in the Schedules shall be allowed to meet the Employer's requirements. The supply and installation cost of any item shall be fully included in the unit price.

The description of an item shall be held to include the manufacture, conveying and delivery, unloading, storing and any other action required to supply and install the item.

The quantities in these Schedules of Quantities are measured provisionally. All work executed in accordance with the construction drawings, approved by the Engineer, shall be re-measured and priced at rates contained in, or based on, the priced schedule of quantities.

Prime cost amounts, provisional amounts and budget allowances shall be fully included in the tender price. Approval and payment for these line items are under the control of the Employer.

Annexure A1

SARS WAREHOUSE
New loading bay

ELECTRICAL INSTALLATION

SCHEDULE OF LUMINAIRES rev0

TYPE	DESCRIPTION	REVISION
F5	Surface fluorescent luminaire similar to Voltex lighting T-BAY/COVER with clear Perspex cover and 4 x 58W lamps or similar approved	0
B4	Floodlights similar to Beka Projectolux 250W HPS complete with stirrup, lamps and control gear or similar approved	0

Annexure A2

SARS WAREHOUSE
New loading bay

ELECTRICAL INSTALLATION

SCHEDULE OF INFORMATION BY TENDERERS

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1 LIST OF RETURNABLE DOCUMENTS

The following documents must accompany Tenderer's submissions.

Document	Included ✓ / ✖
Completed Schedule of Quantities	
Letter of good standing (workman's compensations)	
Tax clearance certificate	
Company profile	
Project references (building-type work)	
Project team organogram with roles and responsibilities, CV's and qualifications, including Master Electrician on payroll	
Proof of Electrical Contractors' Association (SA) membership	
Electrician Artisan Certificates	
Proof of registration with Department of Labour	
Preliminary project plan (based on high level program)	
List of specialist subcontractors envisioned on project	

2 SCHEDULE OF TECHNICAL INFORMATION

This Schedule must be completed by all Tenderers for all items tendered. Tenders may be considered invalid if insufficient information is submitted.

2.1 Guarantee

Item	Description	Guarantee period
1.	Low voltage cables	
2.	Distribution boards	
3.	Luminaires Switches Motion sensors	
4.	Wiring and wire ways	

2.2 Labelling

Item	Description	Response
1.	Manufacturer	
2.	Type	
3.	Fixing method: • Socket outlets • Power skirting • Ducts • SWA/PVC Cables • DBs • Enclosures • Stranded and solid conductors • Conduit	

2.3 Low voltage cables

Item	Description	Response
4.	Manufacturer	
5.	Type of cable	
6.	Type of insulation	
7.	SANS Specification to which cable is manufactured	

2.4 Low voltage distribution boards

Item	Description	Response
1.	Proposed Manufacturer	
2.	Current-carrying capacity of busbars	
3.	Type of busbars	
4.	Method of fixing and supporting of busbars	
5.	Short-circuit rating	_____kA
6.	Type of construction of board	
7.	Manufacturer and type of interlock switch	
8.	Manufacturer and type of isolators	
9.	Manufacturer and type of circuit breakers	

10.	Manufacturer and type of contactors	
11.	Manufacturer and type (class) of surge arrestors	
12.	Manufacturer and type of indication lights	

2.5 Luminaires

Item	Description	Response
1.	Luminaire Manufacturer	
2.	Light switch Manufacturer	
3.	Motion sensor Manufacturer	

2.6 Small power

Item	Description	Response
1.	Switched socket outlet Manufacturer	
2.	Switched socket outlet range/model number	
3.	Isolator Manufacturer	
4.	Isolator outlet range/model number	

2.7 Wiring and wire ways

Item	Description	Response
1.	General purpose stranded copper conductor Manufacturer Type of cable Type of insulation Specification to which cable is manufactured	
2.	General purpose solid copper conductor Manufacturer Type of cable Type of insulation Specification to which cable is manufactured	
3.	Conduit approval authority	
4.	Wiring duct Manufacturer	
5.	Wiring duct model number	
6.	Cable sleeves Manufacturer	
7.	Cable sleeve model number	

3 SCHEDULE OF ALTERNATIVES OFFERED

The Tenderer shall indicate all alternatives below which he wishes to submit when appointed. The price implication of all alternatives shall also be clearly stated here.

Alternatives not indicated below, or filled in incomplete without price implications, will not be considered.

Samples and complete technical data of these offered alternatives shall be submitted for consideration.

4 SCHEDULE OF DEVIATIONS FROM SPECIFICATION

Tenderers shall indicate below in what respect their tenders do not comply with the specification. This is necessary to evaluate the deviations from specification when adjudicating the tender.

Failure to complete the schedule shall be read as that the tender complies fully with the specification

5 SCHEDULE OF PLANT AND LABOUR

Plant and labour which he intends to use on the work, if his tender is successful, must be stated below by the Contractor.

5.1 Plant

Description

5.2 Labour

TRADE OR LABOUR CLASSIFICATION	NUMBER OF PERSONNEL

6 LIST OF SPECIALIST SUBCONTRACTORS ENVISIONED ON THIS PROJECT

Item	Task	Subcontractor
1.	Distribution Board modifications	
2.		
3.		

Annexure A3

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ELECTRICAL INSTALLATION

SCHEDULE OF DRAWINGS rev0

DRAWING NO	DRAWING TITLE	REVISION
B05.PTA.000533-E-102	Loading bay Ground Floor Lighting and Wireway Layout	0
B05.PTA.000533-E-402	Schematics	0