***TENDER NUMBER: GEP001-SUPERBLOCK/18***

| **ISSUED BY:** |
|---|
| ***GAUTENG ENTERPRISE PROPELLER*** |
| **124 Main Street** |
| **6th Floor Marshalltown** |
| **Johannesburg** |
| **2107** |
| **Telephone: 011 085 2002** |

**NAME OF THE TENDERER:** : .....

**TEL NUMBER** : .....

**FAX NUMBER** : _____

# PART B – ELECTRICAL, ELETRONIC INSTALLATIONS

**PART C – MECHANICAL INSTALLATION (Separate Document)**

## TENDER FOR THE APPOINTMENT OF A CONTRACTOR FOR CONSTRUCTION OF JEWELLERY MANUFACTURING PRECINCT (JMP) SUPERBLOCK BUILDING :(BUILDING 4)

## FEBRUARY 2018

# PART B – 1 : GENERAL ELECTRICAL INSTALLATIONS

*Specifications & BOQ*

# PART B – 2: BILL OF QUANTITIES SUMMARY

## PART B - 1: SPECIFICATION

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## DETAIL ELECTRICAL INSTALLATIONS SPECIFICATION

## 1 GENERAL

This specification covers all aspects of the electrical installations.

This document must be read in conjunction with the Civil, Structural and Architect's drawings. Any discrepancies must be brought to the notice of the Electrical Engineer before installation commences.

1.1 Electrical Engineers' Drawings

The Electrical Engineer’s drawings for this project shall include the following:

Lighting Layouts
Power Outlets Layouts
Distribution Board Layouts
Communication and Security Systems Layouts

Architectural, Civil and Structural Engineers’ Drawings

A set of Architectural, Civil and Structural drawings for this project is available for inspection on site**;** the Electrical Contractor shall familiarize himself with the contents of these drawings and all building construction details.

## 2 SCOPE OF WORKS

The scope of the installations shall comprise of:

- Distribution board installations
- Cable installations
- Lighting installations
- Power installations
- Telephone and data outlets installations

- Wiring and wireways
- Earthing, bonding and lightning protection system
- Stand-By Power Supplies (Diesel Generators, Solar Systems)
- UPS (Uninterupted Power Supplies) Systems
- Labelling
- Site supervision
- Production of “as-built” drawings
- Testing and Comisioning of Installations

## 3 STANDARD SPECIFICATIONS, REGULATIONS AND CODES

3.1 The latest edition, including all up to date amendments 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:

3.1.1 SANS 10142-1: The Wiring of Premises: Part 1 – Low Voltage Installations

3.1.2 SANS 10114-1: Interior Lighting Part 1 – Artificial Lighting of Interiors

3.1.3 SANS 10114-2: Interior Lighting Part 2 – Emergency Lighting

3.1.4 Occupational Health and Safety Act (Act 85 of 1993)

3.1.5 SANS 10400: The application of the National Building Regulations

3.1.6 SANS 10313: The protection of structure against lightning

3.1.7 SANS 10139: Fire Detection Systems for Buildings: Design Installation and Maintenance

3.1.8 SANS 10222: Electrical Security Installations SANS 10142-1 – Wiring of premises 2003

3.1.9 Manufacturer's specifications and installation instructions

3.1.10 Gauteng Province Standard Quality Specification GP/E5/1 for Electrical Installations **AND** Quality Specification GP/E5/2 for Electrical Material and Equipment

3.2 The Contractor shall ensure that all safety regulations and measures are applied and enforced during construction, repair and maintenance work on cabling, wiring, distribution boards, luminaires and power outlets.

3.3 The appointed electrical Contractor shall be registered with the electrical contracting board (ECB).

## 4 CONSTRUCTION PROGRAMME

4.1 The Contractor's programme shall be co-ordinated with the programme of the Principal Contractor and shall include allowance for adverse weather conditions, builders holidays and public holidays as specified in the Principal Contractor's conditions of contract.

## 5 STORAGE

5.1 The Contractor shall provide adequate and safe storage for all materials. All materials shall be stored or stacked in positions that will not interfere with other work in progress in the area.

## 6 QUALITY OF MATERIALS

6.1 All materials supplied or utilised under this contract shall be new and unused. Only materials of first class quality and finishes shall be utilised. All materials shall be subject to prior approval by the Engineer before ordering and being brought to site.

6.2 All materials shall comply with the relevant SANS specifications.

6.3 All materials shall be unconditionally guaranteed for a period of 12 months from the date of practical completion, which is first hand over. Where Supplier's guarantees are of a shorter duration than 12 months, the Contractor shall unreservedly agree to the extension and cession of all warranties and guarantees.

6.4 The Contractor shall replace any materials that are found to be defective during the 12 months defects liability period.

## 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 supervision work.

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 programme.

7.3 The works shall be supervised by a registered "three-phase Master ELECTRICIAN".

## 8 CO-ORDINATION OF SERVICES

The Contractor shall be responsible for the onsite co-ordination with the Principal Contractor and other sub-contractors. Due allowance shall be made for this liaison and on-site co-ordinatio

## 9 FINISHING AND TIDYING

9.1 In view of the concentration of construction and other activities likely to be experienced during the Contract period, progressive and systematic finishing and tidying will form an essential part of this Contract. Under no circumstances will soil, rubble, materials, equipment or unfinished operations be allowed to accumulate in such a manner as to unnecessarily impede the activities of others. In the event of this occurring the Employer 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.

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

## 10 EXISTING WORKS AND SERVICES

10.1 The Contractor is responsible for obtaining information regarding services and the existing works which may be affected by the new works. Activities and operations regarding the method to be used for the safeguarding of any services and existing works that may encountered during construction shall be discussed with and have the approval of the Project Manager prior to commencement.

10.2 The cost of all precautionary measures, which may be necessary to ensure the safety of such services and existing works, as well as the protection of all persons, shall be borne by the Contractor. Any alteration to services, which may be required, shall be carried out by the Authority concerned at the expense of the Contractor. The Contractor shall be held responsible for any damage, injury or accident caused as a result of his failure to take the necessary precautionary measures.

## 11 SUPERVISION

Work shall at all times be subject to full time supervision by a qualified and experienced Site Agent. This representative must be authorised and competent to receive instructions on behalf of the Contractor.

## 12 PROTECTION OF OTHER SERVICES AND STRUCTURES

12.1 The Contractor shall take all the necessary precautions to protect existing services, finishes and structures during the execution of the Contract, and shall be fully responsible for all repairs and damages thereto. The cost for any repairs of damages shall be borne by the Contractor.

12.2 The Contractor shall also exercise extreme care when excavations are made, to avoid damage to existing or newly installed services. Any damages to other services shall be rectified forthwith and the cost for the rectification thereof will therefore be recovered from the Contractor.

# 13 LV CABLE INSTALLATION

## 13.1 General

13.1.1 All LV power cables shall have stranded copper conductors and shall be of the 600/1 000V PVC/SWA/PVC type.

13.1.2 All cables must bear the SANS mark of approval for compliance with the relevant SANS specification SANS 1411-1-6

13.1.3 Where sleeves are not specified, cables shall be laid directly in the ground. Minimum laying depths shall be 650 mm below final ground level unless otherwise specified, and routes shall be as indicated on the drawings.

13.1.4 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.

13.1.5 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.

13.1.6 The Contractors shall take cognisance of the fact 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 confirm it with the Engineer.

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

13.1.8 The Contractor is to note that some cables will be installed underneath paved areas. The Contractor shall be required to provide appropriate machinery for this type of installation and shall make sufficient allowance for hiring of such machinery and the remedial civil works associated with this installation.

# 14 DISTRIBUTION BOARDS

14.1 Various LV distribution boards are to be supplied and installed under this contract. The main LV board shall be free-standing, while others shall be surface-mounted. HVAC distribution boards on the roof, if any, shall be weatherproof.

14.2 Distribution boards shall comply with the requirements of IEC 439-1.

14.3 The distribution board requirements are as shown on the schematic drawings. Note the 5 kA minimum fault level. Generally the cascading system has been specified for sub distribution boards and sub local

DB's. Contractors shall draw the attention of their board manufacturers to this aspect, and proper labelling installed.

14.4 Electrical Contractors are advised to order the distribution boards and equipment from a reputable Manufacturer, as inferior boards will not be accepted.

14.5 Shop drawings shall be submitted to the Engineer for formal approval before any manufacture commences.

14.6 It shall further be noted that late approval of drawings and distribution boards due to non-compliance with the specification will not relieve the Electrical Contractor from his obligations to complete the installation according to the programme. No claims for delays or extension of time in this regard, will be entertained.

14.7 All phase, neutral and earth busbars shall be adequately sized to accept all circuits and connections.

14.8 Door hinges shall be of the Perano type. Steel doors shall be padlockable.

14.9 The front face panels shall be secured by means of the Perano type catches. Catches with slots or square key formats will not be acceptable.

14.10 The distribution boards shall be powder coated and colour shall be as specified. Powder coat quality shall be verified during distribution board tests.

14.11 All distribution boards must be inspected and accepted in the factory prior to dispatching. The exact wording of the engraved labelling shall be finalized during the factory inspection.

## 15 POWER SKIRTING; CABLE TRAYS, CONDUITS and TRUNKING

15.1 Power skirting

15.1.1 Power skirting shall be three compartment, two cover steel powder coated.

15.1.2 Power skirting shall be supplied complete with purpose-made faceplate equipment and all the necessary accessories including covers, bends, clip-on partitions, etc.

15.1.3 Supply and install 16 A, 3-pin flush switched socket outlets in the positions indicated on the drawings or as specified. The socket outlets must be purpose made accessories supplied by the manufacturer of the power skirting.

15.1.4 The socket outlets must have brackets to secure them to the channel. The socket outlets must have front covers that overlap the modular covers on both sides of the socket outlet. The front covers must have the same colour finish as the power skirting.

15.1.5 The power skirting shall be linked to the distribution board by conduit installed to a pre-manufactured conduit entry unit behind the power skirting. The power skirting shall be clearly marked on the front

over “conduit entry”. The conduit links shall be routed inside chipped floor screed and as approved by the electrical engineer.

15.1.6 The same arrangement shall apply at positions where power skirting are interlinked. A minimum of four 25 mm diameter PVC conduits shall be installed in each case; i.e. power 2x, data 1x, and

15.1.7 telephone 1x. The Contractor shall allow in his price for drilling through walls and chipping in the floor for the interlinks as indicated on drawings.

15.1.8 Any resulting damage to completed finishes will be rectified to the satisfaction of the Principal Contractor and the Project manager, at the Contractor’s expense.

15.1.9 Extreme accuracy will be required during marking out to ensure that the conduit entries exiting the floor sand walls are positioned correctly.

15.2 Cable trays

15.2.1 Steel cable trays or wire mesh, where required, shall be the hot dip galvanised type complete with elbows, tees and covers. The width shall be as specified on the relevant drawings.

15.2.2 Cable tray supports must consist of two steel hanger rods, at least 8 mm in diameter, on both sides of the tray with a substantial steel cross-member on the underside of the tray, bolted to the rods.

15.3 Conduits

15.3.1 Internal conduits shall be PVC and installed flush inside walls and slabs and surface mounted in ceiling voids. No conduit installation on the wall surfaces shall be permitted in the building.

15.3.2 Conduit work under open roof structures and inside ceilings shall be done in a rectangular grid pattern. Steel saddles shall be used inside ceilings. Caddy clamps shall be used on roof purlins, maximum spacing of saddles and clamps shall be 750 mm.

15.3.3 All external conduits exposed to sunlight or rain shall be Bosal-type galvanised steel. External draw box covers shall be sealed with white silicone after the installation has been completed.

15.3.4 Chasing where applicable, shall only be done with a twin-blade chasing angle grinder or approved methods. Prior approval must first be obtained from the Architect or Engineer before any chasing work is carried out.

15.3.5 Flexible conduit must comply with BS 731 Part 1 and must be steel reinforced PVC conduit.

15.4 Trunkings

15.4.1 Metal trunking and ducting must be manufactured of rolled sheet steel with a minimum material thickness of:

- 2,5 mm for non-ribbed channels with a maximum width of 42 mm
- 1,6 mm for ribbed channels with a maximum width of 42 mm
- 1 mm for non-ribbed channels with a maximum width of 77 mm
- 0,8 mm for non-ribbed channels with a width in excess of 77 mm.

15.4.2 Non-metallic trunking and ducting must be manufactured of extruded, flame retardant Polyvinyl Chloride (PVC) with a minimum thickness of 1.2 mm. The use of non-metallic trunking and ducting must be restricted to indoor applications.

15.4.3 Supply and install all hangers, supports or fixings for the channels. Support channels up to and including 76 x 76 mm at maximum intervals of 600 mm and larger channels at maximum intervals of 1 m. Carefully plan channel runs to avoid clashes with other services and to ensure that all covers can be removed after completion of the entire installation. Use only purpose made clamps, hangers, etc. where required.

15.4.4 Wiring channels must not be loaded to more than 60% of their capacity.

15.5 UNDERFLOOR DUCTING

15.5.1 Supply two or three compartment underfloor ducting as *specified* and install it in the positions and according to the layouts indicated on the drawings.

15.5.2 Three-compartment ducting must have a cross-section of approximately 200 x 32 mm, subdivided into three approximately equal compartments, of which the centre compartment is used for electrical power distribution with the two outer compartments for telephone and other light current services respectively.

15.5.3 Provide at least one opening 300 mm from the natural building lines (such as columns) where partitions may be installed in the future. The openings must have removable, flush, cover plates and prepared fixing holes for future installation of pedestals or recessed outlets. Offset the centre of the openings a distance of 200 mm from the building nodule lines

## 16 LIGHTING INSTALLATION

16.1.1 Light fittings shall be delivered to site in boxes as packed by the Manufacturer. When the installation is handed over, all light fittings shall be in a working condition, new and unused.

16.1.2 The permanent light fittings intended for installation shall not be used for temporary lighting during construction. The certificate of completion for the installation will not be finalised, unless all light fittings and lamps are in working order.

16.1.3 All fluorescent type light fittings shall be equipped with generally 1200 mm long 26 mm diameter tubes, and with a colour temperature of 4300 □K (cool white) and minimum colour rendering index (Ra) of 64.

16.1.4 The Engineer will reject unmarked lamps. All costs to replace these lamps with marked lamps will be for the Electrical Contractor's account.

16.1.5 All light fittings and light fitting components shall be approved by the Engineer and capacitors and ballasts shall bear the SANS mark of approval.

16.1.6 Fluorescent tubes shall have bi-pin end cap arrangements and shall fit into telescopic spring assisted lamp holders to ensure that the lamps are always secure.

16.1.7 The metal body parts shall be finished in white epoxy powder coating for maximum reflectance.

16.1.8 Ballasts shall be of the electronic type and shall be power factor corrected to ensure a power factor better than 0,9.

16.1.9 The Contractor shall submit samples for approval of all types of light fittings to the Engineer prior to procurement thereof.

16.2 Light switches

16.2.1 Switches must be of the rocker operated micro-gap type rated at 16A, 220/250V.

Switches must have protected terminals for safe wiring.

Switches must have silver contacts.

It must be possible to individually change any switch of multi-lever switches.

The yoke strap must be slotted to allow for easy alignment.

16.2.2 To light internal office spaces, lighting shall generally be provided through group control light switches installed either at entrance to the Blocks or at lift lobbies.

16.2.3 Safety lighting shall be installed above exit doors and at staircases. The general lighting shall further be provided for different settings of the client requirements. A control lighting station shall be provided.

16.3 Proximity Switches

16.3.1 The following standard is applicable:

- SANS IEC 60947-5-2: Specification for inductive and capacitive proximity switches that sense the presence of metallic and/or non-metallic objects, ultrasonic proximity switches that sense the presence of sound reflecting objects and photoelectric proximity switches that sense the presence of objects.

**16.3.2 Schedule of luminaires:**

- All light fittings shall be supplied complete with lamps.

**Type Description:**

- **Type A :** 70W LED Reccessed 1200 x 600mm Similar or Beka Dari, SANS Approved.
- **Type B :** 35W LED Reccessed 600 x 600mm Similar or Beka Dari, SANS Approved.
- **Type C :**Similar or Beka Solo LED 12W Decorative Anti Glare Downlight, SANS Approved.
- **Type E :**Similar or Beka Lume LED 100W Flood Light, SANS Approved.
- **Type F :**Similar or BEKA Dari LED 70W 1200mm x 600mm Surface Mounted IP65, SANS Approved with battery back-up.
- **Type S:** Similar or Beka Led Lume-Midi 80W High Perfomance Street Light, SANS Approved.
- **Type I:** Similar or BEKA VAPOURLINE LED 65W Industrial Luminaire, SANS Approved.
- **Type W:** Similar or BEKA Series 31 LED 20W Bulkhead, SANS Approved.
- **Type R:** Same as type W with Red Lens, Mounted Above Safe Door, SANS Approved.
- **Type Ae (Emg.):** ame as Type A1 with 1 hour Battery Back-Up
- **Type Be (Emg.):** Same as Type B1 with 1 hour Battery Back-Up
- **Type Ce (Emg.) :** Same as Type C1 with 1 hour Battery Back-Up
- **Type F (Emg.) :** Same as Type A with 1 hour Battery Back-Up, Surface Mounted
- **Type E2 (Emg.) :** Same as Type E1 with 1 hour Battery Back-Up

- **Type X :** Illuminated exit sign luminaire with with 2 x PL9W lamps or latest LED Similar and emergency control gear for 1hr battery similar to Beka type RT 0209/KSP HYDRA, 1 hour duration

- **PHOTO CELL** (In an Empty Bulkhead Fitting)

## 17 POWER OUTLETS

17.1 For the power installation, the Contractor shall be responsible for: -

- Supply and installation of 16A switch socket outlets – recessed in wall or installed in power skirting.
- Supply and installation of isolators for fixed equipment, geysers, aircons, and hand dryers. For wall
- console HVAC units 20A double pole cordgrip isolators installed surface mounted shall be used.

For HVAC units exposed to weather weatherproof isolators shall be installed.

- Wiring of all circuits back to the DB's.
- Labelling of all outlets as specified.
- Testing of all circuits.

17.2 Socket outlets

17.2.1 Flush mounted round 3-pin conventional switched socket-outlets must be suitable for mounting in 100 x 100 x 50mm wall boxes.

17.2.2 Surface mounted industrial type round 3-pin switched socket-outlets must be manufactured as a unit complete with a neat surface mounted wall box. The socket outlet and wall box provided must be of the same manufacturer.

17.2.3 Socket outlet switches must be of the rocker operated micro-gap type rated at 16A, 250V and must have silver contacts.

Terminals must be enclosed for safe wiring.

Provide safety shutters on live and neutral openings.

The yoke strap must be slotted to allow for easy alignment.

Provide miniature circuit breakers in lieu of switches where specified.

## 17.3 Wiring and Protection

17.3.1 Each socket outlet circuit must be protected in the distribution board with a 20 A moulded case circuit breaker. Socket outlet circuits must also be protected with 30 mA residual current earth leakage units as directed by SABS 0142 and as might be specified.

17.3.2 Socket outlet circuit wiring must consist of two PVC insulated, 4 mm², stranded copper wiring plus one 2,5 mm² bare stranded copper earth continuity conductor or a 4 mm² green-yellow PVC insulated, stranded copper earth continuity conductor as specified.

17.3.3 For single phase circuits the colour of the PVC insulated conductors must be as follows:

- Live conductor :RED
- Neutral conductor :BLACK
- Earth continuity conductor :GREEN-YELLOW or Bare as specified

17.3.4 In three-phase installations, ensure that all the socket outlets in any one room are connected to the same phase.

17.3.5 Single and double socket outlets shall each be mounted in a flush-mounted in a horizontal 100 x 100mm wall box or in the power skirting.

## 17.3 Isolators

17.3.1 All load- break isolators must be of the moulded case type suitable for bolting onto a punched and tapped chassis flush behind a removable sheet steel panel, or for "clip-on" mounting on a die-punched clip tray. True rated voltage of the isolators must be 440 V or 660 V, 50 Hz, AC and the current ratings must be as called for in the project specification.

17.3.6 Where called for in the project specification, the isolators must be fitted with auxiliary switches which must be rated at 10 A, 250 V or 6 A, 380 V, AC.

17.3.7 Isolators exposed to weather shall be weatherproof rated, minimum IP56.

## 18 TELEPHONE OUTLETS

18.1 The telephone termination panel shall be surface mounted 300 x 300 steel with door and fitted with a Supawood 19mm backboard.

18.2 Outlets shall be a combined RJ 11 and RJ 45 data and telephone outlet.

18.3 Outlets shall be flush mounted in power skirting.

18.4 The connections between the telephone termination panel and the outlets shall be done by means of 25mm diameter PVC conduits.

18.5 2,5mmø galvanised draw wire shall be installed in all telephone conduits. Cabling shall be done by others.

## 19 WIRING

19.1 Surfix or Norse cable shall not be accepted on this site.

19.2 All circuits shall be wired from fresh unused coils of red, white, blue and black conductors. The colours of conductors shall correspond to the phase from which that circuit is fed. An alternative colour may be used for the switched conductor between the light switch and the light fitting. The use of insulation tape to indicate phases will not be accepted.

19.3 Wiring shall not be drawn into conduit until the conduit installation has been completed, fitted with bushes and all moisture and debris have been removed.

19.4 Joints of any kind will not be permitted in wiring. No more than 2 single or 1 three phase circuit may be drawn into any conduit.

19.5 All sockets and switches shall be marked by suitable markers indicating the circuit (e.g. L1 on both line and neutral conductors) at either end.

| **Circuit** | **Minimum conductor (size)** | |
|---|---|---|
| | Phase ($mm^2$) | Earth ($mm^2$) |
| Lighting power supply | 2,5 | 2,5 |
| Switched socket outlets | 4,0 | 2,5 |
| Isolators | As approved by the engineer | |

## 20 EARTHING AND BONDING

20.1 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 SANS 0313.

20.2 An earth mat will be installed outside the substation to ensure an earth resistance of less than 1 Ohm.

20.3 Lightning protection installations must comply with SABS 03 and all the latest relevant SANS/e.t.c standards.

## 21 LABELLING OF CIRCUITS

21.1 All outlets, isolators and light switches shall be labelled with engraved labels on the cover plate. The label shall indicate the supply DB and circuit number (e.g. DB-GC-L5). Wiring inside the DB shall bear Gravoplast labels.

## 22 INSPECTIONS

22.1 The Electrical Engineer or Client's representative will inspect the installations at any time. All inferior, unsuitable, unacceptable or rejected work shall, if indicated by the inspecting officers or the Engineer, be removed and shall be rectified by the

22.2 Electrical Contractor at his own expense. Under no circumstances will these inspections relieve the Electrical Contractor of his obligations in terms of the document nor will these inspections be regarded as final approval of the works or portions thereof.

22.3 Where, inspections are requested by the Contractor, the Electrical Engineer or Client's inspection shall only be carried out after the Contractor has carried out his own preliminary inspection to ensure that the Works are completed and comply with the documents. The Electrical Engineer or Client's inspection shall therefore not be regarded as supervision, fault listing, quality assurance or site management.

## 23 SITE TESTS AND COMMISSIONING

23.1 The following minimum site tests shall be carried out by the Contractor and the results presented to the Engineer:

23.1.1 insulation resistance between all conductors and earth

23.1.2 insulation resistance between all conductors and neutral

23.1.3 insulation resistance between all 3 phase conductors

23.1.4 polarity of light switches

23.1.5 earth leakage protection

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

23.2 Complete commissioning, test and inspection data of all systems shall be provided for each installation individually and shall comprise, but not be limited to the following:

(a) Distribution boards and cabling

(b) Lighting system

(c) Small power and appliances

(d) Earthing, bonding and lightning protection system

## 24 CERTIFICATE OF COMPLIANCE

24.1 All work covered under this contract or that has to be carried out on site, 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. After completion of the contract the Contractor shall submit to the Engineer a certificate of compliance in terms of legislation prior to final payment being processed.

24.2 One Certificate is required per electrical DB completed, and the certificate shall cover all downstream works.

## 25 AS-BUILT DRAWINGS AND DOCUMENTATION

25.1 The Contractor shall prepare as-built drawings for cable trenches, earthing cable layout as well as all the conduit routes, inventory list and Operating-and-Maintenance manuals.

25.2 The Operating and Maintenance Manual to be compiled shall be structured and shall at least include the following:

25.3 Description of installation

(a) Distribution boards and cabling

The complete system description of the distribution boards and cabling shall be done for each installation individually. The system description shall be presented in a tabular format and shall contain, but not be limited to the following:

| Item | Distribution board description and location | Feed source | Type (Surface / Recessed) | No of ways | Size and kA rating of main circuit breaker | Description of sub-distribution boards | Size and type of supply cable | Minimum kA rating of circuit breaker |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

(b) Lighting system

The complete system description of the lighting system shall be done for each installation individually. The system description shall be represented in a tabular format and shall contain, but not be limited to the following:

| Item | Circuit description | Switching arrangement | Luminaire detail | Lamp detail |
|---|---|---|---|---|
| | | | | |
| | | | | |

(c) Small power and fixed appliances

The complete system description of the small power and fixed appliances shall be done for each installation individually. The system description shall be represented in tabular format and shall contain, but not be limited to the following:

| Item | Circuit description | Source and type of supply | Switching arrangement | Description of appliance | Location of appliance | Rating of appliance | Type and rating of isolating switch |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |

(d) Earthing and lightning protection

The complete system description of the earthing and lightning protection system shall be done for each installation individually.

The system description shall be presented in tabular format and shall contain, but not be limited to the following:

| Item | Type of installation | Quantity and positions of earth electrodes | Type and size of earth electrode | Size and type of conductors | Type of joint |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

## 26 2-MONTH DEFECTS LIABILITY PERIOD

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

26.2 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. Retention funds will be reduced to 5% upon the commencement of the defects liability period. The balance of the retention money will be paid out after the lapse of the defects liability, provided the installation has in the opinion of the Engineer been in satisfactory working order during this period.

26.3 The Contractor shall be responsible for the replacement of all missing draw wires and conduit accessories during the defects liability period.

# B. SCHEDULE OF INFORMATION

## DETAIL OF PROPOSED ELECTRICAL SUB CONTACTOR

*Detail on this page MUST be completed fully. Incomplete forms shall render the offer invalid.*
***(N/A** to be stated if not applicable).*

| Requirement | Response | | |
|---|---|---|---|
| Registered name of company/enterprise | | | |
| CIPRO Registration number | | CIDB Grading | |
| ECB registration number | | | |
| VAT registration number | | | |
| UIF registration number | | | |
| Official telephone number | ( ) | | |
| Official fax number | ( ) | | |
| E-mail Address | | | |
| Physical Address | | | |
| | | | |
| | | Code | |
| Official Postal Address | | | |
| | | | |
| | | Code | |
| Director / Member (1) — Full Names and Surname | | | |
| Director / Member (1) — Position in company/ enterprise | | | |
| Director / Member (1) — ID No. | | Income Tax No. | |
| Director / Member (2) — Full Names and Surname | | | |
| Director / Member (2) — Position in company/ enterprise | | | |
| Director / Member (2) — ID No. | | Income Tax No. | |
| Director / Member (3) — Full Names and Surname | | | |
| Director / Member (3) — Position in company/ enterprise | | | |
| Director / Member (3) — ID No. | | Income Tax No. | |

## REFERENCES AND VITAL INFORMATION OF ELECTRICAL SUB CONTRACTOR

### 1. CLIENT REFERENCES OF CURRENT AND PREVIOUS CONTRACTS

Please provide references from three customers with similar requirements as the department (one reference may be from the department or division). These references are to demonstrate your ability to fulfil requirements and your ability to maintain satisfied customers.

*(Please mark blocks with '**x**' where appropriate)*

| | | | | | |
|---|---|---|---|---|---|
| **Name of Client/Company (1)** | | | | | |
| Contract period (in months) | | | | Ongoing | Completed |
| Value of Contract (per month) | | | | | |
| Type of business rendered | | | | | |
| Contact | Full Name | | | | |
| | Tel no. | | Alternative Tel no. | | |
| | Fax no. | | E-mail | | |
| **Name of Client/Company (2)** | | | | | |
| Contract period (in months) | | | | Ongoing | Completed |
| Value of Contract (per month) | | | | | |
| Type of business rendered | | | | | |
| Contact | Full Name | | | | |
| | Tel no. | | Alternative Tel no. | | |
| | Fax no. | | E-mail | | |
| **Name of Client/Company (3)** | | | | | |
| Contract period (in months) | | | | Ongoing | Completed |
| Value of Contract (per month) | | | | | |
| Type of business rendered | | | | | |
| Contact | Full Name | | | | |
| | Tel no. | | Alternative Tel no. | | |
| | Fax no. | | E-mail | | |

## 2 LIST OF CURRENT/PREVIOUS SUPPLIERS

| | | | | |
|---|---|---|---|---|
| **Name of Supplier/Company (1)** | | | | |
| Description of Commodity | | | | |
| Value of commodities supplied (per month) | | **R** | | |
| Contact | Full Name | | | |
| | Tel no. | ( ) | Alternative Tel no. | |
| | Fax no. | ( ) | E-mail | |
| **Name of Supplier/Company (2)** | | | | |
| Description of Commodity | | | | |
| Value of commodities supplied (per month) | | R | | |
| Contact | Full Name | | | |
| | Tel no. | ( ) | Alternative Tel no. | |
| | Fax no. | ( ) | E-mail | |
| **Name of Supplier/Company (3)** | | | | |
| Description of Commodity | | | | |
| Value of commodities supplied (per month) | | R | | |
| Contact | Full Name | | | |
| | Tel no. | ( ) | Alternative Tel no. | |

| | | | | |
|---|---|---|---|---|
| | Fax no. | ( ) | E-mail | |

**3 FINANCIAL STATUS**

| **Details of the specific parties utilised by the company/ enterprise tendering** | | | | |
|---|---|---|---|---|
| **Bank** | Name | | | |
| | Branch | | | |
| **Bookkeeper** | Full Name | | | |
| | Tel no. | ( ) | Alternative Tel no. | |
| | Fax no. | ( ) | E-mail | |
| | Address | | | |
| | | | | |
| | | | | |
| **Auditor** | Full Name | | | |
| | Tel no. | ( ) | Alternative Tel no. | |
| | Fax no. | ( ) | E-mail | |
| | Address | | | |
| | | | | |
| | | | | |

| | | |
|---|---|---|
| Please indicate if you will be willing to provide further details if the department considers these necessary to evaluate your capacity to offer the service or goods as detailed in this Tender | Yes | No |

# 4. SCHEDULE OF MATERIALS OFFERED

Contractors shall complete the following schedule of materials and equipment offered for verification by the Employer's Agent as being acceptable in terms of the specification applicable, before any such materials are procured for incorporation into the works.

The contractor undertakes that the actual materials and equipment supplied installed shall be in accordance with this schedule for items that are approved.

Where items are not approved alternative items shall be presented that do meet the specifications. This process shall be repeated until all items are approved.

| 26.4 Item | 26.5 Material | **Make & Trade Name** | **Country of Origin** | **Is Material to Specification** (Yes / No) | **SABS Mark** (Yes / No) |
|---|---|---|---|---|---|
| 4.1 | Kiosk | | | | |
| 4.2 | Distribution Boards | | | | |
| 4.3 | Isolators | | | | |
| 4.4 | Moulded Case Circuit Breakers | | | | |
| 4.5 | Earth Leakage Relays | | | | |
| 4.6 | Light Switches | | | | |
| 4.7 | Switched Sockets | | | | |
| 4.8 | Armoured Cables | | | | |
| 4.9 | PVC Insulted Conductors | | | | |
| 4.10 | Cable Glands | | | | |
| 4.11 | Sleeves | | | | |
| 4.12 | Conduits: PVC | | | | |
| 4.13 | Conduits: Steel | | | | |
| 4.14 | Power Poles | | | | |
| 4.15 | Daylight Switches | | | | |
| 4.16 | Wire Mesh Channel | | | | |
| 4.17 | Cable Tray | | | | |
| 4.18 | Wiring Channel | | | | |

| 26.6 Item | 26.7 Material | **Make & Trade Name** | **Country of Origin** | **Is Material to Specification** (Yes / No) | **SABS Mark** (Yes / No) |
|---|---|---|---|---|---|
| 4.19 | Luminaries | | | | |
| | Type A | | | | |
| | Type Ae | | | | |
| | Type B | | | | |
| | Type Be | | | | |
| | Type C | | | | |
| | Type Ce | | | | |
| | Type D | | | | |
| | Type E | | | | |
| | Type F | | | | |
| | Type I | | | | |
| | Type R | | | | |
| | Type S | | | | |
| | Type W | | | | |
| | Type X | | | | |
| 4.20 | Steel Poles | | | | |
| 4.21 | Power skirting | | | | |
| 4.22 | Security Scanners | | | | |
| 4.23 | Earth Rods | | | | |
| 4.24 | Surge Arrestors | | | | |
| 4.25 | Overload Protection Units | | | | |
| 4.26 | Intercom System | | | | |
| 4.27 | Intrusion Detection System: Controller | | | | |
| 4.28 | Intrusion Detector System: Dual technology movement detectors | | | | |

## 5. LIGHTNING PROTECTION SPECIALIST

| **Lightning Protection Specialist** | | | | |
|---|---|---|---|---|
| Company Name | | | | |
| | Tel no. | ( ) | Alternative Tel no. | |
| | Fax no. | ( ) | E-mail | |

# PART B - 2: BILL OF QUANTITIES SUMMARY