CONTRACT

PART C3: SCOPE OF WORK

C3.1. PROJECT BACKGROUND

MAPSEZ BACKGROUND

The Maluti-a-Phofung Special Economic Zone (MAPSEZ) is a designated Special Economic Zone established in terms of the Special Economic Zones Act No. 16 of 2014, with a mandate to stimulate economic development, attract investment, create employment opportunities, and support industrialisation within the Free State Province and surrounding regions.

MAPSEZ is a subsidiary of the Free State Development Corporation (FDC), the licence holder of the zone, and is located at Site 108, 11th Street, Tshiame, Harrismith, in the Maluti-a-Phofung Local Municipality.

MAPSEZ seeks to facilitate industrial development through the provision of industrial infrastructure and investment support services aimed at promoting sustainable economic growth and enhancing regional competitiveness.

PROJECT CONTEXT

MAPSEZ periodically receives investor/tenant projects requiring specialised facilities and infrastructure which may not be adequately accommodated through conventional industrial facilities. Such projects often require customised technical investigations, design inputs, and specifications to ensure compliance with applicable legislation and operational requirements.

MAPSEZ's investor/tenant is establishing an apple juice concentrate production facility at Site 108, 11th Street, Maluti SEZ. The facility will produce export-quality apple juice concentrate for dispatch in food-grade tankers. The facility forms part of a larger planned agro-processing development that will ultimately include a packhouse and cold storage facility in a subsequent phase.

Apple juice concentrate is a high-value export commodity produced by pressing and concentrating fresh apple juice under controlled conditions. The facility must comply with international food safety standards. The building therefore has highly specific technical requirements for hygiene, drainage, temperature control, chemical resistance, and tanker loading that are materially different from a standard industrial facility.

MAPSEZ, as the developer of industrial infrastructure within the zone, is responsible for the procurement and construction of the top structure only. The investor/tenant will separately procure and install all process equipment, evaporators, pasteurisers, CIP (Clean-in-Place) systems, boilers, and related plant under direct contracts with specialist equipment suppliers.

This Terms of Reference relates to the appointment of a suitably qualified and experienced main contractor for the construction of the apple juice concentrate plant top structure only, in terms of the JBCC Principal Building Agreement Edition 6.2 (May 2018), with MAPSEZ as the Employer.

The main contractor appointed under this TOR will be required to coordinate with and provide general attendance to the investor/tenant's direct contractors as they progressively access completed areas of the top structure for equipment installation, in terms of a phased handover arrangement of areas described in the contract documents.

C3.2. TECHNICAL BACKGROUND

The project entails the construction of a new apple juice concentrate plant top structure at Maluti SEZ, Harrismith. This is a purpose-built industrial food processing facility designed to accommodate the pressing, concentration and dispatch of export-quality apple juice concentrate loaded into food-grade tankers. The building has significant technical requirements due to the food safety and hygiene environment involved.

Tenders must allow for builder’s work in connection with all specialist and direct contractor installations as described in the BOQ but shall not supply or install the tenant's process equipment.

The top structure includes the following principal elements:

- Structural Works: reinforced concrete silo pits, foundations, ground floor slabs designed for heavy process equipment loads, and structural steel portal frame and mezzanine structure to accommodate elevated process equipment and walkways etc.
- Building Envelope: masonry perimeter walls with hygienic internal finish, industrial roof cladding, high-care processing areas as specified, wet processing areas, pest exclusion detailing.
- Food-Grade Floors and Drainage & Hygienic Wall Finishes
- Tanker Loading Bay
- Services: electrical reticulation; fire installation, water reticulation
- Builder's Work: builder's work for all specialist Process Equipment.
- External Works: paved access roads and hardstands for tanker circulation, perimeter security fencing, stormwater drainage, site services connections, security infrastructure

Process Equipment Implications for Top Structure Construction

The process equipment to be installed by the investor/tenant’s direct contractors follows a sequence that directly determines the structural and construction requirements of the top structure.

The contractor must be aware that certain process equipment e.g. evaporators are of a height that requires their installation before the roof structure is completed. The contractor must demonstrate an understanding of

construction sequencing in a tall processing facility environment and must coordinate the construction programme with direct contractor to accommodate equipment installation sequencing requirements.

Failure to plan for this sequencing requirement could result in the roof having to be partially dismantled to allow equipment access, with consequential delay and cost will be for the contractor's account.

Tenderers must understand this equipment sequence and its building implications before pricing:

- Fruit reception silos and flushing channels
- Mills, mash heaters, and hydraulic presses
- Membrane filtration systems
- Evaporators
- Tank storage farm
- CIP stations

C3.3 SCOPE OF WORK

The appointed main contractor shall be responsible for the following (not exhaustive, as standard JBCC terms will apply in addition to the below, including updates made in the tender Preliminaries document):

1) Full execution of all building works as described in Sections 1 to 4 of the BOQ: earthworks, concrete, structural steel, masonry, roofing, cladding, waterproofing, internal finishes, external / site works, electrical and mechanical works. Annexure C3-A provides more detail of the electrical installation work.
2) Assist with sourcing, appointing coordinating and supervising all subcontractors against the PC Sum amounts listed in Section 5.
3) Provision of general attendance on all nominated/selected subcontractors in accordance with the BOQ preambles (access, power, water, scaffolding use, temporary storage areas, and making good on completion).
4) Where specified, provision of special attendance items as described and priced separately in the BOQ.
5) Development, submission, and monthly updating of the master construction programme, incorporating all subcontractor activities and direct contractor access windows.
6) Providing timeous requests for information (RFI) to ensure that there is no information or clarification due by the professional team that may impact the execution of the works.
7) Coordination of, and reasonable facilitation for, any direct contractors appointed separately by the investor/tenant where applicable.
8) Full compliance with the Occupational Health & Safety Act (Act 85 of 1993) and Construction Regulations, 2014, including appointment of a Construction H&S Officer for the full duration.
9) Appointment of a Community Liaison Officer (CLO) at the contractor's own cost for the duration of the project.

10) Where possible, recruitment of all unskilled labour from within a 20km radius of Harrismith with the assistance of the CLO.

11) Submission of monthly local spend reports detailing expenditure on local Free State subcontractors, suppliers and labour that will constitute a minimum of 30% of the contract value.

12) Full responsibility for site security, welfare facilities, and temporary services during construction including providing for the employer's direct contractors while the main contractor is on site.

13) Printing of all drawings and documents required for construction, including those for all subcontractors (a dedicated A0-capable plotter on site is recommended).

14) Application for construction permit with the Department of Employment and Labour, if applicable

15) Coordination with the investor/tenant's equipment contractor on construction sequencing , specifically to accommodate the installation of process equipment that need to be craned into position before the roof structure is completed.

COORDINATING WITH PRINCIPAL AGENT

The contract will be administered by the Principal Agent, acting on behalf of MAPSEZ as Employer.

The main contractor must:

- Attend all site meetings convened by the Principal Agent and provide accurate programme and cost reporting.
- Treat all drawings and project information as confidential and obtain equivalent undertakings from all subcontractors.
- Submit all claims, variations, and subcontractor claims to the Principal Agent with a clear recommendation, to assist adjudication.
- Note that all drawings will be issued electronically, and main contractor must maintain at all times a complete project Dropbox folder or equivalent digital filing system as directed by the Principal Agent.
- The contractor shall have an A0 printer/plotter on site to allow printing of all drawings to scale.
- Attend coordination and technical meetings with the PA, direct contractors and sub-contractors as needed for the duration of the project

EXCLUDED FROM SCOPE

The following are expressly excluded from the contractor's scope and will be procured separately by the investor/tenant:

- Supply and installation of juice plant processing equipment
- Supply and installation of boilers and steam piping systems
- Supply and installation of refrigeration

The contractor shall however provide all builder's work, penetrations, supports, plinths, pits, and trenches required in connection with the above specialist installations, as measured in the Bills of Quantities.

ANNEXURE C3-A: Scope of Work Electrical Installation

PROJECT TECHNICAL SPECIFICATION

1. SCOPE OF ELECTRICAL INSTALLATION WORK

References to the Contractor, Subcontractor, Electrical Contractor and/or Electrical Subcontractor in the specifications and drawings shall mean the Contractor for this Electrical Installation.

The project comprises the top structure for a new apple juice concentrate plant.

The Electrical Installation includes the supply, delivery, off-loading, storage, installation, testing, commissioning and handing over in proper working order of the complete electrical installation as specified in this Specification, Schedules and on the Drawings.

The following broadly defined sections of work are included in this electrical installation:

- Acceptance, storage, installation & commissioning of free issue plant & materials.
- New top structure for apple juice concentrate plant LV Electrical
- Lighting & power in new office.
- Provisional Dayworks and Provisional Sums. (To be expended as directed by the Employer / Engineer).
- Liaison and arrangements with authorities (e.g. Electricity Supply Authority, Telkom, etc.)
- Electricity supply arrangements with the Electricity Supply Authority (Connection fee and deposit shall be paid directly by the Employer as arranged by the Electrical Contractor).
- Arrangements/Liaison with & attendance on Employer and Contractors / Specialists for installation of telephone cabling, outlets, etc.
- Arrangements/Liaison with and attendance on IT/Computers, Security, etc. contractors/specialists for installation of IT and electronic installations, cabling and equipment.
- Supply, installation and termination of the main supply cables and earth conductors form the Miniature Substation to the MDB (miniature substation supplied & installed by Eskom).
- Trenching for cables, backfilling in layers and compacting, removal of excess, cable markers and protection.
- Sealing of used and unused cable sleeves (at both ends) after installation of cables.
- Cable ladders/trays and supports, cables and earth conductors.
- Main distribution board (MDB).
- Distribution boards as per the DB schematics.
- Wireways, conduits, drawboxes, outlets, wiring, switches, switch sockets, luminaires, cover plates, isolators, etc.
- Electronic installations: telephone, IT/Computers, security, access control, fire alarm, TV and communication (electronics) boards, wireways, conduits, drawboxes and outlets.

- Drawwires in all telephone, IT/Computers, security, access control, fire alarm, TV, communication (electronic installations) and unused electrical conduits and sleeves.
- Site, area flood lighting with control/switching, cables, trenching, wiring, etc.
- Main earth, earthing and bonding.
- Lightning protection.
- Power supply cables and earth conductors to, and termination onto, main boards of other services: i.e. Refrigeration plant board.
- Power supplies, connections to and rotation /operation tests of electrical equipment, plant, machines, etc. supplied & installed by others e.g. water heaters, ac units, fans, etc. where local isolators and/or outlets are provided as part of the electrical installation.
- Chasing of brickwork where reasonably required to execute the installation.
- Pointing out and checking requirements for, positioning and correctness of Builder's work required for and related to this services installation, e.g. sleeves, manholes, making and closings openings, making good, etc., as well as checking thereof during construction so that it is correctly and timeously provided by the Builder.
- Submission of samples.
- Compiling, submission and resubmission of workshop and as-built drawings and information, operating and maintenance manuals. (NB: required in final approved format and content before final handover will be taken).
- Training of Employer / User staff.
- Carrying out of tests and submission of test records and certificates.
- One year comprehensive guarantee and repair period.
- All other materials and labour to complete, tests, commission and hand over the services installation in accordance with this specification and the accompanying documents, drawings and schedules.

Care shall be taken not to damage/disrupt any existing services/installations.

Any switching/switchover involving disruption of the power supply shall only be done outside normal hours as agreed with the Employer/User.

2. BUILDER'S WORK & WORK BY OTHERS

The following sections of work are not included in this Electrical Installation:

- Supply of the incoming MV Metering Unit.
- Supply of a 1000kVA transformer.
- Supply of a 3-way Ring Main Unit.
- Supply and installation of the following equipment:
  - Geysers
  - Ventilation fans
  - Airconditioning units and fans
  - Pumps
  - Juice Plant / Process equipment distribution boards.
  - Connection/plugs on process equipment for which SSO’s are provided.
- Supply and installation of equipment and system cabling for :
  - Telephones
  - Computers/IT
  - Communication
  - CCTV
  - Security & Access Control
  - Fire detection and Alarm

- Builder's Work:
  - As indicated on the drawings
  - As requested during/with the tender
  - Sleeves and manholes
  - Making and closing openings as specified in steel structures, walls and ceilings, e.g. for power skirting, luminaires, power posts, etc.
  - Making good of chasing as reasonably made in the normal course of the work

Should already plastered walls be chased without permission, the repair cost will be for the account of the Electrical Contractor.

Builder's work as specified shall be checked and verified by the Electrical Contractor:
- To be complete and sufficient, and point out any further requirements to the Engineer.
- During construction so that it is provided correctly and timeously by the Builder.

3. SITE AND EXISTING SERVICES

The site is situated in the Maluti-a-Phofung Special Economic Zone.

The Contractor shall liaise with authorities (e.g. Electricity Supply Authority, Telkom, Neotel, etc.) and the Employer / User regarding the existence, positions, pointing out, protection and/or relocation of existing services and, after informing the Employer / Engineer and having been instructed to proceed, arrange for and/or undertake the protection and/or relocation of affected existing services.

The cost of the protection and/or relocation of affected existing services do not form part of the contract at tender stage, unless specifically otherwise specified.

4. DRAWINGS

The Electrical Installation is specified on the drawings as listed in the attached SCHEDULE OF DRAWINGS.

The Contractor shall also consult the architectural, civil, structural, mechanical and other services drawings.

Workshop drawings shall be provided of the following:
- Distribution boards : electrical, telephone, IT/computers, security, access control, fire alarm, CCTV and communication
- Builder's works required for the services installation, e.g. plinths, holes, openings, etc.
- Powerskirting and fittings/accessories layouts and details
- Cable ladders/trays & fittings/accessories layouts and details
- Wiring trunking/ducting layouts and details

These must be submitted timeously to permit enough time for scrutiny, adjustment and resubmission and such that no delivery problems are caused.

The Engineer's scrutiny of shop drawings or samples shall not relieve the Contractor of responsibility for any deviation from the requirements of this Contract, unless the Contractor has informed the Engineer in writing of such deviations at the time of submission of shop drawings or samples and the Engineer has given written approval for the specific deviation, nor shall this relieve the Contractor of responsibility for errors or omissions in the shop drawings or samples.

As-built drawings of all drawings for which workshop drawings were submitted, as well as of the cable routes in the ground with location dimensions, shall be provided.

5. SAMPLES AND ALTERNATIVES

Samples or catalogues are required of all the electrical materials/equipment, e.g. luminaires, light switches, dimmers, photocell, socket outlets, isolators, coverplates, powerskirting, standard power skirting colours, floor duct and pedestals, fixings, power posts, etc.

Should alternatives be offered, then a sample of the specified and alternative units, as well as the price implication per unit and the entire installation/project, shall be submitted.

These must be submitted timeously to permit enough time for scrutiny, adjustment and resubmission and such that no delivery problems are caused.

The Engineer's scrutiny of shop drawings or samples shall not relieve the Contractor of responsibility for any deviation from the requirements of this Contract, unless the Contractor has informed the Engineer in writing of such deviations at the time of submission of shop drawings or samples and the Engineer has given written approval for the specific deviation, nor shall this relieve the Contractor of responsibility for errors or omissions in the shop drawings or samples.

6. ELECTRICITY SUPPLY

The electricity supply is a new MV 1000KVA connection point from Eskom.

The Electrical Contractor must allow for liaison with Eskom for the installation of the Miniature Substation on site as indicated on the site plan.

The LV cables form the Miniature Substation forms part of this project.

Work on and changes to existing infrastructure which will require the existing power supply, or any other service, to be switched off, shall be scheduled/carried out outside normal working hours as agreed with the Employer/User.

7. COMPLIANCE WITH THE REGULATIONS, STANDARDS AND CODES

The entire installation shall be carried out in accordance with the latest revisions and amendments of the following:

- National Building Regulations and SANS 10400.
- The Code of Practise for the Wiring of a Premises (SANS 10142).
- The Occupational Safety and Health Act.
- The Municipal Bye-Laws and any special requirements of the local and supply authorities of the area.
- Telkom regulations and requirements.
- Fire Office/Officer.
- The applicable SANS Specifications and Codes of Practice or, where no SANS Specification or Code exists, the relevant BS or IEC Specifications or Codes of Practice shall apply.

The Contractor shall work safely and in accordance with the provisions of the OSH Act. Should any hazardous situation arise during construction and/or from the work being performed/undertaken, the Contractor shall immediately inform the Employer/Architect/Engineer of such situation, as well as what action he is taking to rectify this situation, alternatively what assistance/action he may require from the Employer/ Architect/ Engineer in this regard. The Employer/ Architect/ Engineer reserves the right to take whatever action as may be required to enforce safety standards should the Employer/ Architect/ Engineer discover that the Contractor is working unsafely.

The Contractor is required to appoint a full time safety co-ordinator on site who shall take responsibility for safety on site and liaise with the Building Contractor/Employer on matters relating to safety.

No claims for extras in respect of failure by the Contractor to comply with any of the above regulations will be considered.

8. NOTICES, FEES AND LOCAL AUTHORITY

The Contractor shall arrange and pay the necessary inspection, testing and retesting fees where and as applicable.

The Contractor shall submit the necessary application forms to the local supply authority for the inspection, testing and final approval of the installation.

9. COMPLIANCE CERTIFICATE

The work shall not be considered complete until the applicable test and/or compliance certificates have been issued by the Electrical Contractor to the responsible Authority and copies of these have been submitted to the Employer/Architect/Engineer by the Contractor.

Where it is required that the Engineer should also sign a certificate, the Contractor shall firstly complete and sign such certificate before submission to the Engineer for his signature.

10. ACCEPTANCE TESTS & COMMISSIONING

After completion, either in a part or as a whole, the complete installations shall be subject to acceptance tests by the Employer/Engineer. The Contractor shall assist the Employer/ Engineer during any test carried out and must supply and operate/handle equipment, tools, instruments and consumables for testing purposes.

All labour, power, fuel, dummy and test loads and all instruments and appliances that may be required for the tests and commissioning, shall be provided by the Contractor.

11. MATERIALS

All equipment and materials shall comply with a SANS code and have the SABS/SANS mark. Where no such code exists, the applicable BS or IEC code shall apply. It may at any time be required of the Contractor to provide proof hereof, without any additional cost or compensation to provide such proof and/or to comply herewith.

All materials, equipment and fixings must be corrosion resistant/proof.

Compatibility of equipment, materials and fixings with each other and the environment is vital. Where doubt exists regarding this aspect, it is the Contractor's responsibility to request, in writing, additional information from the Employer/Engineer.

Interchangeability of equipment: similar and equivalent equipment shall be identical in all respects and to the smallest detail such as contacts, fuses, coils, methods of wiring, wiring numbers, instruments, indicating lights and other accessories. It shall be possible to replace any piece of equipment with any similar and equivalent item of equipment under the same contract/subcontract.

Where a certain manufacturer's material or apparatus is mentioned/specified in the drawings or specifications, such materials or apparatus shall be provided as specified, except where an alternative to this condition is allowed in the specifications. Where a specification for material or apparatus is not provided, it shall be understood that all normal requirements for the use of such material or equipment shall apply.

The Contractor shall in all cases and at all times ensure that such equipment/materials comply with the SANS code and bear the SABS mark.

- **In wet/damp areas: Screws on faceplates of switch sockets, outlets, switches, etc. shall be plastic with plastic covers (or stainless steel but not chromed steel).**

12. DISTRIBUTION BOARDS

Standard, approved manufacture, SABS/SANS approved and type tested as per SANS/SABS distribution boards, complete with doors where specified, shall be used.

Distribution boards of 150A and larger shall be certified. Certificates are required with the workshop drawings and again on delivery of the boards and for the record/as-built documents/manual. Type tests are not required, unless specifically specified.

All distribution boards shall comply with the requirements of the Electricity Supply Authority and shall have the necessary space and/or equipment per their normal requirements, e.g. for metering, pre-payment meters, current demand circuit breakers, as well as space for the necessary equipment for the switching of water heating equipment by means of ripple relay, etc.

Workshop drawings of distribution boards must be submitted timeously for comment.

All distribution boards shall be equipped with minimum 5kA circuit breakers/equipment.

All telephone, data, security, access control, fire alarm, TV, communication, etc. boards and drawboxes larger than 100 x 100 shall be labelled as such.

Telephone, IT/computers, security, access control, fire alarm, CATV, CCTV, communication, etc. boards shall be manufactured to the same standard as for electrical distribution boards, to Telkom/Neotel requirements, with hinged doors with handles and Telkom/Neotel approved locking, soft wood backing, interconnection openings between compartments and name labels. Location, sizes, surface/recessed and compartments specified on the drawings.

13. CABLES AND ACCESSORIES

Unless otherwise specified, all cables shall be PVC armoured with copper conductors and separate earth conductors.

Where exposed cables may be subject to mechanical damage, they must be protected in galvanised kickpipe.

All cable routes shall be confirmed on site prior to excavation and cutting of cables.

All cables shall be labelled at both ends with a Hellerman Tyton cable identification system or similar indicating the size of the cable what is it feeding.

14. EARTHING AND BONDING

Main earth, earthing and bonding of electrical systems and equipment and structure by Electrical Contractor.

Earthing and bonding shall be carried out in accordance with the Wiring Code and as specified.

All cables and circuits wiring shall have a separate earth conductor: Refer DB-SCHEMATIC and DB-SYMBOLS A4 size drawings.

A common earth may be installed in cable ducts, cable trays, wiring channels, power skirtings and floor ducts T-ing off from this to DB's, outlets, etc. when more than one cable/circuit are drawn in together.

D-Pin socket outlets circuits are "dedicated clean power" circuits for computers: no earth leakage protection and separate PVC insulated earth conductor.

The entire installation shall be properly and effectively earthed and bonded as prescribed in the SABS/SANS Code of Practice for wiring of Premises, Code SANS 10142.

Self-tapping screws are not acceptable as means of securing earth conductors. All equipment shall be earthed at the earthbars which in turn shall be connected to the main earth system.

Cable armouring's shall be earthed via cable glands.

All luminaires shall be earthed.

Earth conductors shall loop into the kiosks and shall be connected in such a way that disconnection from the earth busbar or terminal does not break the continuity of the earth conductor.

Jointing and T-off's of lengths of earth conductor shall be performed by means of suitable line taps Cadwelding or Silbralloy welding. An overlap of minimum three times the width of the conductor shall be used : Refer CONNECTION OF EARTH CONDUCTORS A4 size drawings.

Where lugs are used for terminating stranded earth conductors, the lugs shall be crimped with an approved type of crimping tool. The lug stud size shall correspond to the fixing bolt and the lug shall be so positioned that the full contact area of the lug is utilised.

All bolts and screws used for the earthing shall be high tensile steel, brass or cadmium plated mild steel bolts.

The cable armour shall be bonded to earth at all terminations of cables.

15. CONDUITS AND ACCESSORIES

All conduits and accessories may be PVC, and shall be recessed in offices and ablutions but shall be Bosal/Heavy duty galvanised on surface in the Parkhouse/Store areas, unless otherwise specified or approved.

IT/Computers conduits and trunkings as indicated on the drawings/Bill of Quantities.

No mixed runs of PVC/steel conduit are permitted unless fitted with separate full-length earth conductors and all equipment earthed with it.

Where conduits are chased in, the Electrical Contractor shall apply a scratchcoat (plaster) to hold the conduits in position and minimise the making good plaster/skin required.

Conduits shall be installed in a neat and workmanlike fashion and at right angles to the building elements.

IT/Computers, Telephone & Electronic Services conduits and cables/conductors shall NOT be run parallel & directly adjacent to electrical conduits or cables. A clear gap of 200mm minimum shall be left between these and electrical conduits and cables/conductors where these are installed near or parallel to each other.

Drawwires shall be installed in all: telephone, IT/Computers, communication, CATV, CCTV, radio, access control, fire alarm, security (electronic services) and unused electrical conduits and sleeves.

All conduits in ceiling to be surface mounted, properly fixed to the underside of the slab.

16. OUTLET BOXES, DRAW BOXES AND COVER PLATES

All outlet boxes, draw boxes and inspection boxes shall match the conduits installed and comply with the requirements of SABS 162 and shall be provided with metal cover plates and rust free screws.

All cover plates shall be White to SANS 1091.

Telephone and IT outlets shall be provided with coverplates and cradles, which can accommodate a RJ11 and RJ45 outlet.

Install blank cover plates on the unused electrical drawboxes and outlets and on telephone,

IT/Computers, security, access control, fire alarm, CATV, CCTV, communication and other electronic services outlets and drawboxes.

Use oversize coverplates on all round outlet boxes.

All conduits in ceiling to be surface mounted, properly fixed to the underside of the slab/structure.

- **In wet/damp areas: Screws on faceplates of switch sockets, outlets, switches, etc shall be plastic with plastic covers (or stainless steel but not chromed steel).**

17. CONDUCTORS

All conductors shall be stranded copper PVC insulated for 660/1000 volts. Conductors shall comply with SABS 150 and shall bear the SABS/SANS mark.

The conductors must be installed as per the A4 size DB-SCHEMATIC and DB-SYMBOLS drawings.

A separate copper earth conductor shall be drawn in with every cable and circuit and all outlets and equipment earthed to it.

A common earth may be installed in wireways and T-ing off to outlets, etc. where more than one circuit is pulled into a wiring channel/powerskirting.

Dedicated clean power circuits (D-pin outlets) shall have a separate PVC insulated earth conductor(s).

18. LUMINAIRES AND PHOTOCELLS AND SENSORS

The Contractor must supply, install, connect and commission all luminaires complete with lamps, poles and accessories as specified in the SCHEDULE OF LUMINAIRES.

Unused light outlet points shall be blanked off with the wiring terminated in a connector block.

Circuit wiring shall not be run in or through luminaires, but shall enter and leave at the entry point nearest the luminaire connection terminals.

Flood, area, street, exterior and feature lighting shall be subjected to night tests in the presence of the Employer/Engineer to ensure that the settings, coverage, etc. are adequate and acceptable.

Emergency lighting shall be fed via a 5000VA Pure Sine Wave invertor with 2x5.5kWh Sunsynk or similar approved lithium batteries.

19. POWERSKIRTING

The powerskirting shall be 3 compartment Type 2 tier 3 channel powerskirting

The colour shall be from the standard range to the Employer/Architect/Engineer's choice: submit samples for selection.

Full-length common earth conductors shall be installed in the powerskirting and earthing of outlets shall be T'd-off with an own earth conductor; as specified on the drawings: 4mm^2 BCE for power and separate 4mm^2 insulated for dedicated clean power circuits.

Every length/butt/joint in metal skirting/trunking shall be bonded/bridged together with minimum 4mm^2 earth conductor screwed/bolted to the metal and every 4th length/butt/joint shall be bonded to the common earth conductor in the skirting/trunking.

20. WIRING TRUNKING

Wiring trunking shall be:

- Similar to Cabstruct size as specified on the drawings, or as required (where not specified).
- Full length common earth conductors shall be installed in the trunking and earthing of the circuits shall be T'd off from this each with its own earth conductor, as specified on the drawings: 4mm^2 BCE for power and a separate 4mm^2 insulated earth for dedicated clean power circuits.
- Wiring shall be held in place in trunkings by means of Z-clips at maximum 1,2m spacing's.
- Every length/butt/joint in metal skirting/trunking shall be bonded/bridged together with minimum 4mm² earth conductor screwed/bolted to the metal and every 4th length/butt/joint shall be bonded to the common earth conductor in the skirting/trunking.

21. CABLE TRAYS

Cable trays/ladders shall be of the heavy duty cable ladder heavy duty hot dipped galvanised type.

Cable trays/ladders shall have minimum 75mm turn-up (side rails).

Each cable shall have a PVC Copper earth conductor, as specified.

22. INSTALLATION AND CONNECTION OF ELECTRICAL APPLIANCES AND EQUIPMENT

Electric Water Heaters: supplied and installed by others, unless otherwise specified.
The Contractor shall be responsible for the final connections to the water heater terminals.

Electric Cooking Appliances: supplied and installed by others, unless otherwise specified.
The Contractor shall be responsible for the final connections to the appliances.

Machine or Motor Outlet Points: Supplied and installed by others, unless otherwise specified.

Air-conditioning Units: supplied and installed by others, unless otherwise specified. The Contractor shall be responsible for the final connections to the appliances.

Extract Fans: supplied and installed by others, unless otherwise specified. The Contractor shall be responsible for the final connections to the appliances.

Security: supplied and installed by others, unless otherwise specified. The Contractor shall be responsible for the final connections of the power supply.

Fire detection and alarm: supplied and installed by others, unless otherwise specified. The Contractor shall be responsible for the final connections of the power supply.

Telephones/PABX: supplied and installed by others. The Contractor shall be responsible for pointing out conduit routes.

CCTV: supplied and installed by others. The Contractor shall be responsible for pointing out conduit routes.

Communication/Intercom: supplied and installed by others. The Contractor shall be responsible for pointing out conduit routes.

IT/Computers: supplied and installed by others. The Contractor shall be responsible for pointing out conduit routes.

23. POWER SUPPLIES TO AND CONNECTION OF SWITCHBOARDS FOR OTHER SERVICES

General: The Contractor shall provide power supplies to equipment, switchboards and control panels as specified and shall terminate these onto the main switch of the applicable boards or equipment & the equipment electrical is by others but the trunkings and dedicated sockets on the conveyors is part of this contract

24. PLANT/FIELD-MOUNTED CONTROL AND SWITCHING EQUIPMENT

Plant/Field-mounted equipment shall be mounted:
- As recommended by the Supplier, and/or
- As specified, and/or
- As approved by the Engineer.

Equipment housings, mounting and fixing materials shall be selected for the environment they will be required to operate in.

All circuits, equipment and mountings shall be

earthed. All equipment shall be identified by

means of labels.

The Contractor shall submit workshop drawings of mounting details for scrutiny by the Engineer.

25. SPECIFICATIONS & DRAWINGS

The specifications, schedules and drawings shall be read together and as a whole.

26. SCHEDULES OF INFORMATION / BILLS OF QUANTITIES

The Schedules of Information and Bills of Quantities shall be completed in full and submitted at tender stage.

All rates and prices shall exclude VAT.