WESTERN CAPE GAMBLING AND RACING BOARD

REFURBISHMENT OF EXISTING OFFICES

PAROW

CE0769/Y.01 PART 4

PROJECT TECHNICAL SPECIFICATION

A. SCOPE OF ELECTRICAL INSTALLATION WORK

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

The project comprises the fitout of an existing Western Cape Gambling and Racing Board office in Parrow.

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:

- Making safe and removal as specified of existing electrical installations.
- Existing cable trays / ladder / trunking on each floor to be surveyed, marked up, and pointed out to the Electrical Engineer.
- Care must be taken not to disturb the existing WiFi, access control, CCTV, outdoor lighting, and other installations as pointed out by the Engineer / Client / Architect.
- Re-use of removed materials and plant, including cable trays, cable ladders and trunking.
- Re-use existing distribution boards, inverters and diesel standby generator.
- Removal offsite to dump and / or to Employer's store of removed but unused materials and plant (The Employer has the option of retaining possession of all / any equipment removed).
- Acceptance, storage, installation and commissioning of free issue materials and plant.
- Provisional Dayworks and Provisional Sums (To be expended as directed by the Employer / Architect / Engineer).
- PC Sums (To be expended as directed by the Employer / Architect / Engineer).
- Liaison and arrangements with authorities (e.g. Electricity Supply Authority, Telkom, etc) regarding existing services.
- Arrangements / Liaison with and attendance on IT / Computers, Security, Fire Alarm, etc. contractors / specialists for installation of electronic installations cabling and equipment.
- New cable trays and supports and cable trunking as required / pointed out by the Engineer.
- Existing main distribution board MDB, and Generator & Inverter distribution boards to remain and re-labeled as required.
- Existing distribution boards on each floor to be reused.
- Feeder cables and earth conductors from MDB to distribution boards and subboards and standby generator.
- Wireways, conduits, drawboxes, outlet boxes, outlets, wiring, switches, switch sockets, luminaires, cover plates, isolators, outlet and equipment labelling, etc.
- Supply and handover of one male plug for every SSO installed.

- Wireways, conduits, drawboxes and outlet boxes with cover plates and labelling for Electronic installations: telephone, IT / Computers, security, access control, fire alarm, TV and communication, etc.

- Fire Detection installation.

- Drawwires in all telephone, IT / Computers, security, access control, fire alarm, TV, communication, etc (electronic installations) and unused electrical conduits and sleeves.

- Earthing and bonding.

- Power supplies, connections to and rotation / operation tests of electrical equipment, plant, machines, etc. supplied and installed by others e.g. water heaters, ac units, fans, hydroboils, 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 inclusive of the scratch coat to fix the conduits and boxes in place.

- Pointing out and checking requirements for, positioning and correctness of Builder's work required for and related to this services installation, e.g. 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 and catalogues, labelling, storage and later installation or removal.

- Compiling, submission and resubmission of workshop and as-built /record drawings and information, operating and maintenance manuals. (NB: Required in final approved format and content before final handover will be taken).

- Carrying out of tests and submission of test records and certificates

- Training of Employer / User staff.

- 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.

1. BUILDER'S WORK and WORK BY OTHERS

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

- Supply and installation of transformer, incoming LV cable to main metering panel: Existing.

- Standby power generator / Solar PV Installation / inverter Installation / UPS Installation: supplied and installed by others : Existing, to be tested by Electrical Contractor.

- Supply and installation of the following equipment:
  - Kitchen equipment, stoves, hobs, ovens, etc
  - Kitchen / Stove extract / hood
  - Laundry equipment
  - Geysers
  - Airconditioning units and fans
  - Pumps: water, sewer pool, fountain
  - CVT
  - Process plant, equipment, boards
  - Connection to / 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 and 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, floors, walls and ceilings, (e.g. through walls and partitions for power skirting)
  - 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 / Subcontractor.

Builder's work as specified shall be monitored, 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

2. SITE AND EXISTING SERVICES

The site is ERF nr 23464 situated in Parrow along Fairway Close.

The Contractor shall liaise with authorities (e.g. Electricity Supply Authority Telkom, etc.) and the User / Tenant regarding the existence, positions, pointing out, protection and / or relocation of existing services and, after informing the Employer / Architect / 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.

3. 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 and electronic installations such as telephone, IT / computers, security, access control, fire alarm, CATV, CCTV communication, etc
- Builder's works required for the services installation, e.g. plinths, holes, openings, etc.
- Cable ladders / trays and fittings / accessories layouts and details
- Power skirting and fittings / accessories layouts and details
- Floor trunking / ducting and 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 as-installed cable routes in the ground and route marketers with location dimensions, shall be provided.

4. 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, power skirting, standard power skirting colours, floor duct and pedestals, fixings, labelling, 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.

- **Where alternative luminaires are proposed the Electrical Contractor must issue the Engineer with light level calculations using approved electronic programs such as Relux or Ulysses. If Relux or Ulysses is used the Electrical Contractor shall issue the luminaire Relux file (.rdf) file for scrutiny by the Engineer.**

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

- **The Contractor shall also issue a delivery program and its context in / impact on the overall program and completion for scrutiny by the Engineer.**

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.

5. ELECTRICITY SUPPLY

There is an existing electricity supply to the site. The existing electricity supply and electricity reticulation to the various sub-distribution boards shall be reused.

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.

6. 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 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.
- GBCSA – Green Star SA Office V1 Technical Manual.
- CIBSE Commissioning Codes

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 Main Contractor / 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 Main Contractor / Employer in this regard. The Main Contractor / Employer reserves the right to take whatever action as may be required to enforce safety standards should the Main Contractor / 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 Main 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.

7. 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.

8. 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.

If the original certificate of compliance(s) is / are issued by the Contractor to the Supply Authority or Main Contractor, a certified copy shall be issued to the Engineer.

- **Otherwise the Contractor to issue the original certificate of compliance to the Engineer.**

9. ACCEPTANCE TESTS AND COMMISSIONING

After completion, either in a part or as a whole, the complete installations shall be subject to acceptance tests by the Employer / Architect / Engineer. The Contractor shall assist the Employer / Architect / 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.

If any offsite commissioning is required, the Engineer shall be notified two weeks in advance to allow time to arrange to attend the commissioning.

10. MATERIALS

All equipment and materials shall comply with a SANS code and have the 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 cables and wiring conductors shall be stranded Copper.

Where Aluminium conductor cables are specified, or permitted, only solid core Aluminium conductors shall be used. Stranded Aluminium conductors shall NOT be used and will NOT be accepted

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 / Architect / 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 an SABS code and bear the SANS 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).**

11. MAKE SAFE AND REMOVAL

Make safe and removal shall include the following:
- Testing, isolating, making safe and disconnecting of electrical and electronic services.
- Removal of all electrical and electronic services including cabling, wiring surface conduits and outlets / outlet boxes which are redundant.
- Pointing out the redundant recessed boards, outlet boxes, etc which may be demolished with slabs and / or walls, or which may / should be plastered over.
- Dumping / disposal of materials after giving the Employer the opportunity to choose to keep some or all of the removed materials.
- Providing disposal certificates to the Engineer for materials like lamps, oils, pollutants, etc.

The following installations / services shall not be removed / disposed of :
- Access Control
- CCTV
- Intruder Alarm
- WiFi
- Extract Air Fans
- Outside lighting
- Lighting in Stair cases
- Distribution boards

12. DISTRIBUTION BOARDS

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

Distribution boards in outside, exposed or corrosive locations, shall be constructed of 3CR12 and be powder coated, weather proof with drip canopy, and all cables / wiring bottom entry.

The distribution boards shall be manufactured and assembled in accordance with the latest revisions and amendments of the following:

- SANS 1973-1, Low-voltage switchgear and controlgear ASSEMBLIES –Part 1: Type-tested ASSEMBLIES with stated deviations and a rated shortcircuit withstand strength above 10 kA.

- SANS 1973-3, Low-voltage switchgear and controlgear ASSEMBLIES – Part 3: Safety of ASSEMBLIES with a rated prospective short-circuit current of up to and including 10 kA.

- SANS 1473-1, Low-voltage switchgear and controlgear assemblies – Part 1: Type-tested, partially type-tested and specially tested assemblies with a rated short-circuit withstand strength above 10 kA.

- SANS 1973-8, Low-voltage switchgear and controlgear ASSEMBLIES – Part 8: Safety of minimally tested SSEMBLIES (MTA) with a rated short- circuit current above 10 kA and a rated busbar current of up to and including 1 600 A a.c. and d.c.

- SANS 60439-4/IEC 60439-4, Low-voltage switchgear and controlgear assemblies – Part 4: Particular requirements for assemblies for construction sites (ACS).

- SANS 60439-5/IEC 60439-5, Low-voltage switchgear and controlgear assemblies – Part 5: Particular requirements for assemblies for power distribution in networks.

Standard, approved manufacture, SABS approved and type tested as per SANS code 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 tested certificates are required and shall be provided together with the workshop drawings.**

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.

All wire ends of stranded conductors shall be boot laced ferruled unless the conductor is crimped with a lug.

All inner panels / doors / faceplates to be hinged type with key locking mechanism. Where applicable, access to inside of board to be door / hinged. No removable panels shall be accepted. **A minimum rating of IP40 is required for all distribution boards, unless specifically specified elsewhere. All labels and rating plates to be permanently fixed to all distribution boards. No printed sticker labels will be accepted. No insulating tape will be allowed within the distribution boards, only heat shrink shall be used.**

All locking mechanisms on distribution boards shall be made of metal. Each distribution board shall be equipped / issued with its' own square / locking key during the electrical installations inspection before practical completion. **Spare square keys shall be issued for each distribution board. All square keys to be made of metal.**

Workshop drawings of distribution boards must be submitted timeously for comment, adjustments and resubmission.

The Engineer requires to inspect all distribution boards at the manufacturer's work, before shipment to site. The Engineer's inspection of any distribution board shall not relieve the Contractor of his responsibility to comply with the specification.

All distribution boards shall be equipped with minimum 6kA circuit breakers / equipment or higher as specified. **Only ABB, Schneider and CBI switchgear may be used within distribution boards. Where cascading is done with switchgear the manufacturer shall provide proof of how cascading was archived. The cascading documentation shall be issued with the workshop drawings.**

The manufacturer is required to issue factory acceptance test certification for each board at the manufacturers workshop during the distribution board inspections.

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

Telephone, IT / computers, security, access control, fire alarm, CCTV, communication, etc boards shall be manufactured to the same standard as for electrical distribution boards, to Telkom requirements, with hinged doors with handles and Telkom 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

All cables shall be PVC armoured with copper conductors and separate earth conductors.

All cables and wiring conductors shall be stranded Copper.

Where Aluminium conductor cables are specified, or permitted, only solid core Aluminium conductors shall be used. Stranded Aluminium conductors shall NOT be used and will NOT be accepted

Where exposed cables may be subject to mechanical damage, they must be protected in galvanised kick pipe, or galvanised steel trunking with galvanised steel lid, as approved by the Engineer.

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

Cable routes and cable laying shall be planned and executed so that the minimum of cable cross-overs take place on cable routes in the trenches, dust and on cable trays / ladders.

Cable shall be unrolled properly and (coils and loops) be straightened prior to the laying, installation and / or fixing of cables.

The laying / installation of cables in cable trenches / ducts / risers and cable trays / ladders shall only be undertaken **after** inspection and approval by the Engineer of cable trenches, ducts and cable trays /

ladders.

All cables shall be labelled at both ends with **a Hellerman Tyton Cable Identification System or similar** indicate the size of the cable, what it is feeding and from where it is fed **from /to**.

All wire ends of stranded conductors connected to plug points, isolators, light switches and other equipment shall be boot laced ferruled, unless the conductor is crimped with a lug.

14. EARTHING AND BONDING

14.1 General

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

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.

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.

14.2 Inspection & Testing

Earthing shall be inspected and tested after installation and the readings recorded and forwarded to the Engineer.

15. CONDUITS AND ACCESSORIES

All conduits and accessories shall be heavy duty galvanised / threadless (Bosal), with PVC permissible in the false ceilings and in the brick walls and shall be recessed unless otherwise specified or approved.

No Sprague shall be used, unless specifically specified and / or approved.

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 and Electronic Services conduits and cables / conductors shall NOT be run parallel and 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 electronic: telephone, IT / Computers, communication, CATV, CCTV, radio, access control, fire alarm, security (electronic services) and unused electrical conduits and sleeves.

Where conduits are jointed, glue shall be used on the joint to ensure permanent fixing. Where conduits terminate into accessories, nuts shall be used to ensure the conduit is firmly fixed to the accessories.

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 unless specifically specified. All cover plates shall be labelled on the inside indicating from which circuit breaker in which distribution board it is fed from. Each switch socket outlet, lights switch, isolator, etc. shall be marked in the same way as its corresponding cover plate. The marking small be done with white self adhesive tap and black marking on the tape.

All drawboxes and outletboxes shall be fitted with a “Brother” type label on the inside of the cover plate, indicating the type of drawbox / outletbox and where it is fed from.
Telephone and IT outlets shall be provided with cover plates and cradles which can accommodate a RJ11 and RJ45 outlet.

All power isolators, SSO’s and 5A plug outlets on lighting circuits (in roof spaces / ceilings used for plug-in of light fittings) shall also be individually labelled to identify the feeder DB name and the power / lighting circuit numbers.

Individual isolators, SSO’s, switches, etc an power skirting, on pedestals, on floor trunkings and floor boxes,
- Shall also be labelled individually
- Labelling / Fixing: Trafolite label fixed with screws to wall be installed above each one, or on cover plate label to be colour white with black lettering (lettering minimum 7mm high)

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 cover plates on all round outlet boxes.

- **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 mark.

The conductors must be installed as per the A4 size DB-SCHEMATICS and DB-SYMBOLS / NOTES 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 / power skirting.

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

All wire ends of stranded conductors connected to plug points, isolators, light switches and other equipment shall be boot laced ferruled unless the conductor is crimped with a lug.

18. LUMINAIRES AND PHOTOCELLS

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

- Only Osram or Phillips lamps may be used / installed.

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 / Architect / Engineer to ensure that the settings, coverage, etc. are adequate and acceptable.

Photocells shall be the Royce Thomson Catl RTE/P6.

- All photocells shall be mounted inside a clear bulkhead as per the illustration.

All luminaires shall be hard wired without 5A sockets.

19. POWER SKIRTING

The power skirting shall be 2 tier, 3 compartment PVC.

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 power skirting and earthing of outlets shall be T'd-off with an own earth conductor; as specified on the drawings : 4mm² BCE for power and separate 4mm² insulated for dedicated clean power circuits.

Every length / corner / butt / joint in metal skirting / trunking shall be bonded/bridged together with minimum $4mm^2$ earth conductor jumper screwed / bolted to the metal **and** every 4^{th} length / corner / 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).
- Manufactured from galvanised sheet metal as per the specification / drawings.
- Provided complete with its PVC lids as per the specification/ drawings.
- 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 spacings.
- Every length / corner / butt / joint in metal skirting / trunking shall be bonded / bridged together with minimum 4mm² earth conductor jumper screwed/bolted to the metal **and** every 4th length / corner / 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 Weldmesh heavy duty hot dipped galvanised type.
- Shall have minimum 50mm turn up (side rails).
- Be continuous cable trays / ladders with the manufacturer's custom bends and accessories, supporting cables over their full length.
- Not have bends omitted with the cables "jumping" unsupported through space.
- Have lengths / corner / bends/ butts / joints solidly connected through for earth continuity and shall be bonded / bridged together with minimum 10mm² earth conductor jumpers screwed / bolted to the metal

and after every 4th length / corner / bend / butt / joint shall be solidly bonded to the common earth conductor on the tray / ladder.

A 70mm² bare stranded copper common earth conductor shall be installed on all cable trays, unless otherwise specified, with other earth conductors T-ing off from it, and the cable trays also earthed to it.

The laying / installation of cables on cable trays / ladders shall only be undertaken **after** inspection and approval by the Engineer of these cable trays / ladders.

Cable routes and laying shall be planned and executed so that the minimum of cable crossovers take lace on the cable trays / ladders.

Cables shall be unrolled properly and (kinks, coils and loops) be straightened prior to the laying, installation and fixing of cables

22. INSTALLATION AND CONNECTION OF ELECTRICAL APPLIANCES AND EQUIPMENT

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

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

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.

The termination onto machines or motors by means of cables or wiring in conduit as specified or approved shall form part of this contract. The Contractor shall provide the connections from the respective distribution boards to the switches / isolators and to the machine terminals.

Where a machine or motor is mounted on slide rails or on a spring foundation, solid conduit shall be interrupted by a flexible cable to facilitate adjustment of driving belts or to prevent the transmission of noise or vibration. Flexible conduit shall not be used unless specified or approved by the Engineer.

The Contractor shall provide switches / isolators as required by the regulations and as specified. Unless otherwise specified, no provision shall be made for any starters, pressure switches or other control equipment.
The Contractor shall satisfy himself that motors are sufficiently protected and shall obtain, in writing, from the Engineer or Contractor supplying the motors, the required overload settings for each motor and shall check the settings of all overload relays to be in accordance with the requirements before any motor is switched on.

Airconditioning 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.

Hydroboil : 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.

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.

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

23. SPECIFICATIONS and DRAWINGS

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

B. SCOPE OF FIRE DETECTION INSTALLATION

References to the Contractor, Fire Detection Subcontractor, and/or Electronic Contractor in the specifications and drawings shall mean the Subcontractor for the Fire Detection and emergency evacuation Installations.

The project comprises the fire detection installation at a new warehouse and offices.

The Electronic Installations include the supply, delivery, off-loading, storage, installation, testing, commissioning and handing over in proper working order of the complete electronic installations as specified in this Specification, Schedules and on the Drawings:

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

- Arrangements/Liaison with the Electrical Contractor regarding wireways, drawwires, outlets, covers and power points.

- Addressable Fire Detection and Alarm System:
  - Addressable fire panel on ground floor.
  - Breakglass units
  - Optical smoke detectors
  - Sounders
  - Line isolators
  - Interface unit
  - Line relay
  - Cabling and wiring
  - Power supply
  - Battery backup

- Power supplies and connections to power supply points.

- Earthing and bonding.

- Pointing out and checking requirements for, positioning and correctness of Builder's and Electrical work required for and related to this services installation, e.g. sleeves, wireways, outlets, making and closings openings, making good, etc.

- 100 x 100 and 100 x 50 coverplates for electronic boxes. (The Electrical Contractor will supply the other coverplates like 50Ø round, etc. However it stays the Electronic Contractor to make sure that these are fitted.).

- Submission of samples.

- Compiling and submission of record information and maintenance and operation manuals.

- Carrying out of tests and submission of test records and certificates.

- Training of operating staff/Users.

- 1 Year comprehensive guarantee and maintenance 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.

1. BUILDER'S WORK & WORK BY OTHERS

The following sections of work are not included in this contract:

- Work by Builder and/or Others:
  - Sleeves

- Work by Electrical Contractor:
  - Conduits, wireways, drawboxes and outlet boxes with coverplates (excluding 100x100 and 100x50 coverplates for the electronic boxes).
  - Drawwires in conduits
  - 220V switch socket outlets for:
    - Fire panel in the ground floor reception area and mimic panel in the security kiosk outside.
  - DB's (as indicated on the drawing).

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

2. DRAWINGS

The Electronic Installations are specified on the drawings as listed in the attached SCHEDULE OF DRAWINGS.

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

Workshop drawings shall be provided of the following:
- Builder's, electrical, etc work required for the services installation(s).
- Cable layout/schematic.
- Catalogues/brochures of all equipment offered shall be provided at quotation stage
- Wiring and connection diagrams for all systems.
- Operation and maintenance manuals shall be provided as a pre-requisite for completion

Operation and maintenance manuals shall be provided well before training, completion and handover.

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 shall be provided.

3. SAMPLES AND ALTERNATIVES

Samples or catalogues are required of all the systems components and equipment.

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, 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.

4. ELECTRICITY SUPPLY

Electricity supplies for these installations shall be taken from 240V AC switched socket outlets (provided by the Electrical Contractor) as specified on the drawings and in Clause 2.

Should additional SSO's (and/or wireways and outlets) or changes to these, be required by the Contractor, these shall be requested/pointed out at quotation submission stage.

Electricity for erection, testing and commissioning purposes shall be arranged/provided by the Contractors as permanent supply will not be available during the execution of this contract.

5. 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 Premises SANS 10142.
- The Machineries and Occupational Safety Act of 1983.
- SANS 10139: Fire detection and alarm systems for buildings – system design installation and servicing.
- The Municipal Bye-Laws and any special requirements of the local and supply authorities of the area.
- Telkom regulations.
- 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 in this regard. The Employer 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 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.

The Contractor shall be registered with the FDIA as a designer and an installer.
- Proof of registration of personnel shall be submitted with the quotation as a prerequisite.

6. NOTICES, FEES AND LOCAL AUTHORITY

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

7. COMPLIANCE CERTIFICATE

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

Separate certificates are required for the separate systems.

8. 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/Architect/Engineer. The Contractor shall assist the Employer/Architect/Engineer during any test carried out and must supply and operate/handle equipment, tools and instruments 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.

9. MATERIALS

All equipment and materials shall comply with a SABS code and have the SABS mark. Where no such code exists, the applicable BS or IEC code shall apply.

Samples or catalogues are required of all equipment offered for each installation.

All materials, equipment and fixings must be corrosion resistant (and also weatherproof where used in outside areas and where water or other liquids may be used and UV resistant where exposed to the sun).

Compatibility of materials 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/ Architect/Engineer.

Interchange ability 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.

Where a certain manufacturer's material or apparatus is mentioned 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.

10. CABLES, WIRING, CONDUCTORS AND ACCESSORIES

Cable selection shall depend on the length of run required and whether used indoors, outdoors or underground.

Where surface mounted cable is used, it shall be colour matched to the interior/exterior decor, if possible, and shall be fixed as recommended by the manufacturer and approved by the Engineer (glue, staples, saddles, etc, so as not to deform the cable outer sheath while providing secure fixing).

Outdoor cables shall withstand all weather extremes wart. Sunlight, temperature, humidity, corrosion, etc.
Underground cable (whether in conduit, sleeves or direct burial) shall have a high moisture resistance.
Armoured cable shall be used where direct burial is required.
Manufacturer’s recommendation w.r.t. Application bending radius, method of fixing, ambient conditions, etc. shall be strictly adhered to.
Where exposed cables may be subject to mechanical damage, they must be protected in kickpipe.

All cable routes shall be confirmed on site prior to cutting and installation.

All multicore cables shall be provided with a minimum 25% spare capacity with a minimum of 2 cores over & above any specifically specified & allocated spare.

No joints in the PH30 cable are allowed. No joints are allowed in cable where cable sizes do not change or when no T-offs or splits are made. Where joints are required in other type of cable than PH30 the joint must be a solder joint in a PVC box next to the trunking or tray or in conduit run or joint with a joint kit design for the cable used.

11. EARTHING AND BONDING, LIGHTNING & SURGE PROTECTION

Earthing and bonding and lightning and surge protection of systems and equipment by Contractor.

Earthing and bonding and lightning and surge protection shall be carried out in accordance with the Wiring Code, other regulations and normal/good practice for this area.

12. CONDUITS AND ACCESSORIES

All conduits with drawwires and conduit accessories for this installation shall be installed as per the layout drawings and shall be recessed unless otherwise specified or approved: by the Electrical Contractor.

Drawwires shall be installed in all conduit and sleeves: by the Electrical Contractor and Builder.

Should additional and/or different conduits and/or outlets be required by the Contractor, this shall be

pointed out at quotation awarding stage.

13. OUTLET BOXES, DRAW BOXES AND COVER PLATES

All outlet boxes draw boxes and inspection boxes and unused boxes will be provided with coverplates, (except 100 x 100 and 100 x 50 coverplates that will be provided by the Electronic Contractor) by the Electrical Contractor. The Electronic Contractor must refit all coverplates and screws.

All 100 x100 and 100 x 50 coverplates and any other none standard or special coverplate for the electronic boxes must be supplied by the Electronic Contractor. These plates must be WHITE steel Crabtree plates where possible.

14. STANDBY BATTERIES

The batteries shall be a sealed lead acid type with a 24/12-volt operating voltage (as appropriate), charged from a float charger incorporated in the applicable panel power module. The charger shall be fitted with a boost charge switch for accelerated recharge of the battery unit when necessary.

The battery will be capable of providing standby power for the system for a period of not less than 48 hours and still return adequate capacity to operate the total alarm load at optimum efficiency for a further period of not less than 1 hour. The Engineer will require a demonstration of this ability.

15. TESTING AND HANDOVER

After commissioning of the systems, the Contractor shall test the systems to prove the correct functioning of all the elements in the systems and these test results shall be documented. Further tests may be called for if the Engineer is not satisfied that the systems comply with the specifications.

16. OPERATION AND MAINTENANCE MANUALS

Three (3) sets of O&M manuals shall be prepared and submitted to the Engineer as a prerequisite for the Handover Inspection.

The structure and contents of the O&M manuals shall be as follows:
- System description and instructions for use/operation.
- Routine operator maintenance schedules.
- Equipment specification sheets and extracts from manufacturers and suppliers catalogues.
- Test certificates and commissioning data.
- 1 Year free maintenance and guarantee contract.
- Schematic wiring and control logic diagrams.
- Contractor’s as-built drawings.
- Software source code.
- Engineer’s contract/construction drawings.

17. TRAINING OF OPERATING STAFF

The Contractor shall train the Client/User to be fully competent in the operation and basic operational trouble shooting of the systems.

- A minimum of 3 training sessions shall be allowed for.

18. ONE YEAR GUARANTEE PERIOD AND MAINTENANCE CONTRACT

1 Year Guarantee period and free maintenance will be provided by the Contractor starting from the day that the final handover is completed. This guarantee with the dates of the 1 Year Guarantee period must be enclosed in the O&M manuals as described in Clause 18 above.

Quarterly inspections shall be carried out by the appointed Contractor as part of the 1 year maintenance that is included in this contract. The appointed Contractor shall perform their inspection even if the Client or Engineer reports no faults.

An inspection report must be issued to the Engineer and Client after the inspection.

At the time of quoting, Contractors shall offer contracts for the regular inspection, service and maintenance of the installation after the above one-year maintenance period after final handover and enter the cost of such a contract in the Schedule provided.

Full particulars of the contract offered shall be provided.

If the Owners elect to enter into such a contract, this will be after the 1-year maintenance included in the contract.

19. FIRE DETECTION AND ALARM SYSTEM

19.1 Scope

- Addressable Fire Detection and Alarm System:
  - Addressable fire panel on ground floor.
  - Breakglass units
  - Optical smoke detectors
  - Sounders
  - Line isolators
  - Interface unit
  - Line relay
  - Cabling and wiring
  - Power supply
  - Battery backup

19.2 Operation

The fire panel will be the Ziton analogue addressable 2 loop type complete with LCD, which will be installed on ground floor and have the following loops.

- Loop 1: Basement and Ground Floors
- Loop 2: First & Second Floor

The LCD display must be 32 characters, 4 line unit to display 4 names of different detectors or break glass unit, sounders, etc. if necessary. If more than 4 alarms exist, the panel must first display the first 4 and store the other to display them as soon as a line becomes available, in other words a broken glass is acknowledged.

The alarm can be silenced at the fire panel via a push button.

The description / name of each detector, break glass unit, sounder, store, relay and door contact must be approved by the Engineer.

Sounders shall be powered directly from the panel without requiring additional wiring minimum cable specification: PH30 cable must be used.

When a device is triggered, the address of the device and a description of its position shall appear on the LCD display. The system shall go into alarm on a double knock.

Fresh air fans to switch off, access control doors and roller shutter doors to release / open and lifts to home when the fire alarm is triggered.

The installation shall be carried out in accordance with the latest revision & amendments of the SANS 10139.

19.3 Monitoring for Maintenance

The system must check the calibration of each analogue line device and record changes caused by environmental contamination.
The build-up of dirt or similar contamination on the surfaces will cause the output signal from the detector to gradually change. The control panel shall be capable of monitoring this slow change in signal and at a predetermined level indicate that the detector is in need of servicing.

When maximum calibration adjustment is reached the panel must indicate a “maintenance” signal.

19.4 Optical Smoke Detector

Optical smoke detectors must be of the pre-set uniquely addressable 2 way communication type.

The devices shall be certified by the Automatic Energy Board.

The detectors must be capable of operating within the following environmental limits :

- Temperature operating range : -10°C to 75°C
- Humidity operating range : 20% to 95% RH (no condensation)
- Wind resistance : Up to 10 m/s
- Protected against dust and moisture.

The detectors must be fully compatible with the system and must protect an area of 100m2 at a height of 12m.

All optical detectors will be WHITE.

19.5 Breakglass Units

Breakglass units shall be compatible with the addressable fire detection system provided.

Recessed back boxes for these units must be issued to the Electrical Contractor for installation.

The breakglass units must be the resettable plastic BGU 4 off fire BGU reset keys for resetting of BGU’s shall be issued to the Client at handover.

All breakglass units will be RED.

19.6 Sounders / Strobes

Sounders / Strobes shall be compatible with the fire detection system provided and be of 110 dBA area models and have multi-tone operation.

Sounders / Strobes shall be powered directly from the addressable loop, without requiring any additional wiring. It shall be possible to fit up to 20 sounders onto each loop, depending on the size and length of the loop.

All sounders Strobes will be WHITE.

19.7 Isolators

Loop isolators must be with a maximum spacing of one per 20 devices. The isolators shall protect against short circuits, and partial short circuits, on the loop by isolating that section of the loop where the short circuit occurred, thus maintaining the remainder of the system.

19.8 Interface units

The interface unit must be the same brand as the panel.

The unit must be capable of operating within the following environmental limits and have an IP42 rating :

- Temperature operating range : -10°C to 75°C
- Humidity operating range : 20% to 95% RH (no condensation)

19.9 Line relay

The line relay units must be the same brand as the main panel.

The units must be capable of operating within the following environmental limits and have an IP40 rating:

- Temperature operating range : -10°C to 75°C
- Humidity operating range : 20% to 95% RH (no condensation)
- Maximum switching : 1,5 Amps

19.10 Cabling and Wiring

Style A wiring must be used for the system.

PH30 cable must be used.

The shields of the cables must be connected at each termination. The addressable line outgoing and return loop must both be earthed.

The earthing must be continuous with the fire detection system only earthed at the control panel.

All cables shall terminate in a round 50mm outlet box with compression glands, supplied by the electronic Contractor unless conduits / drawboxes have been provided in slabs.

19.11 Battery Backup

The battery will be capable of providing standby power for the system for a period of not less than 48 hours and still return adequate capacity to operate the total alarm load at optimum efficiency for a further period of not less than 1 hour. The Engineer will require a demonstration of this ability.

20. SPECIFICATIONS & DRAWINGS

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

21. SCHEDULES OF INFORMATION & RATES

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

All rates and prices shall exclude VAT.

22. CONTINGENCY & PROVISIONAL SUMS

The contingency & provisional sums as included in the contract amount, or any part thereof, are not claimable by the Contractor unless specifically instructed and approved by the Consulting Engineer in writing for additional works carried out.

WESTERN CAPE GAMBLING AND RACING BOARD

REFURBISHMENT OF EXISTING OFFICES

PAROW

CE0769/Y.01 **PART 5**

SCHEDULES OF QUANTITIES

GENERAL NOTES

1. These schedules of quantities contain sequently numbered pages as indicated in the contents list. Tenderers are required to check that the pages in their schedules of quantities are complete. If any pages are duplicated or omitted, or if any quantity or typing is unclear or if the schedules of quantities contain any obvious errors, the tenderer shall immediately notify the engineer so that the problem may be rectified. No responsibility for any errors arising from any of the above shall be accepted by the engineer.

2. The schedules of quantities form part of and shall be read in conjunction with the specification, which contains full description of the work required to be performed and the materials and equipment to be supplied and used in the execution of the works. Tenderers shall refer to the specification for the full meaning and description of work to be executed and materials and equipment to be supplied or used in the execution of the work.

3. Tenders shall be submitted with schedules of quantities completed in full. Non or partial completion of the schedules of quantities shall render tenders liable for disqualification.

4. The total tender price as carried forward to the tender form, after correction for arithmetic extension errors, etc shall be the contract price as awarded to the successful tenderer. Tenderers are requested to check multiplication and addition of the schedules of quantities. The rate submitted shall be regarded as the price offered per item.

5. No changes, additions or omissions to the contents of the schedules of quantities shall be permitted. If any changes, additions or omissions are made these shall not be recognised and the original wording of the schedules of quantities shall apply.

6. The priced schedules of quantities of tender shall be checked by the engineer. The engineer reserves the right to request adjustments to one or more individual tender prices and to rectify contradictions and thereby alter the total tender price as submitted. The acceptance of this tender does not preclude the engineer from querying or requesting of the contractor to adjust the rates at any stage during the contract period or any extension thereto.

7. The responsibility of the accuracy of the quantities included in the schedules, remains with the person who prepared the schedules. The tenderer is relieved from the responsibility of the measurement of quantities at tender stage and the tender amounts shall be for the quantities as listed in the schedules. It is however expected from the tenderer to include for minor construction items such as would be required for the complete execution of works in accordance with the specification.

8. The successful tenderer and the client or his agent may agree that the total of an individual list or lists, inclusive of any variations such as additions to or omissions from the list, form an accurate description of the work required for the execution of a part, or the whole of the works and as such shall form the total final payment of a part or the whole of the works. The agreed total for one or more lists, inclusive of any agreed variations to the list, shall be considered a lump sum total for the part or whole of the works with any subsequent additions to and omissions from part or whole of the works calculated on the basis of the rates as tendered.

9. The quantities in these schedules of quantities shall not be used for the ordering of materials.

10. Changes in the scope of works included in the schedule of quantities shall be permitted and shall be measured and priced at the tariffs as included in the schedules of quantities and shall form an addition to or omission from the total of the schedule of quantities. Any changes not covered by any rates in the schedules of quantities shall be agreed and priced as non schedule items in accordance with the conditions of contract.

    The extent and value of variations shall be in accordance with the conditions of contract. Variations to the works prior to the execution thereof shall be priced as above. Variations to work already executed shall not necessarily be priced in accordance with the schedule of quantities and shall be judged individually on merit.
11. Except where the separate rate for the material and labour components of any item is specifically called for, the unit price of such item shall be deemed to include the supply and installation of that item.

    The description of any items shall, except where otherwise specified, allow for the purchase, delivery, off-loading, storage, packing, lifting, placing, positioning and fixing in position, cutting and wastage, dies and patterns, models and equipment, temporary work, return of packing material, fixing costs, profit or other obligations of the contract arising out of the conditions of contract.

    All items prices shall exclude VAT but include any other tax or levy as applicable.

12. All items are measured to the net final quantity as indicated on the drawings with the completed work in the position as indicated on the drawing. All prices and rates shall allow for wastage for whatever reason, irrespective of any other standard measurement which may be currently used elsewhere.

13. Should the contractor identify any additional issues or items which in his opinion are necessary for the complete and proper execution of the works, he shall identify such items in a covering letter attached to his tender and submit rates for these items. Mistakes in the physical measurement of items in the schedules of quantities shall be rectified but no claim shall be considered for the non-measurement of doubtful or minor items or claims resulting of criticism of method of measurement used or descriptions given. The priced schedule of quantities shall not be adjusted on the grounds of the items which in the opinion of the tenderer should have been brought into account unless so detailed in the accompanying letter.

14. The schedule of quantities shall be adjusted to reflect the quantities of materials used on completion of whole or part of the works as a result of remeasurement, qualification or variations. The remeasured quantities shall form the basis for the calculation of payment certificates. The schedules of quantities are not intended for the ordering of materials, etc. and the contractor is advised to extract the quantities for the ordering of materials directly from the drawings and specification. Any order placed directly from the schedules of quantities shall be solely at the contractor's risk.

15. The unit rates as entered in the schedule of quantities with the exclusion of dayworks items shall in all cases include any present and applicable sales tax or similar statutory duties.

16. DAYWORKS

16.1 The quantities and rates for daywork shall form part of the tender price. The tenderer's attention is drawn to the fact that these quantities shall be considered to be preliminary quantities. Payments against dayworks shall only be made as and when required and a written instruction for the work to be performed on dayworks is issued by the engineer.

16.2 LABOUR

The unit rates for labour shall allow for all payments and obligations in terms of the various labour agreements in force during the period of contract, as well as any or all transport allowances and all transport costs, lodging or site allowances and any other remuneration or allowances payable to the workers at tender submission date.

The rates for labour and dayworks shall be applied to the time worked and shall include for labour costs, supervision, overheads, transport, profit, full levies, bonuses, leave payments and shall in all cases exclude VAT but include any other present and applicable statutory duties and levies not covered under preliminary and general costs.

Time sheets with the time spent during each day on the specific day of work undertaken in dayworks including the names of the workmen and the material used in execution of dayworks shall be submitted

weekly to the engineer or his representative, as agreed and in accordance with the conditions of contract.

16.3 MATERIALS

The cost of materials in dayworks shall be based on the rates in the schedules of quantities and where the suitable rates for these materials do not exist the costs shall be based on the nett costs which shall be substantiated by means of invoices.

The unit rates for materials as indicated shall be the nett rates after deduction of applicable discounts. VAT shall be excluded but any other applicable levies shall be included. Quantities of material used shall be inclusive of any reasonable and unavoidable wastage of material.

16.4 PERCENTAGE MARK-UP

The percentage mark-up which is added to labour and materials only, shall be considered to cover all costs inclusive of contractor's profit, administration, insurance, establishment, supervision (with the exception of time spent by the applicable artisan, team leader, or leader artisan as allowed by the engineer), the use of hand tools and all other non-mechanical equipment and any other costs already covered in the preliminary and general section of schedules.

16.5 MECHANICAL EQUIPMENT AND MACHINERY

The rates submitted for mechanical machinery and equipment shall include for the hiring or use of machinery exclusive of VAT but inclusive of any other applicable taxes, the machine operators time (exclusive of time spent by helpers and artisans, separately detailed), insurance, consumables, fuel, lubrication, repairing, service and maintenance, transport to and from the site (unless specifically brought to site on the instruction and with the agreement of the engineer) and all other overheads and profit.

16.6 TOWING AND HAULAGE

The rates submitted for towing and haulage shall include for the hire or use of the vehicle, drivers time, fuel and oil, repair, service, maintenance, insurance and any applicable taxes or levies excluding VAT and shall include for all overheads and profits. Towing shall only be paid for vehicles used exclusively for dayworks and only with the prior approval of the engineer.

16.7 EQUIPMENT

The rates for non-mechanical equipment and supplies shall include for usage, wear, maintenance, repair and/or replacement to and from the site and all landing and overhead costs and profit. Only equipment specifically brought to site for the execution of dayworks and used exclusively on dayworks shall be paid.

16.8 STANDING/WAITING TIME

Standing time for mechanical equipment or hauling vehicles will only be paid in periods of inactivity during normal working hours while it is necessary to be fully prepared for the execution of the specific daywork.

16.9 UNSCHEDULED ITEMS

Prior to the application of any labour, equipment, material of any nature to dayworks the contractor shall be required to submit rates to the engineer for approval of any unscheduled items.

17. PRELIMINARY AND GENERAL

17.1 Tenderers should place preliminary and general under one or all of the following groups:

a. a fixed amount
b. an amount adjustable in proportion with the final contract period in comparison with the originally specified contract period.

All sub-divisions of preliminary and general of the above categories shall be realistic and the contractor may be requested to justify the cost allocations submitted. Attention is specifically drawn to the rights reserved in accordance with clause 6.

17.2 GENERAL ALLOWANCES

Items relating to the entire project are prices on a lump sum basis and including the following:

a CONDITIONS OF CONTRACT

Allow for all items and contingencies in the conditions of contract and special conditions of contract which are not specifically allowed for elsewhere.

b. INSURANCE

Allow for the payment of all premiums of all insurance and guarantees as required by the contract documents with the exception of any items specifically allowed for and priced elsewhere.

c. ESTABLISHMENT

Allow for establishment on site.

d. CLEANING

Allow for the cleaning of the external services of buildings and structures, removal of marks on tar surfaces, removing of stains, cleaning of paving and floors, etc., removal of refuse and rubble and all other work required to leave the works clean and in a complete condition.

e. SAMPLES

Allow for the supply of samples of materials as may be requested by the engineer and for the erection of test panels as described in the standard and project specifications.

17.3 ESTABLISHMENT ON SITE

Items shall be priced on the basis of initial erection and use and maintenance and disassembly and removal on completion of contract which will include the following:

a. FENCING AND PROTECTION

Allow for the protection and fencing between the site, adjacent properties and public areas including the supply and installation of all necessary fences and protection, scaffolding, supports, protective screens, barriers, fences, false pavement, temporary curbs including the modifications and adjustments required from time to time and for the procurements of all necessary permits and the payment of all deposits, rents, etc. during the contract period.

b. SITE OFFICE STORAGE, ACCOMMODATION, ETC.

Allow all necessary site offices, temporary workshops, living accommodations, mess facilities, storage areas, cleaning and recreation facilities, etc., including suitable furniture, fences for temporary camps and any necessary moving of facilities during the course of the project. (Lighting and cleaning etc shall be allowed for elsewhere).

c. SITE FACILITIES:

No site facilities are required by the engineer unless otherwise specified in the project specification.

17.4 SITE ADMINISTRATIVE COSTS

The following items shall be priced on the assumption that they shall mainly be proportional to the full contract period and will include the following:

a SITE PERSONNEL SALARIES AND LOANS

Allow for all salaries, loans and related costs in respect of supervisory and other unproductive

personnel including general foreman, site engineers, site surveyors, section foreman, costing clerks, time clerks, office and store personnel, night watch, etc.

b. TELEPHONE

Allow for all necessary telephone services including radio and telephone intercommunication systems and for the payment of all installation and connection fees, rental, telephone call unit costs and any other costs for the moving of the telephone as necessary and for the removal of system at contract completion.

c. GENERAL

Allow for the necessary stationary, first aid stores, office cleaning including materials and any other necessary expenses.

17.5 SITE ON COSTS AND EXPENSES

Items shall be priced relating to specific overheads which may be continuous, intermittent or of varying duration including the following:

a. MECHANICAL MACHINERY AND EQUIPMENT

Allow for all costs including the erection, installation, repairing, maintenance, accessories, fuel, lubrication, operators, etc. and any movement of machinery and the removal of machinery on contract completion (transport to and from site shall be allowed in sub-clause(d) below).

b. SCAFFOLDING

Allow for all scaffolding, supports, boards, etc., for internal or external use, inclusive of erection, hiring, repair and replacement, etc. and any requirements on site and the eventual demounting and removal thereof (transport to and from site shall be allowed in sub-clause (d) below).

c. NON MECHANICAL EQUIPMENT AND MACHINERY

Allow for non-mechanical and contractors machinery and also for any loose tools, consumables, protective clothing, etc. (transport to and from site will be allowed in the sub-clause (d) below).

d. TRANSPORT

Allow for all transport related to the works to or from the site including the transport of employees, materials, machinery and equipment (excluding the removal of rubbish and rubble).

e. SAFETY MEASURES

Allow the necessary safety measures for the protection of the public and workers against damage or injury, including the provision of temporary safety railings or barriers and warning boards, etc.

f. ATTENDANCE ON ENGINEER

Allow for the provision of all attendance (labourers or any other attendance) required by the engineer or any other person or persons nominated by the engineer for the purposes of the preparation of records or measurement of any of the details of the work executed and for the exposing work for inspection or any similar obligation of task, for the preparation of an account and finalising of design details on the site.

g. RUBBISH REMOVAL

Allow for the cleaning of all rubbish and off-cuts as required from time to time (final cleaning shall be allowed under sub-clause (d) in 17.2.

h. PROTECTION OF THE WORKS

Allow for the covering and protection of the section of the work liable to be damaged by any cause and for the removal of coverings at completion of the contract.

i. ELECTRICAL AND WATER COSTS
Allow for all cost in respect of electricity and water usage required for the execution of the works, whether this be supplied by means of a main connection supply or any means.

18. All provisional amounts shall be expended on written instruction by the engineer and the remaining balance of provisional amounts shall be omitted from the contract sum.

19. All items described as provisional shall be measured and executed and shall be paid in accordance with the prices in the Schedule of Quantities and any unused amounts shall be deducted from the final contract value. Items designated as provisional shall be undertaken only on written instruction from the engineer.

20. All rates shall allow for the testing and commissioning procedures required for equipment and systems.

21. All quantities are net except where otherwise specified and tenderers shall make allowances in their rates for all wastage.

22. 5% has been added to all underground cable lengths to take into account the effect of gradient and waviness and weaving around agreed obstacles. One joint per 300m of cable allowed for.

    The purchasing and fitting of permanent locks for kiosks, transformers etc shall be included in the rates for these items.

    Earth conductors include running joints.

    Excavation classifications as per SABS 1200. Cable trenching and all other excavations shall include stabilisation, keeping the trenches free of wind-blown sand, backfilling and compacting in layers and the removal, spreading and compacting of excess soil.

    Cable marker installation includes excavation to install cable marker.

    Workshop drawings shall be submitted in quadruplicate, delivered to the engineer's office.

    As-built drawings and test reports and records shall be delivered to the engineer's office.

    Samples shall be delivered to the engineer's office.

    Terminations and joints are measured per cable end & per joint.