PROPOSED COMMERCIAL DEVELOPMENT ON PLOT L.R. NO. NAIROBI/BLOCK 40/15, DESAI ROAD

FOR

MWITO DT SACCO LTD

VOLUME 2B
PHASE 1

CONDITIONS OF CONTRACT SPECIFICATIONS AND BILLS OF QUANTITIES FOR ELECTRICAL INSTALLATIONS

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QUALITY OF MATERIALS

AND

WORKMANSHIP

PART ONE

QUALITY OF MATERIALS AND WORKMANSHIP

1. GENERAL

This section specifies the general requirements for plant, equipment and materials forming part of the electrical contract and shall apply except where otherwise specified.

The Contract Works must be carried out strictly in accordance with the following documents: -

(i) The 15th Edition of the "Regulations for the Electrical Requirement of Buildings" issued by the Institution of Electrical Engineers of Great Britain with local amendments.

(ii) The Licence's by-laws.

(iii) Relevant British Standard Specifications and Codes of Practice published by the British Standards Institution (hereinafter referred to as B.S and C.P respectively).

(iv) The Specification.

(v) The working drawings, produced by the Contractor and approved by the Engineer.

(vi) The Engineer`s instructions.

The Contractor shall undertake all modifications, demanded by the authorities in order to comply with the regulations, and produce all certificates, if any, from the authorities without extra charge.

Materials and/or apparatus supplied by others for installation and/or connection by the Contractor shall be carefully examined on receipt.

Should any defects be noted the Electrical Contractor shall immediately notify the Consulting Engineer.

Unless otherwise specified all materials including equipment, fittings, cables, etc., shall be in new condition. Defective equipment or that damaged in course of installation or test shall be replaced or repaired to the approval of the Consulting Engineer. Should any replacement be necessary the Electrical Contractor shall bear the cost of substitution of all associated builder`s work and making good finishes.

It is particularly necessary that all the Electrical Contractor`s proposals and Working Drawings for and in connection with the Works shall be submitted early in the Contract period to facilitate co-ordination with others.

All plants, apparatus, equipment, valves, distribution boards, terminals and cable cores shall be securely and properly labelled to the approval of the Engineer. The labelling shall clearly show the identification of the item and if applicable its control function and the part of the system controlled. Labels shall be of Traffalyte sheet or equal fixed with screws or rivets.

Uniformity of type and manufacture of fittings or accessories is to be preserved throughout the whole work.

The Contractor will be entirely responsible for all materials,apparatus, equipment etc., furnished by him in connection with his work,and shall take all special care to protect all parts of finished work from damage until it is handed over to the Employer.

The work shall be carried out by competent workmen under skilled Supervision. The Engineer shall have the authority to have any part of the work taken down or changed, which is executed in an unsatisfactory manner.

2. SWITCHGEAR

The Switchgear shall be designed throughout to secure safety during operation, inspection, cleaning and maintenance and shall be so arranged as to minimise the risk of fire arising and spreading.

Each switchboard section shall be completed, fully wired and checked out at the factory or workshop and shall require a minimum of installation work on the site. Modular construction shall be used wherever practicable and provision shall be made for simplified servicing, replacement and maintenance throughout without major dismantling.

All switches, switchfuses, circuit breakers etc., shall be labelled in agreement with the Engineer using engraved plastic labels.

Where spaces on switchboards is provided for future components to be installed as shown on the drawings all ancillary parts such as busbars shall be provided and installed so the future components may be installed and connected with the least possible inconvenience. Full safety measures shall be provided with all such spaces.

The switchboard shall comprise the equipment shown on the drawings together with all current transformers, auxilliary fuses, labels, control wiring and interconnection necessary to facilitate transport and erection. The maximum height of the switchboard is to be approximately 2.0 metre.

A suitable connection chamber containing all field terminals shall be provided at the top or bottom of the switchboard as appropriate.

Before manufacture, the Contractor shall submit to the Consulting Engineer for approval detail drawings showing the layout construction and connection of the switchboard.

All fuse switches are to comply with B.S 3185 and shall have a fault rating at least equal to the fault rating of the switchboard in which they are installed. Cartridge fuse links to B.S 88 category A.C 46, Class Q1 and fusing factor not exceeding 1.5 shall be supplied with each fused switch.

Mounting arrangements shall be such that individual complete fuse switches may be disconnected and withdrawn when necessary without extensive dismantling work. Where switches are arranged in tier formation all necessary horizontal and vertical barriers shall be provided to ensure segregation from adjacent units.

All busbars and busbar connection shall be clearly marked with colours according to the phases, red, yellow, blue and black for neutral.

The busbars shall be orderly arranged in the panel and furthermore so the extensions to both sides may be made in the future.

Removable insulated shields shall be provided for protection against contact with live parts. All panel arrangements shall be of sufficient mechanical strength to withstand the influences of short-circuit currents.

All wiring within each switchboard shall be orderly laced and bonded to the panel structure, the wiring insulation being coloured according to the above busbar colour scheme.

Where wiring passes through holes in metalwork protection by rubber bushes shall be provided.

Where single core cables are used care shall be taken to prevent hysteresis.

Conduit and cable entries shall be provided at top and bottom end.

Where wiring is installed to panels which are supplied and installed by others the cables shall be brought into the panel and sufficient length left to permit the making off and connection by others to the terminals.

Similarly where wiring is installed by others to a panel supplied under this contract, the final connection of the cables of the terminals shall be carried out as part of this contract.

Standard colour phase disc shall be fixed on all panels to indicate to which phase the various components are connected.

Each panel shall be fitted internally with circuit lists and a schematic drawing showing the distribution system, mounted on a glazed frame.

Control-voltage of all contactors, automatic switchgear and motor-protection gear shall be 230/240V. The short circuit of all circuit breakers, switchgear and motor control gear shall be in accordance with British Standard.

Where the requirement for miniature circuit breakers is indicated on the drawings, the Distribution Boards shall be fitted with moulded thermoplastic units of the combined thermal overload and magnetic short circuit tripping type B.S.S 3871 Part 1 (1984) having clearly marked "ON" and "OFF" positions. MCB`s of all ratings shall have minimum short circuit current breaking capacity of 3,000 A.

3. CABLES AND CONDUCTORS

All cables shall be delivered to the site in their original packing with all seals intact.

Cable dimensions shall comply with the rules and regulations and with the information given on the drawings or in the specifications.

All cables shall conform to British Standard. No cable dimensions smaller than 1.5 sq.mm shall be used for light and control circuits.

An anti-corrosive paste shall be used where aluminium cables are connected to copper or brass elements in switchboards etc.

Cables in vertical runs shall be clamped in such a way that stresses in the cables are avoided.

Where no trays or trunking is installed the cables shall be fixed to structures by means of screw fixed saddles.

Common saddles shall be used where cables are grouped. All cables shall be terminated with suitable compression type cable glands of the correct size.

All low voltage cables shall be of 440 volt grade unless otherwise specified.

Where specified or where installed in corrosive situations they shall be sheathed with PVC sleeves.

Cable routes are indicated on the drawings for tender purposes but the exact final routes shall be agreed with the Consulting Engineer.

All work including builder`s work shall be carried out by the Electrical Contractor, who is to include for the supply and installation of all jointing materials, cable supports, steel racking and making all the necessary cable joints. The cables shall be installed and tested in strict accordance with the appropriate clauses of the IEE Regulations, the Factories Acts and B.S 6346 P.V.C Insulated Cables.

Cables shall at all times be handled with care and every effort made to avoid damage.

Unloading, rolling to position and mounting of cable drums shall be carried out efficiently and carefully in the recognised manner and cable shall be pulled from the top of drum. Twisting shall at all times be avoided.

Adequate numbers of drum jacks, rollers and other handling accessories shall be used. Make-shift arrangements will not be tolerated. In all cases care shall be taken to break the rotation of the drum and cable shall not be dragged over loose earth, concrete or any surface but shall be adequately supported on rollers or man-handled into position.

The Electrical Contractor shall take particular care to avoid damage to other services which may run adjacent to or across the route of the cable being installed.

Cables shall be installed with a minium of 200 mm clearance of any equipment or pipework including lagging associated with other services.

Where this condition is unavoidable or difficult to maintain the Electrical Contractor may be called upon to divert or adjust the route of any cable so affected.

Cables shall not be installed within 300 mm of a metal roof, unless clipped to the lower side of wooden joints or otherwise protected from radiant heat.

Trenching, laying, tiling and backfilling will be carried out by the Electrical Contractor.

Cables in trenches are to be laid at a minimum depth of 0.6 m for MV cables and are to be on a 100 mm bed of sifted soil or sand and a further 100 mm shall be added before laying cable covers in position. The sand bedding and covering will be carried out by the Electrical Contractor.

Where laid in trenches the cables are to be completely protected by inter-locking concrete or other approved cable covers indelibly marked "DANGER -HATARI", to be supplied and laid by the Electrical Contractor.

Cables shall cross roads and enter buildings by means of 100 mm diameter heavy gauge PVC ducts or similar non-corrosive pipes.

These shall be laid at minimum depth of 85 mm and extend at a distance of 600 mm on either sided of road, etc.

The Electrical Contractor shall supply and install concrete marker posts at each cable entry into a building, each change of direction, each road or pathway crossing and throughout the length of the cable at intervals not exceeding 50 metres.

The position of all cable marker posts shall be agreed with the Architects and Consulting Engineers before installation.

The Contractor will supply and install 100 mm diameter heavy gauge PVC ducts as indicated on the relevant drawings.

After the installation of cables all ducts shall be adequately sealed to prevent the ingress of moisture. The sealing substances shall be of the non-hardening type.

The Electrical Contractor`s attention is drawn to the fact that all cable sizes and fuse ratings given in the Specification and/or Contract Drawings are based on the use of cables with copper conductors unless specifically specified to the contrary.

An approved system of compression terminals as recommended by the cable manufacturers shall be used for all aluminium cables and all copper conductor cables above 35 sq.mm conductor size.

The greatest care shall be taken when terminating mineral insulated cables and insulating tests shall be taken 24 hours after a cable has been sealed.

Mineral insulated cables shall, where no cable trays exist, be fixed by copper clips of an approved design at maximum 35 cm centres on vertical runs and maximum 25 cm centres on horizontal runs.

Through joints will only be allowed at runs exceeding the length to which cables can be manufactured.

Sealing of mineral insulated cable ends shall be by means of cold screw-on type seals and universal glands of same manufacture as the cable.

No flexible cords smaller than 0.5 sq.mm shall be used.

4. **WIRING**

Wiring shall be carried out in an approved type of PVC insulated single core copper conductor cable.

The colours of the cores shall comply with the colour code requirements of the IEE Regulations.

Cables shall be drawn in at accessories, distribution boards and switchgear after the erection of the conduit system.

Low voltage cables and medium voltage cables shall be enclosed in entirely separate conduits.

Under no circumstances shall it be permitted to draw cable into an incomplete section of the conduit installation. The wiring looping shall be carried out on the terminals of main switches, and socketed outlets,etc., and fixed apparatus only. No joints shall be made in boxes unless approved.

The cable shall run in the conduit so as not to exceed the capacities as set out in Tables 12A, 12B, 12C and 12D of the IEE Regulations (15th Edition) with current amendments.

Where fittings and accessories require earthing, an earth continuity conductor shall be run through the conduit. The earth continuity conductor shall be a bare copper wire of minimum size 2.5 sq.mm and shall be continuous between terminals.

All metal boxes shall be equipped with an earth terminal. Each final sub-circuit that is required to be earthed shall be provided with its own individual earth continuity conductor which shall be run from a terminal on the earth bar in the distribution board or consumer`s control unit protecting the particular final sub-circuit.

Attention is drawn of the requirements to install earth continuity conductors when plastic conduit systems are used. The load and return conductors of the same circuits or circuit shall, in all cases, be drawn in the same conduit.

Not more than six final sub-circuit cables shall be run in conduits feeding outlet boxes without the approval of the Consulting Engineer.

Not more than eight cables running straight back to the distribution board shall be enclosed in any one conduit.

The arrangement and size of telephone conduits is to be such as will accommodate the number of circuits as indicated on the contract drawings.

Where conduits enter adaptable boxes each conduit is to be numbered to indicate the outlet point which it feeds. Unless otherwise stated on the drawings, conduits will terminate in standard metal boxes to B.S 1363 with flush fitting cover plate. Draw wires of piano quality steel wire of not less than 22 swg. are to be left in all telephone conduits.

Draw-in boxes are required in telephone conduits on the same basis as laid down for power and lighting.

Telephone outlet boxes, draw-in boxes and the telephone distribution boxes are to be marked internally with yellow paint to distinguish them from boxes provided for other services.

Flexible cords shall be of 250 volt grade VR or PVC insulated and shall comply with B.S 6007 and 6500. No flexible cord smaller than 0.7 sq.mm shall be used. Flexible cords for pendant fittings shall be circular,heat resistant type, white finish.

5. <u>CONDUIT, TRUNKING AND ASSOCIATED FITTINGS</u>

Surface conduit shall be run in square symmetrical lines and shall be marked on site for approval before installation. Conduit shall be fixed by means of distance saddles spaced at not more than 1.2 m (for 20 and 25 diameter conduit) and 1.5 m for larger sizes, for steel conduits and 0.9m for PVC conduits.

Sunken conduit run in chases in walls shall be fixed by means of mild steel pipe hooks or non-metallic saddles spaced not more than 0.9 m. Where conduit is concealed behind plaster it shall be sunk to a depth of either 15 mm below finished plaster level, or installed flush with the structural wall level before application of plaster, whichever is the lesser depth.

Conduit cast-in-situ shall be frequently secured to the steel reinforcement work, with heavy binding wire to prevent movement of the conduit and conduit boxes during the pouring and vibrating of the concrete.

Outlet boxes shall be filled with paper to prevent ingress of concrete, and all boxes shall be securely fixed to the shuttering with nails, or by means which shall be visible as a marker on removal of the shuttering only. Conduit shall be installed after the first grid of steel reinforcement work is securely fixed and all open ends of conduit shall be protected by couplings plugged with a suitable non-metallic stopping plug. The number of right angle bends in conduit cast-in-situ shall not exceed two between boxes.

Where straight runs of conduit are installed, draw-in boxes shall be provided at distances not exceeding 15 metres.

Immediately prior to installing the wiring all conduit and fittings shall be dried and cleaned out by drawing through a cloth swab.

Conduit shall be installed in such a manner as to prevent interference with other services and shall be kept at least 150 mm clear gas or water pipes, and heat in excess of 70^0C.

Where conduit runs enter specified areas requiring flameproof equipment, barrier boxes shall be inserted immediately before the conduit enters the flameproof area. All conduits installed within this area shall be solid drawn galvanised, as shall be conduit fittings and accessories and Buxton Certified as suitable for Group 11 hazards, Equipment shall comply with B.S 229, B.S 889, and Code of Practice C.P 1003.

Steel-Conduits shall be of heavy gauge Class B Welded to British Standard Specification B.S 31.

In no case will conduit smaller than 20 mm diameter be used on the works. Conduits installed within buildings shall be black enamelled finish except where specified otherwise.

Where installed externally or in damp conditions they shall be galvanised.

Conduit fittings,accessories or equipment used in conjunction with galvanised conduits shall also be galvanised or otherwise as approved by the Consulting Engineer.

Plastic-Conduit shall be best quality new super high impact grade heavy gauge Class "A" rigid PVC unplasticesed conduit as or similar to manufacture Egatube Africa Ltd., suitable for plain connections or as specified.

The conduit shall be bent and formed strictly in accordance with the manufacturer`s instructions.

Small sizes i.e. 20 mm diameter and 25 mm diameter shall be bent cold by inserting the correct size bending spring.

It is essential for right angle bends that the conduit is bent past 90^0 to allow for "spring back".

Larger sizes of conduit shall be pre-heated before inserting rubber cord to prevent kinking. Conduits badly formed or bent, or damaged in any way, shall not be used.

Joints shall be made water-tight by the use of cement applied with a brush or rag. Cement shall be applied to the complete circumference of the conduit. Conduit shall be thoroughly cleaned at the ends to ensure a good adhesion to the ends fittings. Cement shall not be permitted to enter into the conduit.

All conduit fittings and accessories including couplers, ordinary clips, saddles, pipe hooks, reducers, stopping plugs, locknuts and male and female bushes shall be manufactured dimensionally, similar to B.S 31/1940 where applicable. Solid tees shall not be used.

Solid inspection elbows or bends or inspection tees shall be used only in exceptional circumstances and then only with the approval of the Consulting Engineers.

A means of expansion shall be provided in conduit runs in excess of 10 m without any bend or set, by use of expansion couplings, which shall be used at building expansion joint.

Where ceiling roses occur and the ceiling box is recessed below the finished level of the ceiling, suitable extension rings to accomodate the ceiling roses must be provided.

All spare ways in junction boxes etc. left for possible future extension shall be fitted with stopping plugs.

Metal trunking shall be fabricated from mild steel of not less than 18 swg.

All sections of trunking shall be rigidly fixed together and attached to the framework or fabric of the building at intervals of not less than 1.2 m.

Joints in trunking shall not overhang fixing points by more than 0.5 m.

All trunking shall be made electrically continuous by means of 25 x 3 mm copper links across each joint and where the trunking is galvanised, the links shall be made by galvanised flat iron strips.

All trunking fittings (i.e. bends, tess, etc.,) shall leave the main trough completely clear of obstruction and continuously open except through walls and floors, at which points suitable fire resisting barriers shall be provided as may be necessary. The inner edge of bends and tees shall be chamfered where cables larger than 35 sq.mm are employed.

Where trunking passes through ceilings and walls the covers shall be solidly fixed to 150 mm either side of ceilings and floors and 50 mm either side of walls.

Screws and bolts securing covers to trunking or sections of covers together shall be arranged so that damage to cables cannot occur either when fixing covers or when installing cables in the trough.

When trunking is used to connect switchgear or fuseboards, such connections shall be made by trunking fittings manufactured for this purpose and not by multiple conduit couplings.

When vertical sections of trunking are used which exceed 4.5 m in length, staggered tie off points shall be provided at 4.5 m intervals to support the weight of cables.

Unless otherwise stated, all trunking systems shall be painted as for conduit.

Cable tray shall be fabricated from perforated mild steel tray of minimum 14 swg. with return flanges and coupling pieces for rigidity and strength.

Unless otherwise stated in the Specification of Works the cable tray shall be painted grey enamel for indoor use and shall be hot dipped galvanised for outdoor locations.

Cable tray shall be appropriately fixed on robust and substantial brackets fixed into the walls or shall be suspended on rods securely fixed to the structure together with a bracket arrangement as required to facilitate the mild steel. Brackets of suspension supports shall be provided as necessary, the spacing of which shall not exceed 2.0 m.

Where the cable tray changes direction the minimum radius of bends shall not be less than 300 mm on the inside of the bend and in no case shall it be less than bending radius of the cable supported.

All brackets, suspension rods and attachments shall be finished as the cable tray supported.

The total length of bus-bar systems shall be determined from the Drawings for tender purposes, but the measurements must be checked on site prior to manufacture.

Fixing brackets for wall fixing shall be provided at not less than 1.8 m intervals.

Phase colours shall be clearly marked.

Where the rising bus-bar systems are carried through floors, a barrier of fire resisting material shall be incorporated in the trunking at each floor level to prevent the possible spread of fire between floors.

A 25 x 3 mm copper tape shall be installed externally for the full length of the bus-bar trunking. The tape shall be bonded to each section at intervals not exceeding 1.2 m by means of 10 mm brass bolts, washers and locknuts.

6. **EARTHING**

Where protective multiple earthing (PME) is provided by the Electricity Supply Authority, the earthing lead shall be connected to the consumer`s earthing terminal together with the neutral conductor of the installation, shall be so arranged that connection to the neutral conductor of the incoming supply can be carried out by the supply undertaking.

The earthing of the installation shall comply with the requirements laid down in Chapter 54 of the IEE Regulations. In addition, provision for earthing the neutral conductor shall be made for each distribution main.

An earth electrical system shall be installed at a point adjacent to the main supply intake and at every building served by the external distribution system.

Each earth electrode shall be a 12 mm diameter copper rod driven to depth of 1300mm. In rocky soil conditions, where depth is difficult to obtain, the Contractor shall obtain written approval from the Consulting Engineer for an alternative earth electrode system. The electrode shall be connected via a green PVC insulated 2.5 sq.mm copper wire to an earth terminal adjacent to the incoming supply to which all cable armouring, conduit, trunking, switchgear etc., shall be bonded, together with all other metallic incoming services, e.g. water, gas etc.

Earthing arrangements and the resistance of the earth continuity conductor shall comply with the current 15th Edition of the IEE Regulations. In particular, attention is drawn to Regulations 542-1 to 547.

In situations such as bathrooms, kitchens, laundries or any situation where there is exposed metal and socket outlets or fixed appliances are installed all, metalwork including hot and cold water pipes, waste pipes, metal distribution boards, the casings of electrical appliances, etc., shall be effectively bonded to the earth continuity conductor of the electrical installation so as to ensure that no difference in electrical potential can arise between these items.

Attention is drawn to the IEE Regulations to the effect that the resistance of the earth continuity conductor shall not exceed 0.5 ohm.

7. TESTING ON SITE

The Contractor shall conduct during and at the completion of the installation and, if required, again at the expiration of the maintenance period, tests in accordance with the relevant section of the current edition of the Regulations of the Electrical Equipment of buildings issued by the IEE of Great Britain, the Government Electrical Specification and the Electric Supply Company`s By-Laws.

Tests shall be carried out to prove that all single pole switches are installed in the "Live" conductor.

Tests shall be carried out to prove that all socket outlets and switches are connected to the "Live" conductor in the terminal marked as such, and that each pin is effectively bonded to the earth continuity system. Tests shall be carried out to verify the continuity of all conductors of each "ring" circuit.

Phase tests shall be carried out on completion of the installation to ensure that correct phase sequence is maintained throughout the installation. Triplicate copies of the results of the above tests shall be provided within 14 days of the witnessed tests and the Contractor will be required to issue to the Consulting Engineer the requisite certificates upon completion as required by the Regulations refered to above.

Any faults, defects, or ommissions or faulty workmanship, incorrectly positioned or installed parts of the installation made apparent by such inspections or tests shall be rectified by the Contractor at his own expense.

The Contractor shall provide accurate instruments and apparatus and all labour required to carry out the above tests.

The Contractor shall test to the Consulting Engineer`s approval and as specified elsewhere in this Specification or in the Standard and Regulations already referred to, all equipment, plant and apparatus forming part of the works and before connecting to any power or other supply and setting to work.

Where such equipment, etc., forms part of or is connected to a system whether primarily of an electrical nature or otherwise (e.g. Air Conditioning System) the Contractor shall attend and assist in balancing, regulating, testing and commissioning, or if primarily an electrical or other system form of the Works, shall balance, regulate,test and commission the system to the Consulting Engineer`s approval.

SECTION 2

PARTICULAR SPECIFICATION

SECTION TWO

PARTICULAR SPECIFICATION

1. EXTENT OF WORK

The work to be carried out under this Sub-Contract includes the supply, on site, storage, delivery, installation, connection, testing, replacement of broken items, protecting, cleaning, energising and leaving in serviceable condition to the satisfaction of the Architect and Engineer, guarantee and maintenance in defects, of the complete installation as herein specified on the drawings or as may be directed and shall include all such materials and equipment which, although not expressly specified, are required and are necessary to complete the installation to the satisfaction of the Architect and Engineer.

The installation comprises the following items which are more fully described in other parts of this specification.

The supply, installation and testing of: -

(a) All consumer units and splitter units.

(b) All main and Sub-Main cables.

(c) All power and lighting circuits.

(d) All final circuit switches.

(e) All 13 Amps socket outlets and fused spur unit.

(f) All earthing requirements.

(g) All underground cabling and tiling.

(h) All lighting fittings, complete with lamps and tubes.

(i) The complete wiring of telephone system including conduit, and outlet boxes, wiring and RJ11 outlet plates for the telephone installations.

(j) All earthing including earth electrodes, test clamps, earthing manholes, earthing and bonding leads.

(k) Excavation of earth mats.

(l) Excavation of cable trenches, sandbedding and cables.

(m) Cable ducts for underground cables.

2. ELECTRICITY SUPPLY

The supply of electricity to the project shall be provided by KP & Lighting Co Ltd at 415/240 volts, 3-phase 4-wire 50 Hz.

All trenching, sand bedding, tiling and backfilling for underground cabling shall be carried out by sub-contractor.

3. TELEPHONE SERVICES

In coming telephone services shall be carried underground by Telecom Kenya Limited.

All telephone wiring shall be carried out by a Contractor registered with Telkom (K) Ltd. The Sub-Contractor shall install a 25 diameter plastic conduit system with draw-wires from the switch box/disc case adaptable box at all blocks and loop from one telephone outlet to another. The Electrical sub-contractor shall forward the name of the contractor to undertake the telephone wiring to the engineer for approval.

All accessories shall be as MK or equal and approved.

4. MANHOLES AND DUCTS

All Manholes and ducts shall be supplied and installed by the Sub-Contractor.

Earthing Manhole

The standard earth electrode manholes shall be precast units with internal dimension 450 x 450 x 300 deep. They shall be supplied and installed by the Sub-Contractor.

5. DISTRIBUTION BOARDS AND CONSUMER UNITS

All distribution boards consumer units and splitter unit shall be as Merlin Gerlin or equal and approved.

All shall be internally labelled with circuit lists as per our drawings in type - written text.

6. POWER INSTALLATION

All power installations shall be carried out with Cu PVC/SC wires drawn into plastic conduits surface fixed with spacer bar saddles along roof purlins/members and concealed in walls and floors.

The tender shall be based on the following heights for sockets, water heaters, other than Kitchen Equipment and plant room outlets:-

Socket outlets 300 mm a.f.f.l

Water Heaters outlets	1400 mm a.f.f.l
Switches	1400 mm a.f.f.l

Socket outlets above worktops shall be fixed at 150 mm on wall above worktop.

Socket outlets in the plant room shall be fixed at 1400 mm a.f.f.l.

All accessories shall be as MK or equal and approved.

7. **INTERNAL LIGHTING**

All internal lighting installations shall be carried out with PVC/SC wires drawn into plastic conduits surface fixed along purlins with spacer bar saddles and concealed in walls.

Where fittings are mounted on cast-in boxes, box sizes shall be chosen such that they are completely covered by the fittings.

All lighting fittings and accessories shall be supplied by the contractor, complete with lamps, tubes and all necessary accessories.

Tubes shall be either warm white or daylight.

All accessories shall be as MK or equal and approved.

The rating of the switches shall be either 5A or 20A according to the load switched.

All lighting fittings shall be cleaned and the installation left in complete working order before handing over.

8. **INTERNAL TELEPHONE INSTALLATION**

The Sub-Contractor shall allow for a complete telephone conduit system as shown on the drawings.

All conduits shall be 25 mm diameter PVC concealed in floors and walls from adaptable boxes at entry to all telephone outlets.

All telephone outlet conduits shall provide easy passage for cables and shall have draw-wires left in position.

The telephone outlet shall comprise a standard flush steel box complete with moulded telephone outlet plate as MK mounted at 300 mm a.f.f.l.

All adaptable boxes shall be standard switch boxes complete with cover unless otherwise specified.

9. INTERNAL TV CONDUIT INSTALLATIONS

The Sub-Contractor shall allow for a complete TV conduit system as shown on the drawings.

All conduits shall be 25 mm diameter heavy gauge PVC concealed in floors and walls from outlet to TV outlet points.

All TV outlet conduits shall provide easy passage for cables and shall have draw in wires left in position.

The TV outlet shall comprise a standard flush through way plastic box mounted at 300 mm below ceiling level.

The adaptable box as entry shall be a standard switch box with cover.

10 STREET LIGHTING

All street, area and flood lighting installations shall be carried out in 2/4 core Cu PVC SWA PVC cable and laid underground to the lighting columns.

These shall be steel galvanised pipe columns having mounting height 5 metres and shall be as shown on the drawings. The columns shall be installed at a minimum depth of 1000 mm in the ground on 225 x 225 mm mild steel baseplate with a 20 mm diameter hole in the centre and the poles shall be surrounded by concrete upto 225 mm high.

These columns shall be painted to an approved colour.

11 LANTERNS

These shall be of the completely enclosed type with antivandal bowl designed for side entry mounting on brackets with 38 mm diameter plain tubing. These shall be capable of accommodating one single 125 watt M.B.F./U lamp, 3-slot lamp holder connected with heat resistant cables. The lanterns shall be semi cut-off type with light output ratio of not less than 70% and shall be complete with control gear, reflector, and lamp. The lantern shall be as manufactured by "THORN" or equivalent and approved by the Engineer.

12. EARTHING

All the columns, lanterns and other metal parts shall be properly earthed. Electrical and mechanical continuity shall be preserved throughout the whole system from the consumer unit to the remotest columns and the earth resistance must not exceed 0.5 ohms. Every second pole must be efficiently earthed through earth electrodes by means of substantial copper clamps secured by non-rusting bolts. The lead must be visible and adequately protected. No earthing lead shall be less than 6 sq.mm in size except for the one used for earthing the lanterns where 2.5 sq.mm single core earth wire may be used.

SECTION 3

ELECTRICAL INSTALLATIONS

BILLS OF QUANTITIES

SCHEDULE OF PRICES

GENERAL NOTE

1. The total of price in the summary of prices shall include for the whole of the Sub-Contract Works in accordance with the specification as defined before and shall be carried forward to the Form of Tender.

2. Any prices omitted from any item, section or part of the price schedule shall be deemed to have been included in another item, section or part.

3. The prices shall include for all obligations under the Sub-Contract including and not limited to:-

   a) Supply of all materials, equipment, apparatus, fittings, spares and tools

   b) Insurance

   c) Clearing and forwarding

   d) Delivery and storage at site

   e) Packing for storage

   f) Replace any defective or damaged item

   g) Installation

   h) Testing

   i) Painting

   j) Commissioning

   k) Maintenance during the defects liability period

4. The unit rates shall include import duty, sales tax, and VAT where applicable, and shall be expressed in Kenya Shillings.

PROPOSED COMMERCIAL DEVELOPMENT ON PLOT L.R. NO. NAIROBI/BLOCK 40/15, DESAI ROAD
ELECTRICAL INSTALLATIONS - LOWER GROUND FLOOR PLAN

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.1.00	**LIGHTING POINTS AND FITTINGS**				
	Supply, install, test, commission and maintain following items :-				
1.1.01	Lighting points wired in 1.5sqmm PVC insulated single core (SC) copper wires drawn in 20 mm HG PVC conduits concealed in walls and floors,one way switched with all accessoriesbut excluding switch and fitting	No.	10		
1.1.02	Ditto, for two way lighting points	No.	25		
1.1.03	10A plateswitch gang two-way SP as MK K 4671	No.	6		
1.1.04	10A plateswitch 3 gang two-way SP as MK K 4673	No.	2		
1.1.05	18W Circular LED ceiling lamp as Nlux XD9002T, Type A5	No.	4		
1.1.06	1200mm 18W LED corrosion resistant luminare as FSL complete with lamps Type "F1" or approved equivalent	No.	15		
1.1.07	Oval bulkhead Plafonier as Sofla-oc series as Nationwide 002.021.B.C.E27 complete with lamps, Type "S3"	No.	2		
1.1.08	Maintained emergency exit luminare illuminated by L.E.D.s with 3hr NiCd battery backup with extruded aluminium support rail enclosing l.e.d's on linear PCB, supported by chains, suspended from ABS injection moulded housing, enclosing battery and electronic control circuits,Type "EXIT"	No.	6		
1.1.09	Occupancy sensor package as 752/CD2RC Clipsal 752 Dual-Tech Or Approved Equivalent consisting both ultrasonic and PIR sensing technologies complete with wiring	No.	7		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 6				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.2.00	**POWER POINTS AND OUTLETS**				
	Supply, install, test, commission and maintain following items :-				
1.2.01	13 Amp ring twin socket outlet points wired in 3 x 2.5sq mm PVC SC copper cables drawn in 20mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the socket outlet plate	No.	14		
1.2.02	Booster Pumps circuit wired in 5 x 10sq mm PVC SC copper cables drawn in 32mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the isolator switch	LM	40		
1.2.03	Fire fighting Pumps circuit wired in 5 x 10sq mm PVC SC copper cables drawn in 50mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the isolator switch	LM	20		
1.2.04	13A flush 2 gang switch socket-outlet as MK K2747 WHI	No.	14		
1.2.05	32A TP Isolator as Katko	No.	2		
1.2.06	50mm dia. H.G PVC conduit for linking the adaptable box concealed in the wall or floor with all accessories	LM.	100		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 6				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.3.00	**Telephone And CCTV POINTS**				
	Supply, install, test, commission and maintain following items :-				
1.3.01	Telephone and CCTV outlet points comprising of 25 mm diameter HG PVC conduits and the draw wire concealed in the walls and floor with all accessories	No.	10		
1.3.02	300 x 300 x 75mm prepainted steel adaptable box	No.	2		
1.3.03	50mm diameter H.G PVC conduits concealed in the walls with all accessories.	LM	100		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 6				

PROPOSED COMMERCIAL DEVELOPMENT ON PLOT L.R. NO. NAIROBI/BLOCK 40/15, DESAI ROAD
ELECTRICAL INSTALLATIONS - LOWER GROUND FLOOR PLAN

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.4.00	**SUB-MAINS AND DISTRIBUTION**				
	Supply, install, test, commission and maintain following items :-				
1.4.01	10-way TPN distribution board "DB LG" as Schneider with a 125A TP integral Isolator as complete with the following:- 2No. 10A SP MCB 4No. 20A SP MCB 4 No.30A SP MCB 2 No.63A SP MCB 11 No. Blanking plates	No.	1		
1.4.02	Sub-mains comprising of 4C 16 sq mm PVC/SWA/PVC CU cable drawn in 50 mm HG PVC conduits from the Clean Power Sub-board to the above Distribution boards	LM	30		
1.4.03	Cables glands and lugs for the 16 sq mm 4 Core PVC SWA PVC cables complete with shroud	No.	2		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 6				

ITEM	DESCRIPTION	UNIT	QTY	RATE SHS.	AMOUNT SHS.
1.5.00	FIRE ALARM SYSTEM				
	Install, test, commission and maintain the following items :-				
1.5.01	Single loop Wiring for addressable call/detector points comprising 1.5 sq mm 3 core copper fire defence cable with CPC drawn in 20 mm diameter HG PVC conduits concealed in floors and walls from the Addressable Control Panel to alarm points	No.	25		
1.5.02	Ditto, from Control Panel to alarm bell	No.	6		
1.5.03	24V DC fire alarm sounder as Menvier Cat. MBM244	No.	6		
1.5.04	Manual call point as Menvier Cat. MBG 913	No.	6		
1.5.05	Combined photo/thermal detector as Menvier Cat. MPT 950 complete with base as Menvier MBD 800	No.	19		
1.5.06	2 Zone fire alarm control/ indicator panel as Menvier Cat. No. MF9300 complete with integral battery charger, 24V sealed recombination lead acid battery suitable for 72 hour + 1/2 hour alarm	No.	1		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 6				

ELECTRICAL INSTALLATIONS - LOWER GROUND FLOOR PLAN

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
	COLLECTION PAGE				
	BROUGHT FORWARD FROM PAGE No. 1				
	BROUGHT FORWARD FROM PAGE No. 2				
	BROUGHT FORWARD FROM PAGE No. 3				
	BROUGHT FORWARD FROM PAGE No. 4				
	BROUGHT FORWARD FROM PAGE No. 5				
	ALLOW FOR A PROVISIONALCONTIGENCY				100,000.00
	TOTAL FOR LOWER GROUND FLOOR CARRIED FORWARD TO SUMMARY PAGE				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.1.00	**LIGHTING POINTS AND FITTINGS**				
	Supply, install, test, commission and maintain following items :-				
1.1.01	Lighting points wired in 1.5sqmm PVC insulated single core (SC) copper wires drawn in 20 mm HG PVC conduits concealed in walls and floors,one way switched with all accessoriesbut excluding switch and fitting	No.	10		
1.1.02	Ditto, for two way lighting points	No.	30		
1.1.03	10A plateswitch 1 gang two-way SP as MK K 4671	No.	22		
1.1.03	10A plateswitch 2 gang two-way SP as MK K 4672	No.	15		
1.1.04	10A plateswitch 3 gang two-way SP as MK K 4673	No.	10		
1.1.05	18W Circular LED ceiling lamp as Nlux XD9002T, Type A5	No.	4		
1.1.06	18W Circular LED ceiling lamp as Nlux XD9001T, Type A2	No.	10		
1.1.07	600 x 600mm x 60 mm LED Panel Lights,45W as ROBUS complete with LED lamps and all other accessories Type L4	No.	37		
1.1.08	Maintained emergency exit luminare illuminated by L.E.D.s with 3hr NiCd battery backup with extruded aluminium support rail enclosing l.e.d's on linear PCB, supported by chains, suspended from ABS injection moulded housing, enclosing battery and electronic control circuits,Type "ET"	No.	4		
1.1.09	Slim bathroom luminaire for 18W T16 linear fluorescent lamps with glare free light distribution and dimming options, As Thorn Cimi or Approved equivalent Type "B3"	No.	5		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 12				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.2.00	**POWER POINTS AND OUTLETS**				
	Supply, install, test, commission and maintain following items :-				
1.2.01	13 Amp ring twin socket outlet points wired in 3 x 2.5sq mm PVC SC copper cables drawn in 20mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the socket outlet plate	No.	35		
1.2.02	Ditto but for Fused spur units	No.	8		
1.2.03	Air Conditioning unit power points comprising wiring in 3x4mm2 PVC/SC CU cables drawn in 32mm diameter concealed HG PVC conduits	No.	4		
1.2.04	13A flush 2 gang switch socket-outlet as MK K2747 WHI	No.	35		
1.2.05	13A flush Non standard 2 gang switchsocket-outlet as MK K 1248D6ALM complete with 13A Plug	No.	0		
1.2.06	20A flush DP switch with pilot lamp as MK K5213	No.	8		
1.2.07	20A flex outlet as MK K 1090 WHI	No.	8		
1.2.08	200 x 50mm two compartment trunking surface mounted prepainted and baked made out of 16 swg sheets and frame complete with cover, switch boxes, cross over bridges, face plates and fixing accessories	LM.	115		
1.2.09	32 A Tripple pole Katko Isolator	No.	4		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 12				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.3.00	**Telephone And CCTV POINTS**				
	Supply, install, test, commission and maintain following items :-				
1.3.01	ICT outlet points comprising of 25 mm diameter HG PVC conduits concealed in walls and floor with all accessories excluding outlet plate complete with draw wire	No.	52		
1.3.02	150 x 150 x 75mm prepainted steel adaptable box	No.	3		
1.3.03	50mm dia. H.G PVC conduit for linking the adaptable box concealed in the wall or floor with all accessories	LM.	100		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 12				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.4.00	**SUB-MAINS AND DISTRIBUTION**				
	Supply, install, test, commission and maintain following items :-				
1.4.01	10-way TPN distribution board "DB LG" as Schneider with a 125A TP integral Isolator as complete with the following:- 2No. 10A SP MCB 4No. 20A SP MCB 4 No.30A SP MCB 2 No.63A TP MCB 11 No. Blanking plates	No.	1		
1.4.02	Sub-mains comprising of 4C 25 sq mm PVC/SWA/PVC CU cable drawn in 50 mm HG PVC conduits from the Clean Power Sub-board to the above Distribution boards	LM	50		
1.4.03	Cables glands and lugs for the 25 sq mm 4 Core PVC SWA PVC cables complete with shroud	No.	2		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 12				-

ITEM	DESCRIPTION	UNIT	QTY	RATE SHS.	AMOUNT SHS.
1.5.00	FIRE ALARM SYSTEM				
	Install, test, commission and maintain the following items :-				
1.5.01	Single loop Wiring for addressable call/detector points comprising 1.5 sq mm 3 core copper fire defence cable with CPC drawn in 20 mm diameter HG PVC conduits concealed in floors and walls from the Addressable Control Panel to alarm points	No.	24		
1.5.02	Ditto, from Control Panel to alarm bell	No.	2		
1.5.03	24 V DC fire alarm Electronic sounder as Menvier Cat. MAS 850LPS	No.	2		
1.5.04	Addressable break glasss call point as Menvier MBG814	No.	2		
1.5.05	Analogue photo/thermal detector as Menvier MAOH 850 complete with mounting base as Menvier MAB 800	No.	22		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 12				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
	COLLECTION PAGE				
	BROUGHT FORWARD FROM PAGE No. 7				
	BROUGHT FORWARD FROM PAGE No. 8				
	BROUGHT FORWARD FROM PAGE No. 9				
	BROUGHT FORWARD FROM PAGE No. 10				
	BROUGHT FORWARD FROM PAGE No. 11				
	ALLOW FOR A PROVISIONALCONTIGENCY				100,000.00
	TOTAL FOR UPPER GROUND FLOOR CARRIED FORWARD TO SUMMARY PAGE				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.1.00	**LIGHTING POINTS AND FITTINGS**				
	Supply, install, test, commission and maintain following items :-				
1.1.01	Lighting points wired in 1.5sqmm PVC insulated single core (SC) copper wires drawn in 20 mm HG PVC conduits concealed in walls and floors,one way switched with all accessoriesbut excluding switch and fitting	No.	10		
1.1.02	Ditto, for two way lighting points	No.	30		
1.1.03	10A plateswitch 1 gang two-way SP as MK K 4671	No.	22		
1.1.03	10A plateswitch 2 gang two-way SP as MK K 4672	No.	15		
1.1.04	10A plateswitch 3 gang two-way SP as MK K 4673	No.	10		
1.1.05	18W Circular LED ceiling lamp as Nlux XD9002T, Type A5	No.	4		
1.1.06	18W Circular LED ceiling lamp as Nlux XD9001T, Type A2	No.	10		
1.1.07	600 x 600mm x 60 mm LED Panel Lights,45W as ROBUS complete with LED lamps and all other accessories Type L4	No.	37		
1.1.08	Maintained emergency exit luminare illuminated by L.E.D.s with 3hr NiCd battery backup with extruded aluminium support rail enclosing l.e.d's on linear PCB, supported by chains, suspended from ABS injection moulded housing, enclosing battery and electronic control circuits,Type "ET"	No.	4		
1.1.09	Slim bathroom luminaire for 18W T16 linear fluorescent lamps with glare free light distribution and dimming options, As Thorn Cimi or Approved equivalent Type "B3"	No.	5		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 18				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.2.00	**POWER POINTS AND OUTLETS**				
	Supply, install, test, commission and maintain following items :-				
1.2.01	13 Amp ring twin socket outlet points wired in 3 x 2.5sq mm PVC SC copper cables drawn in 20mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the socket outlet plate	No.	35		
1.2.02	Ditto but for Fused spur units	No.	8		
1.2.03	Air Conditioning unit power points comprising wiring in 3x4mm2 PVC/SC CU cables drawn in 32mm diameter concealed HG PVC conduits	No.	4		
1.2.04	13A flush 2 gang switch socket-outlet as MK K2747 WHI	No.	35		
1.2.05	13A flush Non standard 2 gang switchsocket-outlet as MK K 1248D6ALM complete with 13A Plug	No.	0		
1.2.06	20A flush DP switch with pilot lamp as MK K5213	No.	8		
1.2.07	20A flex outlet as MK K 1090 WHI	No.	8		
1.2.08	200 x 50mm two compartment trunking surface mounted prepainted and baked made out of 16 swg sheets and frame complete with cover, switch boxes, cross over bridges, face plates and fixing accessories	LM.	115		
1.2.09	32 A Tripple pole Katko Isolator	No.	4		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 18				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.3.00	**Telephone And CCTV POINTS**				
	Supply, install, test, commission and maintain following items :-				
1.3.01	ICT outlet points comprising of 25 mm diameter HG PVC conduits concealed in walls and floor with all accessories excluding outlet plate complete with draw wire	No.	52		
1.3.02	150 x 150 x 75mm prepainted steel adaptable box	No.	3		
1.3.03	50mm dia. H.G PVC conduit for linking the adaptable box concealed in the wall or floor with all accessories	LM.	100		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 18				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.4.00	**SUB-MAINS AND DISTRIBUTION**				
	Supply, install, test, commission and maintain following items :-				
1.4.01	10-way TPN distribution board "DB F" as Schneider with a 125A TP integral Isolator as complete with the following:- 4No. 10A SP MCB 8No. 20A SP MCB 7 No.30A SP MCB 11 No. Blanking plates	No.	1		
1.4.02	Sub-mains comprising of 4C 25 sq mm PVC/SWA/PVC CU cable drawn in 50 mm HG PVC conduits from the Clean Power Sub-board to the above Distribution boards	LM	50		
1.4.03	Cables glands and lugs for the 25 sq mm 4 Core PVC SWA PVC cables complete with shroud	No.	2		
	STABILIZER INSTALLATION				
1.4.08	Sub-mains comprising of 4 core 16 sq mm armoured copper cable drawn in 100 mm HG PVC conduits	LM	10		
1.4.09	Cables glands and lugs for the 16 sq mm 4 Core PVC SWA PVC cables complete with shroud	No.	4		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 18				

ITEM	DESCRIPTION	UNIT	QTY	RATE SHS.	AMOUNT SHS.
1.5.00	FIRE ALARM SYSTEM				
	Install, test, commission and maintain the following items :-				
1.5.01	Single loop Wiring for addressable call/detector points comprising 1.5 sq mm 3 core copper fire defence cable with CPC drawn in 20 mm diameter HG PVC conduits concealed in floors and walls from the Addressable Control Panel to alarm points	No.	24		
1.5.02	Ditto, from Control Panel to alarm bell	No.	2		
1.5.03	24 V DC fire alarm Electronic sounder as Menvier Cat. MAS 850LPS	No.	2		
1.5.04	Addressable break glasss call point as Menvier MBG814	No.	2		
1.5.05	Analogue photo/thermal detector as Menvier MAOH 850 complete with mounting base as Menvier MAB 800	No.	22		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 18				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
	COLLECTION PAGE				
	BROUGHT FORWARD FROM PAGE No. 13				
	BROUGHT FORWARD FROM PAGE No. 14				
	BROUGHT FORWARD FROM PAGE No. 15				
	BROUGHT FORWARD FROM PAGE No. 16				
	BROUGHT FORWARD FROM PAGE No. 17				
	ALLOW FOR A PROVISIONALCONTIGENCY				200,000.00
	TOTAL FOR FIRST FLOOR CARRIED FORWARD TO SUMMARY PAGE				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.1.00	**LIGHTING POINTS AND FITTINGS**				
	Supply, install, test, commission and maintain following items :-				
1.1.01	Lighting points wired in 1.5sqmm PVC insulated single core (SC) copper wires drawn in 20 mm HG PVC conduits concealed in walls and floors,one way switched with all accessoriesbut excluding switch and fitting	No.	10		
1.1.02	Ditto, for two way lighting points	No.	30		
1.1.03	10A plateswitch 1 gang two-way SP as MK K 4671	No.	22		
1.1.03	10A plateswitch 2 gang two-way SP as MK K 4672	No.	15		
1.1.04	10A plateswitch 3 gang two-way SP as MK K 4673	No.	10		
1.1.05	18W Circular LED ceiling lamp as Nlux XD9002T, Type A5	No.	4		
1.1.06	18W Circular LED ceiling lamp as Nlux XD9001T, Type A2	No.	10		
1.1.07	600 x 600mm x 60 mm LED Panel Lights,45W as ROBUS complete with LED lamps and all other accessories Type L4	No.	37		
1.1.08	13W, 100mm Diameter Recessed Circular LED fiiting, as Philips CoreLine SlimDownlight, Type "L1"	No.	15		
1.1.09	Maintained emergency exit luminare illuminated by L.E.D.s with 3hr NiCd battery backup with extruded aluminium support rail enclosing l.e.d's on linear PCB, supported by chains, suspended from ABS injection moulded housing, enclosing battery and electronic control circuits,Type "ET"	No.	4		
1.1.10	Slim bathroom luminaire for 18W T16 linear fluorescent lamps with glare free light distribution and dimming options, As Thorn Cimi or Approved equivalent Type "B3"	No.	5		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 24				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.2.00	**POWER POINTS AND OUTLETS**				
	Supply, install, test, commission and maintain following items :-				
1.2.01	13 Amp ring twin socket outlet points wired in 3 x 2.5sq mm PVC SC copper cables drawn in 20mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the socket outlet plate	No.	35		
1.2.02	Ditto but for Fused spur units	No.	8		
1.2.03	Air Conditioning unit power points comprising wiring in 3x4mm2 PVC/SC CU cables drawn in 32mm diameter concealed HG PVC conduits	No.	4		
1.2.04	13A flush 2 gang switch socket-outlet as MK K2747 WHI	No.	35		
1.2.05	13A flush Non standard 2 gang switchsocket-outlet as MK K 1248D6ALM complete with 13A Plug	No.	0		
1.2.06	20A flush DP switch with pilot lamp as MK K5213	No.	8		
1.2.07	20A flex outlet as MK K 1090 WHI	No.	8		
1.2.08	200 x 50mm two compartment trunking surface mounted prepainted and baked made out of 16 swg sheets and frame complete with cover, switch boxes, cross over bridges, face plates and fixing accessories	LM.	115		
1.2.09	32 A Tripple pole Katko Isolator	No.	4		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 24				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.3.00	**Telephone And CCTV POINTS**				
	Supply, install, test, commission and maintain following items :-				
1.3.01	ICT outlet points comprising of 25 mm diameter HG PVC conduits concealed in walls and floor with all accessories excluding outlet plate complete with draw wire	No.	52		
1.3.02	150 x 150 x 75mm prepainted steel adaptable box	No.	3		
1.3.03	50mm dia. H.G PVC conduit for linking the adaptable box concealed in the wall or floor with all accessories	LM.	100		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 24				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.4.00	**SUB-MAINS AND DISTRIBUTION**				
	Supply, install, test, commission and maintain following items :-				
1.4.01	10-way TPN distribution board "DB S" as Schneider with a 125A TP integral Isolator as complete with the following:- 4No. 10A SP MCB 8No. 20A SP MCB 7 No.30A SP MCB 11 No. Blanking plates	No.	1		
1.4.02	Sub-mains comprising of 4C 25 sq mm PVC/SWA/PVC CU cable drawn in 50 mm HG PVC conduits from the Clean Power Sub-board to the above Distribution boards	LM	50		
1.4.03	Cables glands and lugs for the 25 sq mm 4 Core PVC SWA PVC cables complete with shroud	No.	2		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 24				

ITEM	DESCRIPTION	UNIT	QTY	RATE SHS.	AMOUNT SHS.
1.5.00	FIRE ALARM SYSTEM				
	Install, test, commission and maintain the following items :-				
1.5.01	Single loop Wiring for addressable call/detector points comprising 1.5 sq mm 3 core copper fire defence cable with CPC drawn in 20 mm diameter HG PVC conduits concealed in floors and walls from the Addressable Control Panel to alarm points	No.	24		
1.5.02	Ditto, from Control Panel to alarm bell	No.	2		
1.5.03	24 V DC fire alarm Electronic sounder as Menvier Cat. MAS 850LPS	No.	2		
1.5.04	Addressable break glasss call point as Menvier MBG814	No.	2		
1.5.05	Analogue photo/thermal detector as Menvier MAOH 850 complete with mounting base as Menvier MAB 800	No.	22		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 24				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
	COLLECTION PAGE				
	BROUGHT FORWARD FROM PAGE No. 19				
	BROUGHT FORWARD FROM PAGE No. 20				
	BROUGHT FORWARD FROM PAGE No. 21				
	BROUGHT FORWARD FROM PAGE No. 22				
	BROUGHT FORWARD FROM PAGE No. 23				
	ALLOW FOR A PROVISIONALCONTIGENCY				100,000.00
	TOTAL FOR SECOND FLOOR CARRIED FORWARD TO SUMMARY PAGE				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.1.00	**LIGHTING POINTS AND FITTINGS**				
	Supply, install, test, commission and maintain following items :-				
1.1.01	Lighting points wired in 1.5sqmm PVC insulated single core (SC) copper wires drawn in 20 mm HG PVC conduits concealed in walls and floors,one way switched with all accessoriesbut excluding switch and fitting	No.	10		
1.1.02	Ditto, for two way lighting points	No.	50		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 30				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.2.00	**POWER POINTS AND OUTLETS**				
	Supply, install, test, commission and maintain following items :-				
1.2.01	13 Amp ring twin socket outlet points wired in 3 x 2.5sq mm PVC SC copper cables drawn in 20mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the socket outlet plate	No.	1		
1.2.02	Ditto but for Fused spur units	No.	4		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 30				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.3.00	**Telephone And CCTV POINTS**				
	Supply, install, test, commission and maintain following items :-				
1.3.01	ICT outlet points comprising of 25 mm diameter HG PVC conduits concealed in walls and floor with all accessories excluding outlet plate complete with draw wire	No.	52		
1.3.02	150 x 150 x 75mm prepainted steel adaptable box	No.	3		
1.3.03	50mm dia. H.G PVC conduit for linking the adaptable box concealed in the wall or floor with all accessories	LM.	100		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 30				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.4.00	**SUB-MAINS AND DISTRIBUTION**				
	Supply, install, test, commission and maintain following items :-				
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 30				

ITEM	DESCRIPTION	UNIT	QTY	RATE SHS.	AMOUNT SHS.
1.5.00	FIRE ALARM SYSTEM				
	Install, test, commission and maintain the following items :-				
1.5.01	Single loop Wiring for addressable call/detector points comprising 1.5 sq mm 3 core copper fire defence cable with CPC drawn in 20 mm diameter HG PVC conduits concealed in floors and walls from the Addressable Control Panel to alarm points	No.	24		
1.5.02	Ditto, from Control Panel to alarm bell	No.	2		
ITEM	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 30				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
	COLLECTION PAGE				
	BROUGHT FORWARD FROM PAGE No. 25				
	BROUGHT FORWARD FROM PAGE No. 26				
	BROUGHT FORWARD FROM PAGE No. 27				
	BROUGHT FORWARD FROM PAGE No. 28				
	BROUGHT FORWARD FROM PAGE No. 29				
	ALLOW FOR A PROVISIONALCONTIGENCY				50,000.00
	TOTAL FOR THIRD FLOORS CARRIED FORWARD TO SUMMARY PAGE				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
2.1.00	**POWER RETICULATION**				
	Supply, install, test, commission and maintain :-				
2.1.01	Free standing switch board to house 2 No. 3 phase KPLC meter, 4No. 125A Three Phase private meters with integrated serial modbus, fabricated from 16 SWG steel sheets, frames and the following:-				
	- 2 No. 200A TPN Adjustable MCCB as ABB with Shunt trip				
	- 1 No. 200A TPN COPPER BUSBARS				
	- 2 No. 200A TPN MANUAL BYPASS SWITCH				
	- 1 No. 200A TPN AUTOMATIC CHANGEOVER SWITCH				
	- 2 No. 125A TP MCCB as ABB				
	- 5 No. 63A TP MCCB as ABB				
	- 4 No. TPN Spare ways				
	- 50KVAr automatic power factor Capacitor bank in , 3 steps of 10KVAr, and 4 steps of 5KVAr				
	- Current and Voltage meters complete with all associated accessories				
	The Switch board to be finished in auto lacquer, IP55 Degree of Protection and as manufactured by Power Technics Ltd	Item	1		
2.1.02	Trenching, sifting and backfilling the duct trench after laying the ducts and compaction	LM	50		
2.1.03	150mm duct with 150 mm thick 1:3:6 concrete surround	LM	50		
2.1.04	600 x 600 x 450mm power manhole complete with cover	No.	5		
2.1.05	Earth mesh comprising of 25 x 3mm copper tape complete with red soil, merconite and clamps, installed into the ground around the building and connected to the test clamps complete with all accessories	Item	1		
2.1.05	Earthing cable comprising of 1 run of 35 sq mm 1C SWA/PVC/SWA cable drawn in cable trays from the switchboard to the earth pit	LM	30		
2.1.06	600x50mm prepainted steel cable tray made out of 16 swg complete with mounting brackets	LM	100		
	TOTAL CARRIED TO COLLECTION PAGE No. 34				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
2.1.00	**POWER RETICULATION**				
	Supply, install, test, commission and maintain :-				
2.1.07	Allow for attendance and follow up for KP & LC services comprising of application for service line, service line installation, and meter connections `	Item	1		
2.1.13	Fireman's switch circuit wired in 3 x 2.5 sq mm PVC SC copper cables drawn in 25mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the Fireman's switch	LM	20		
2.1.14	Fireman's switch as MEM 230AF	No.	1		
	`				
	TOTAL CARRIED TO COLLECTION PAGE No. 34				

ITEM	DESCRIPTION	UNIT	QTY	RATE SHS.	AMOUNT SHS.
	COLLECTION PAGE				
	BROUGHT FORWARD FROM PAGE No. 32				
	BROUGHT FORWARD FROM PAGE No. 33				
	ALLOW FOR A PROVISIONAL CONTINGENCY				200,000.00
	TOTAL CARRIED FORWARD TO SUMMARY PAGE				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
3.1.00	**ICT RETICULATION**				
	Supply, install, test, commission and maintain :-				
3.1.01	Telephone manhole, TMH as per KP & TC "JF4"	No.	4		
3.1.02	100mm duct with 150 mm thick 1:3:6 concrete surround for linking the manholes complete with draw wire	LM	70		
3.1.03	Trenching, sifting and backfilling the duct trench after laying the ducts and compaction	LM	100		
3.1.04	300 x 300 x 150 mm prepainted steel adaptable box.	No.	2		
3.1.05	300x50mm prepainted steel cable tray made out of 16 swg complete with mounting brackets	LM	100		
	TOTAL CARRIED FORWARD TO SUMMARY PAGE No. S/P				

SUMMARY PAGE

PROPOSED COMMERCIAL DEVELOPMENT ON PLOT L.R. NO. NAIROBI/BLOCK 40/15, DESAI ROAD

ELECTRICAL INSTALLATIONS - PHASE ONE

ITEMS	DESCRIPTION	AMOUNT
		KES
A	Preliminaries	
B	Total Brought Forward From Page No. 6 for Lower Ground Floor	
C	Total Brought Forward From Page No. 12 for Upper Ground Floor	
D	Total Brought Forward From Page No. 18 for First Floor	
E	Total Brought Forward From Page No. 24 for Second Floor	
F	Total Brought Forward From Page No. 30 for Third Floor Floors	
G	Total Brought Forward From Page No. 34 for Power Reticulation	
H	Total Brought Forward From Page No. 35 for ICT Reticulation	
I	Allow a PC sum for KP&LC Services	150,000.00
	TOTAL FOR ELECTRICAL SERVICES INSTALLATIONS (INCLUSIVE OF VAT) CARRIED FORWARD TO DRAND SUMMARY PAGE FOR MAIN WORKS	