



**PROPOSED UMMA UNIVERSITY STUDENTS'
ACCOMMODATION**

FOR

UMMA UNIVERSITY

**CONTRACT CONDITIONS, SPECIFICATIONS AND BILLS
OF QUANTITIES**

FOR

ELECTRICAL & FIRE ALARM INSTALLATIONS

TENDER NO. UUT/03/2026

ARCHITECTS

TECTURA INTERNATIONAL LTD.
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QUANTITY SURVEYING

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Contract Conditions, Specifications and Bills of Quantities

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INVITATION TO TENDER

TENDER NAME AND DESCRIPTION OF WORKS: PROPOSED ELECTRICAL INSTALLATIONS – ELECTRICAL AND FIRE ALARM WORKS

1. Umma University invites sealed tenders for the Proposed Electrical Installations – Electrical and fire alarm works
2. Tendering will be conducted under appropriate procurement method selected by the procuring entity using a standardized tender document. Tendering is open to eligible, qualified and interested tenderers.
3. A complete set of tender documents may be downloaded at the university website umma.ac.ke at a cost of 5,000/= payable to KCB Bank account number 1198 158468. Payment receipt to be attached to the tender document.
4. Tenders shall be quoted be in Kenya Shillings and shall include all taxes. Tenders shall remain valid for (120) days from the date of opening of tenders.
5. All Tenders must be accompanied by a Tender Security (2% of Contract Value)
6. The Tenderer shall chronologically serialize all pages of the tender documents submitted.
7. Completed tender documents **MUST** be submitted to the University tender box at the reception main campus in Kajiado so as to be received by **23rd July 2026 at 11.00 am**.
8. Tenders will be opened immediately after the deadline date and time specified above or any deadline date and time Specified later. Tenders will be publicly opened in the presence of the Tenderers' designated representatives who choose to attend at the address below.
9. Late tenders will be rejected.
10. Mandatory pre-tender site visit: **17th June 2026 at umma university - kajiado main campus starting from 10.00 am**
11. Every bidder shall be physically represented by one technical person. The representative should produce a copy of National ID and an original letter (signed and stamped) from the company authorizing them to represent the company in the pretender site visit.
12. NOTE: Tenderer's name **MUST** be in the pre tender site visit attendance register otherwise, the site visit certificate will be disregarded.
13. The addresses referred to above are:

A. Address for obtaining further information and for purchasing tender documents

(1) Name of Procuring Entity. **Umma University**

(2) Physical address for hand Courier Delivery to an office or Tender Box (City, Street Name, Building, Floor Number and Room). Kajiado along Namanga Road.

(3) Postal Address 713-01100 Kajiado

B. Name, telephone number and e-mail address of the officer to be contacted.

procurement @umma.ac.ke, Tel.0746790207

C. Address for Submission and Opening of Tenders.

(1) Name of Procuring Entity. Umma University

(2) Postal Address: Vice Chancellor P.O. Box 713-01100 KAJIADO

(3) Physical address for hand Courier Delivery to an office or Tender Box (City, Street Name, Building, Floor Number and Room). Kajiado Main Campus, A long Nairobi Namanga Road.

**UMMA UNIVERSITY,
P.O. BOX 713 – 01100,
KAJIADO, KENYA**

1a. FORM OF TENDER

Dear Sirs,

PROPOSED UMMA UNIVERSITY STUDENTS' ACCOMMODATION, KAJIADO

I/We understand that the works, the subject of this tender, include

ELECTRICAL AND FIRE ALARM INSTALLATIONS

I/We undertake in accordance with the particulars set out in the preliminaries and to the satisfaction of the Engineer, to execute and complete the Contract works within.....weeks and as per the specifications and drawings for the sum of **KSHS**.....

I/We confirm that this Tender is subject to adjustments by any variation ordered by the Engineer.

I/We undertake to commence the works within 7 days from the date of official confirmation of acceptance of the tender.

I/We understand that you are not bound to accept the lowest or any tender and that no expenses incurred by us in the preparation of this tender will be allowed.

I/We agree that this tender shall remain valid for, and shall not be withdrawn within **Ninety (90) days** from the final date of submission of tenders and in the event of your acceptance to execute a formal contract agreement with the client.

For and on behalf of (Name of Company)

Official stamp:

P.I.N. No. : V.A.T. Reg. No. :

Signed by: Date:

**UMMA UNIVERSITY,
P.O. BOX 713-01100,
KAJIADO, KENYA**

1b. FORM OF UNDERTAKING

We _____

Of _____

are willing to act as Surety and to be bound to the Client in the sum equal to Ten percent (10%) of the contract sum, for the due performance by

_____ (Tenderer)

Of P.O. Box

of a Contract which he/ they contemplate(s) entering into with the Client for the supply, installation, testing and commissioning of the Lift Installations as described in this document and the accompanying relevant drawings for **Proposed Umma University Students' Accommodation** According to the terms of the Form of Bond, a copy of which has been inspected by us without addition of any limitations.

We agree to enter into a Bond under the above-mentioned terms when and if called upon to do so.

Signature: _____

Official Rubber Stamp & Date: _____

Witness: _____

To be completed by proposed surety
And returned with Tender Documents

**UMMA UNIVERSITY,
P.O. BOX 713-01100,
KAJIADO, KENYA**

1c. FORM OF BOND (TO BE SUBMITTED BY NOMINATED BIDDER)

(To be used with agreement and Schedule of Conditions of Building Contract.)

KNOW ALL MEN BY THESE PRESENTS that we _____
_____ (SURETY)

Of _____
ARE BOUND to _____ (MAIN CONTRACTOR / CLIENT)

Of _____
In the sum of KSHS _____

To be paid by us to the said _____ (MAIN CONTRACTOR / CLIENT)

WHEREAS by an agreement in writing dated _____
between _____

(CONTRACTOR) of _____

contracted with the said _____ (MAIN CONTRACTOR / CLIENT)

to (description of works) _____ in the said agreement
particularly described and conformable thereto. NOW THE condition of the above written bond is such that if the said

_____ (CONTRACTOR)

is / their executors, administrators or assignees shall conform to the said agreement then the above written bond to be void
otherwise to remain in full force. Provided always and it is hereby agreed and declared that the liability of us to the said

_____ (SURETY) under the above written bond shall not in any way be
discharged or impaired by reason of or any breach or breaches (willful or otherwise) of the said agreement committed with
or without the knowledge or consent to the said _____

(CONTRACTOR) by or on behalf of, with the knowledge or consent of the said
_____ (MAIN CONTRACTOR / CLIENT)

In witness whereof we have hereunto set our hands this _____ day of _____ In the Year _____

Witness

Surety, Authorized by power of Attorney

SECTION 02:

2a. PRELIMINARIES AND GENERAL CONDITIONS

1. NAMES OF PARTIES

The following will be inserted in the Articles of Agreement: -

Client:	M/S Umma University
Architects:	M/S Tectura International Ltd.
Quantity Surveyors:	M/S Makon Consultants
Civil & Structural Engineer:	M/S Professional Consultants
Services Engineers	M/S Norkun Intakes Ltd

2. DESCRIPTION OF SITE

The site of the works is at [Umma University, Kajiado](#). The works will be carried out adjacent to occupied premises. Due care will be required during construction so that the occupants and facilities in the adjacent premises and the premises themselves are not interfered with in any way.

The tenderer is recommended to visit the site and will be deemed to have satisfied themselves with regard to the relevant details of preliminary. If the tenderer, for whatever reason, feels specialized attendance will be required, with significant financial implications or requires specialized mobilization to start the works, he should spread the cost of such works in his unit rates.

No claims whatsoever by the Contractor for additional payment will be allowed on the grounds of any misunderstanding or misapprehension in respect of any such matters or otherwise, should the Contractor be required to offer specialized attendance prior to, or during, the performance of the contract.

3. DEFINITIONS & INTEPRATION OF TERMS

The terms, phrases and abbreviations shall be deemed to have the following meanings wherever used hereinafter and in all contract documents.

Engineer: Shall in the case of Electrical/Mechanical works mean 'Norkun Intakes Ltd' Nairobi and, or in the event of any of their deaths, or ceasing to be the Engineers for the purposes of this Contract, such other person as the client shall nominate for that purpose. For the purpose of Mechanical and Electrical engineering works the Engineer shall be deemed vested with the duties of, and be the representative of the Client, except on respect of variations which involve the Contract sum.

Client: Shall mean the client whose name is indicated in item 1 above and shall include his or their heirs, executors, administrators, assigned successors and duly appointed representatives. For the purposes of this work, the terms "Client" and "Contract" shall have the same meaning.

Contractor: Shall mean the person or persons, partnership, firm or company, who's tender for the Contract for

the works has been accepted, and who has or have, signed the Contract and shall include his or their heirs, executors, administrators, assigned successors and duly appointed representatives.

Main Contractor: Shall mean the person or persons, partnership, firm or company, whose tender for the main building contract for the development will be accepted, and who has or have, signed the contract and shall include his or their heirs, executors, administrators, assigned successors and duly appointed representatives.

Works: Shall mean all or part of the works, material and articles, wherever the same are being manufactured or prepared, which are to be used in the execution of this Contract and whether the same may be on the site or not.

Approved: Shall mean approved by the Engineer at his absolute discretion.

Directed: Shall mean directed by the Engineer at; his absolute discretion.

Selected: Shall mean selected by the Engineer at his absolute discretion.

M³: Shall mean cubic meter

M²: Shall mean square meter

M: Shall mean meter

LM: Shall mean Linear Meter

Kg: Shall mean Kilogram

No.: Shall mean Number

Item / Lot: Shall mean total sum of all items combined

Prs: Shall mean Pairs

B.S.: Shall mean the current British Standard Specification published by the British Standards institution, 2 Park Street, London, W.I. England

K.S.: Shall mean the current Kenya standards specification published by the Kenya Bureau of standards

As before: Shall mean in all respects as earlier described in the same or previous bill

Ditto: Shall mean the whole of the preceding description except as qualified in the description. Where it occurs in descriptions of succeeding terms it shall mean the whole of the preceding description which is contained within the appropriate brackets.

Install Only: Shall mean take delivery on site (unless otherwise stated), unload where necessary, transport within site compound, store, unpack, check contents against orders and packing lists, assemble as necessary, distribute and hoist or install to position, test and commission.

Supply Only: Shall mean procure, deliver to site (unless otherwise advised), unload where necessary, transport within site compound, store, unpack, check contents against orders & parking lists, repack, assemble as necessary and store neatly in the storage space provided by others as directed.

Supply and Install: Shall mean undertaking both supply only and Install only.

Agreement: Shall means this Agreement, its Schedules, the Contract Drawings, the accepted Bills of

Quantities, the specifications, the letter of acceptance, the Purchase Order, and such other documents as may be expressly incorporated in the letter of acceptance or contract agreement (save as may otherwise be varied by this Agreement)

Bills of Quantities, Contract Bills or BOQ: Shall mean the document drawn up by the Engineer and priced by the Contractor to arrive at a contract price.

Certificate of Practical Completion: Shall mean a certificate issued by the Engineer / Architect to the Contractor to signify a state of completion where, in the opinion of the Engineer / Architect, the Works are substantially complete and can effectively and conveniently be used for the intended purposes

Code of Conduct: Shall mean the Contractor Code of Conduct as set out in Schedule 9 to this Agreement

Practical Completion: Shall mean that the Works have been substantially completed in all material respects such that the Site is capable of being taken over and used by the client for the purpose for which it was intended without prejudicing the safe and convenient use of the Site and there are no Defects other than those identified in the Defect List

Contract Drawings: Shall mean drawings showing and describing the Works to be done or to be prepared by the Contractor and includes any modifications to such drawings and where the context requires includes drawings prepared by the Contractor and approved by the client

Contract Period: Shall mean the period agreed for the construction of the Works and stated in the appendix to these conditions or extended in accordance therewith

Contract Price: Shall mean the price for the Works as stated the agreement or as adjusted in accordance with the contract.

Defect: Shall mean any aspect of the Works which is not in accordance with the contract or to the reasonable satisfaction of the Engineer / Architect

Final Acceptance: Shall mean that the Services have been carried out and completed within the terms of this Agreement and all the Defects List items completed

Final Certificate: Shall mean a certificate issued by the Engineer / Architect to the Contractor signifying that the Works have been carried out and completed in accordance with the terms of contract and that all adjustments to the contract price have been made in accordance herewith.

Final Account: Shall mean the document prepared by the Engineer containing all the adjustments to the contract price in accordance with the conditions of contract and which in his opinion is the total value of the Works at final completion.

Interim Payment Certificate: Shall mean any certificate of payment issued periodically as the Works progress by the Engineer / Architect

Prime Cost Sum: Shall mean a sum included in the contract bills for works or services to be executed by a nominated sub-contractor, statutory or other authority or for materials or goods to be obtained from a nominated supplier.

Provisional Sum: Shall mean a sum included in the contract bills for the execution of work, which cannot be entirely foreseen, defined or detailed at the time the tender documents are issued.

Contingency: Shall mean a sum included in the contract bills for taking care of any future event or circumstance that is possible but cannot be predicted with certainty and shall only be used on approval by the client or design team

4. EXTENT OF INSTALLATIONS

The Tenderer shall include in his tender, prices, manufacture, inspection, testing, packing, shipment, insurance, shipping, customs duties, taxes, delivery to site, unloading and all other charges. The Tenderer shall also include for complete erection, tests on completion, setting to work, finishing and painting and maintenance of all items of plant and equipment described or implied within these Technical Specifications and shown on the relevant drawings to the satisfaction of the Engineer and the Architect.

The installed services within the buildings shall be complete in all respects as specified herein, and shall include all items of equipment, materials, accessories, fittings, supports, etc. necessary whether such items are specifically referred to in the Contract or not. The Tenderer shall be deemed to have included in his tender price all items necessary such that the installations are complete in all respects and left in good working order.

If awarded the Contract, the Contractor shall be expected to provide fully detailed drawings shop of the entire installation together with layouts of all proposed civil and building works etc. required to accommodate/house the plant and equipment, these layout drawings and details being related to the existing layouts as may be necessary. The drawings shall be submitted for approval within three (3) weeks of the award of the Contract such that the Engineer can be made aware of all requirements. It shall be deemed to be the responsibility of the Contractor to ensure all civil and builder's works required for this Contract are prepared and/or provided to suit the programme of this Contract. No claims will be entertained.

All proposed new layouts and structures shall be subject to the full approval of the Engineer

5. PROGRAMME OF WORKS.

The Tenderer shall provide within 2 weeks of acceptance of his tender and award of Contract, a complete programme for the proposed installations to be executed indicating the anticipated commencement and completion dates of the following activities:

- (a) Submission of working drawings for approval
- (b) Placing of orders with other specialists for plant and equipment to be incorporated in the works
- (c) Receipt by the Contractor from other specialists of plant to be incorporated in the works.
- (d) Manufacture by the Contractor of plant to be incorporated in the works
- (e) Inspection and testing by the Engineer
- (f) Shipment of the plant from country of manufacture
- (g) Delivery of the plant and equipment to site
- (h) Erection on site, details for all activities
- (i) Kenya Power & Lighting Company Supply, ISP connections, Water & Sewer Connections & any other statutory body connections as desired by contract
- (j) Tests on Completion.
- (k) Training to management team

Operations shall be commenced when instructed and shall be carried forward to completion with the greatest possible expediency, to the satisfaction of the Engineer, in accordance with the Programme. The Contractor's programme shall be agreed with the Engineer and shall adhere fully to the requirements and timing of the agreed Main Contractor's program.

6. TENDER CONDITIONS

Any act of collusion that may distort normal competitive conditions may cause the rejection of the tenders concerned. By participating in the tendering, tenderers certify not to be involved in such acts of collusion.

Tenders must be returned Complete as per the "Tender Invitation Letter". The tender shall be dully signed, Stamped and submitted to the stated venue & before the stated time.

Tenders received after the stated time will be returned unopened and incomplete tenders will be rejected.

Tenders containing abnormally high or low unit prices and /or lump sums may be rejected. Before such rejection, however the tenderer may be given the opportunity of giving a detailed explanation in writing.

Tenders are invited in strict accordance with the documents issued, counter offers submitted with tenders will not be considered, letters of qualifications with tenders may be ignored if they have the effect of modifying either the terms of a tender or the compatibility of a tender with the other tenders. However, should a tenderer, in good faith wish to propose modifications to the tender terms, conditions and contents for the purposes of reducing the tender amount then he shall contact the Engineer in writing well before the date of tender opening. Should the Engineer approve the proposed modification, all tenderers will be advised in due time for the modification of their tenders. No proposed modification will be considered unless this procedure has been followed.

The client is not bound to accept the lowest or any tender, nor is the client bound to divulge reasons for the acceptance or non-acceptance of any tender. Any tender may be accepted by the client within the stated period unless previously withdrawn by the tenderer.

All deletions, additions and corrections to figures inserted in the tender document are to be counter signed by the tenderer.

In the event of two or more tenders being in the same sum, tenderers may be given seven (7) days within which to revise their tender prices. Should there again be two or more tenders in the same sum, and in the absence of any qualities to give one tenderer preference over the other(s), then, the Contract may be awarded by drawing lots in the presence of the tenderers concerned.

7. TENDER TECHNICAL DATA

Where included in the Tender Documents, all Tenderers shall complete Schedules of technical data. Otherwise, the Tender may not receive full consideration and will be liable to rejection.

8. TENDER EVALUATION PROCEDURES

Following the return of the tenders for the works measured in these bills of quantities, arithmetical and other analysis will be carried out in order to select the lowest acceptable tender in terms of responsive and realistic pricing, etc. This section will be at the sole discretion of the client.

The unit rates offered by the selected tenderer will then be applied to new quantities measured by the Engineer for the revised scope of works.

The resultant total, together with the priced preliminaries and any modified prime cost and provisional sums, will be consolidated into a sum for which the Contract will be signed.

This procedure will be applied only to the selected tender. Neither the Client nor the Consultants will enter into discussion or any correspondence with the other tenderers after the selection process has been carried out, and no reasons will be given for selection or non-selection.

Any tenderer unable to comply with these procedures will be disqualified from the selection process

9. ACCESS TO SITE AND SECURITY

Means of access to the site will be as directed by the Engineer. No other access will be permitted in any circumstances.

10. AREA TO BE OCCUPIED BY THE CONTRACTOR

Areas to be occupied by the Contractor for use as storage shall be as directed by the Project Engineer.

11. DRAWING(S)

11.1 Tender Drawings:

The Contractor will be deemed to have examined the drawings before tendering and to have satisfied himself regarding their details and regarding the nature and extent of the works and the method of installation involved. No claims arising out of misapprehension in these respects will be allowed.

The Drawings indicate generally the arrangement of the installations and are for assistance in tendering only. The position of equipment and apparatus shown thereon is approximate only; the exact positions, together with the actual runs of ductwork, trunking, and conduit, etc., will be agreed upon with the Engineer and the Client prior to commencement of work. It shall be deemed that the prices entered by the Contractor include for the repositioning of the various services, to meet the above requirements. No claims will be entertained.

The Engineer will furnish the Contractor within a reasonable time after the receipt by the Engineer of a written request for the same, any details of which, in the opinion of the Engineer, are necessary for the execution of any part of the works. Such a request shall be made only within a reasonable time prior to the execution of such work in order to fulfill the Contract. One copy of the Drawings, details and Technical Specifications shall be kept on the site until the completion of the Contract and the Engineer shall at all reasonable times have access to the same. The Contractor shall return all copies of Drawings and other relevant details to the Engineer on the completion of the Contract.

Additional Drawings will be issued by the Contractor to the Engineer to suit the design requirements of the works. These Drawings being issued either during or after the tender period as may be required or necessary. These Drawings will supplement the details contained within the Technical Specifications and Bills of Quantities and the Tenderer shall be deemed to have taken these into account in his pricing. Where the Contractor can demonstrate that the Drawings relate to new approved or additional items these new or additional items shall be priced to approval in accordance with the Contract rates and prices.

11.2 Award / Contract Drawings:

Two (2) copies of all drawings and a copy (1) of the specifications will be furnished free of cost to the Contractor (whose tender has been accepted) for his own use. Any extra copies will be paid for.

The Contractor shall at his own risk and cost execute and perform the works described in the conditions of contract and bills of quantities and detailed in the drawings provided and supplied to the Contractor for the purpose of works and completely finish the said works in a good workmanship and with the utmost expedition.

The Contractor shall satisfy himself as to the correctness of all drawings and measurements as per site conditions. If the Contractor finds any discrepancy in the drawing or between the drawing and the specifications he shall immediately refer the same to the Engineer who will decide which shall be followed.

Figured dimensions shall be taken in preference to the scale mentioned on or attached to any drawing. Details shown on drawings shall be taken in preference to items and quantities in the specification.

11.3 Shop / Working Drawings:

The Contractor shall prepare fully detailed Shop / Working Drawings for all items of plant, equipment and accessories required for installation under this section of the Contract. Two (2) copies of each Drawing shall be forwarded to the Engineer for approval and or comments and one (1) soft copy in PDF and CAD formats. One (1) copy will be returned stamped "Approved" or "Not-Approved". Where Drawings require further information and/or modifications to meet the comments made by the Engineer they shall be re-submitted, again as above, for approval.

When Drawings have been approved two (2) further copies as above shall be forwarded to the Engineer, together with copies to the Architect, Site and the Client.

Shop / Working drawings, and, where relevant, calculations in respect of the following shall be prepared by the Contractor and submitted to the Engineer for his approval commencing within ten (10) days from acceptance of the tender. These are (As Applicable to the specific service):

- (a) Cabling and external cable routes
- (b) Details of all conduit and trunking runs in respect of different services
- (c) Details of lighting and power circuits, routes etc.
- (d) Details of sub-main switchgear and distribution boards
- (e) Details of Lightning and surge protection
- (f) Details & Layouts of all ducts, chases, holes, trenches and all other services throughout the whole of the building and associated external works

- (g) Details & Layouts of Fire alarm system and all circuit diagrams
- (h) Details & Layouts of all Security Installations
- (i) Details & Layouts of all Structured cabling & ICT Installations
- (j) Details & Layouts of all Audio Visual & Voice Evacuation Installations
- (k) Details & Layouts of all BMS Installations
- (l) Details & Layouts of all Generator Installations
- (m) Details & Layouts of all Lift Installations
- (n) Details & Layouts of all UPS Installations
- (o) Details & Layouts of all Automatic Voltage Stabilizer Installations
- (p) Details & Layouts of all Rectifiers & Inverter Installations
- (q) Details of all equipment and panels
- (r) Technical literature for all the services

All Shop / working drawings shall be to scale and fully detailed with all the important dimensions shown and the construction of key components indicated.

During progress of the building works, the Contractor shall make all necessary checks on site to ascertain that the various services can be installed as specified and shown on the approved Drawings.

Where such works cannot be so installed, this must be immediately brought to the notice of the Engineer and Architect prior to the progress of such works.

The Engineer, in conjunction with the Architect and the Client, will check and return the Drawings submitted for approval within a reasonable period, but in any case not exceeding fourteen (14) days from receipt of the Drawings.

The layouts of plant and equipment are for general guidance only. The Contractor shall assess the requirements and prepare a plant layout Shop / Working drawing for approval within twenty one (21) days, the required liaison being maintained with other specialists, such that an agreed layout is submitted for approval.

11.4 Record (As-Built) Drawings:

As soon as the works are complete and all tests satisfactorily carried out, the Contractor shall hand to the Engineer two (2) sets of Record Drawings, together with one (1) set of soft copy of the same in PDF and CAD formats, showing the works as finally installed. These Drawings shall be prepared on approved transparent plastic material in black ink or as approved by the Engineer.

The certificate, of making good defects, will not be issued until this condition has been complied with.

Record Drawings are in addition to detailed Working Drawings and shall show all cable routes, circuits, trunking, conduits, plant, trenches, ductwork and ducts etc., together with the entire plumbing, drainage and firefighting installation, as finally installed.

The Engineer will provide the Contractor with a set of Contract Drawings (in addition to the two (2) sets provided for the Contractor's site and office use), which shall be maintained by the Contractor's representative on site and which shall be used for recording of Contract variations as they occur. This set of Drawings shall be available for the Engineer's inspection on site, and shall be kept up to date.

The cost of the preparation and submission of the above Contract and Record Drawings shall be deemed to be included within the Contractor's prices.

12. CONTRACT AGREEMENT AND CONDITIONS

12.1 General:

The articles of Agreement and conditions shall be based on the agreement and schedule of conditions of building contract forms published by the Kenya Association of Building and Civil Engineering Contractors' (KABCEC).

FIDIC conditions for electrical and mechanical works shall form complementary reference where clear interpretation cannot be made.

Communications Authority (CA) conditions for structured cabling, ICT & Security works shall form complementary reference where clear interpretation cannot be made.

12.2 Water and Electricity Supply

The Main Contractor will make water and electrical power available to the Contractor for general use at no cost e.g. for sanitation, cleaning, general lighting welding works, drilling, grinding, testing, commissioning of equipment, etc. In the event of heavy usage, then the Main Contractor and the Contractor will mutually agree whether or not the latter should pay for the water / electricity used for the works and thus generate a documented cost sharing method. That notwithstanding, no excuse will be entertained for power failure or lack of water as the Contractor is required to make his own arrangements in such circumstances.

12.3 Contractor's Materials

Purchase of materials by the Contractor and their storage on site for inclusion in payment certificates far in advance of reasonable requirements may be allowed at the sole discretion of the Engineer. This however is also subject to availability of such storage space.

Storage space may be provided on site.

13. INSURANCE

The Contractor shall during the execution of the works, insure himself and keep himself insured against all liability under the WIBA or any amendment thereto for accidents to workmen employed by him on the said works and shall hold the client and all parties to the contract harmless in respect of any such liability.

The Contractor shall further insure himself and keep himself insured against all liabilities arising from all Third party claims arising from accidents and he shall hold the client, the Consultants and all parties to the contract harmless in respect of any such liabilities.

No payments on account of the work executed will be made to the Contractor until he has satisfied the Engineer either by the production of an Insurance Certificate that the foregoing provisions have been complied with in all respects.

Thereafter the Engineer may from time to time check that premiums are duly paid up by the Contractor who shall, if called upon to do so, produce receipts of premium renewals for the Engineer's inspection.

14. BOND

The Contractor shall find and submit for the approval by the Engineer one (1) surety who shall be an established bank, Insurance company or fidelity guarantee corporation and who will be willing to be bound to the client and/the Client in an amount equal to ten percent (10%) of the Contract amount for the due performance of the Contractor up to the date of completion as certified by the Engineer and who will then and if called upon, sign a bond to that effect, on the same day as the Contract agreement is signed.

In the event of the surety named not being approved by the Engineer, the Contractor shall furnish, within seven (7) days, another surety to the approval of the Engineer.

15. SAFETY, HEALTH, AND WELFARE OF WORKPEOPLE

The Contractor shall allow for providing for the safety, health, and welfare of workpeople and for complying with any relevant ordinances, regulations, or Union agreement.

16. NATIONAL INSURANCE AND PENSIONS

The Contractor shall allow for making any National Social Security Fund and National Hospital Insurance Fund payments due in respect of workpeople.

17. HOLIDAY AND TRANSPORT OF WORKPEOPLE

The Contractor shall allow for providing holidays and transport for workpeople and for complying with any relevant ordinances or union agreement.

18. TRAINING LEVY

The Contractor's attention is drawn to legal notice no. 237 of October, 1971, which requires payments by the Contractor of a training levy on all contracts of more than KShs. 50,000/= in value and his tender must include for all costs arising or resulting therefrom. Proof of payment of those training levies will be required.

19. EXISTING PROPERTY

The Contractor shall take every precaution to avoid damage to all existing property including flower beds, fences, roads, cables, office equipment, pipes, drains, plant, equipment, adjacent buildings and other services and he will be held responsible for all damages arising from the execution of this Contract to the afore-mentioned property and he shall make good all such damage where directed at his own expenses to the satisfaction of the Engineer

20. FOREMAN

The Contractor shall keep constantly on works a competent English-speaking foreman and any directions or explanations given by the Engineer to such a foreman shall be deemed to have been given to the Contractor.

21. SUPERVISION AND WORKING HOURS

The works shall be executed under the direction, and to the entire satisfaction in all respects, of the Engineer who shall at all times during normal working hours have access to the works and to the yards and workshops of the Contractor or other places where work is being prepared for the Contractor.

The working hours shall be those generally worked by good employers in the building and civil engineering trades taking note of gazetted holidays unless the Engineer shall so direct.

No work shall be covered up in the absence of the clerk of works without the prior approval of the Engineer in writing

22. SAMPLES

The Contractor shall furnish at his own cost any samples of materials or workmanship that may be called for by the Engineer for his approval or rejection and any further samples in the case of rejection until such are approved by the Engineer, and the Engineer may reject any materials or workmanship not in his opinion up to the approved samples.

The Engineer shall instruct for the testing of such materials as he may at his discretion deem desirable and the testing shall be made at the Contractor's cost.

The Contractor shall allow in his tender for such samples and tests.

23. TRADE NAMES

Except where expressly stated, where trade names of manufacturer's catalogue numbers are mentioned in these specifications, the reference is intended, as a guide to the type of the article or material required. The Contractor may use any article or material equal in type or quality to those therein described subject to the prior approval of the Engineer, and at his (Engineer's) absolute discretion. The onus of proof as to equivalent quality will rest with the Contractor, whose tender will be deemed to include for the makes described hereafter.

24. MATERIALS, TOOLS, PLANT ETC.

The Contractor shall allow for providing of all ladders, tools, plant and transport required for the works, except in so far as may be specifically stated otherwise.

All materials and workmanship used in the execution of works shall be of the best quality and description unless otherwise described. Any materials for the works condemned by the Engineer shall immediately be removed from the site at the Contractor's expense.

All materials, fittings and accessories are to be new and in accordance with the requirements of the current legal and regulatory framework where such exist, and with the relevant international standards.

Uniformity of type and manufacture of fittings and accessories is to be as far as practicable preserved throughout the whole Works.

The Contractor shall provide at his own risk and cost all materials, scaffolding, tools, plant, transport and workmen required for the works except, insofar as may be stated otherwise herein.

The Contractor shall order all materials to be obtained from overseas immediately after the Contract is signed and shall also order materials to be obtained from local sources as early as necessary to ensure that such materials are on site when required for use in the works.

Any defects that may appear, either of materials or of workmanship, during the defects liability period provided by the Contract, shall be made good by the Contractor at his own expense, as and when directed.

If the Contractor shall fail to carry out such orders, as by the preceding paragraph provided within such reasonable time as may be specified in the order, the materials or works affected may be made good by others in such manner as the Engineer may direct, in which case the cost thereby incurred shall, upon the written certificate of the Engineer, be recovered from the Contractor as liquidated damages.

25. ORDERS

Copies of all orders for major items of plant, equipment and materials places with suppliers shall be provided in triplicate to the Engineer together with a soft copy

26. INSPECTION AND TESTS AT MANUFACTURER'S WORKS

The Engineer, or his duly authorized representative, shall have at all reasonable times access to the Contractor's premises to inspect and examine the materials and workmanship of the mechanical and electrical plant and equipment during its manufacture.

If part of the plant and equipment is being manufactured on other premises, the Contractor shall obtain on behalf of the Engineer, or his duly authorized representative, permission to inspect as if the plant and equipment was manufactured on the Contractor's own premises. Such inspection, examination or testing, if made, shall not relieve the Contractor from any obligation under the Contract.

Where the plant and equipment is a composite unit of several individual pieces manufactured in different places, it shall be assembled and tested as one complete working unit, at the Maker's works, to specifications and the relevant International Standards where applicable.

27. TRANSPORT

All plant and equipment shall, during transportation, be suitably packed, crated, and protected to minimize the possibility of damage and to prevent corrosion or other deterioration.

On arrival at site all plant and equipment shall be examined and any damage to parts and protective priming coats made good before installation.

Adequate measures shall be taken by the sub-contractor to ensure that plant and equipment do not suffer any deterioration during transit and transportation.

Prior to installation, all accessories, plant, and equipment shall be thoroughly cleaned.

If, in the opinion of the Engineer any equipment has deteriorated or has been damaged to such an extent that it is not suitable for installation, then the sub-contractor shall replace this equipment at his own cost.

28. STORAGE

Limited Space for storage will be provided by the Main Contractor on site but the Sub-contractor will be responsible for the provision of any lock-up sheds and stores required.

Nominated sub-contractors are to be made liable for the cost of any storage accommodation provided specially for their use. No materials shall be stored or stacked on suspended slabs without the prior approval of the architect and structural engineer

29. SUNDRIES

The necessary holding down bolts, supporting brackets and templates, guards and screens, locks, piping, conduits, lamps and other requisite sundries whether specified in detail or not shall be provided, under the Contract and it shall be deemed that the Contractor's prices, rates and the like include for all such items.

30. BLASTING

Blasting will not be allowed unless with express authority of the Engineer.

31. HOISTING

The Contractor is referred to the Drawings and to the general description of the building. Throughout these specifications, generally no mention is made of heights for hoisting.

All prices must include for hoisting and fixing at any level within the limits shown on the drawings or included in the general description of works. Where a particular level is specified, the Contractor shall price accordingly.

32. CASING UP AND PROTECTING

The Contractor shall be responsible for casing up or otherwise protecting to the satisfaction of the Engineer all parts of the Contract works liable to cause injury and for removing such protection and making good on completion.

The Contractor shall also carefully protect from injury by weather all Work and materials which may be affected thereby and allow in his prices for all dams, pumping, shoring, temporary drains, sumps etc. necessary for the purpose. The Contractor shall clear away and make good at his own cost to the satisfaction of the Engineer all damage caused thereby.

33. BUILDERS WORK & CIVIL WORKS

Builder's Work and Civil Works that are incidental to this section of the Contract (Ordinarily referred to as Builders Works in Conjunction with Services or abbreviated BWICS) such as cutting of holes in walls and floors, provisions of foundations for the plant and machinery, shall be the responsibility of the Main Contractor. The Contractor shall be fully responsible for the preparation of all such details that relate to such works, the details being subject to approval by the Architect and Engineer prior to submission to the

Main Contractor for action. Other items such as fixing of brackets, cables and ductwork and trenching, making good etc. shall be carried out by the Contractor to suit the installation of all the services.

It is the Contractor's sole responsibility to ensure that all holes and chases are in the required position and that any additional ducts, holes and chases necessary for erection of the installations in situ concrete walls, floor slabs etc., are included in the early stages of construction as appropriate.

The Contractor shall furnish the Engineer, Architect and Main Contractor with all the necessary information, including position of foundations, brackets and fixings, and shall ensure that such works are performed in accordance with available information.

The Contractor shall include in his tender all supports, fixings, plugging of holes in walls, ceilings and floors to facilitate the installation of the pipework, accessories, and all other portions of the specified installations. Any purpose-made fixing brackets shall also be provided and installed by the Contractor, including escutcheon plates and the like.

The Contractor shall supply and install approved pipework, ductwork, trays, Ladders, Light fittings and Equipment support brackets and hangers. It shall be deemed that prices include for any special requirements and that the Contractor has visited the site during the tender period to ascertain all details.

The Contractor shall pay particular attention to the installing and alignment of items. All items shall be installed square, true and perpendicular to floors in clear parallel lines i.e. as shown on Drawings and as may be required at site to the Engineers approval.

34. SETTING OUT OF WORK

The Contractor will be responsible for laying out his work and shall obtain all the necessary information as may be required to carry out the work. Such information shall be obtained sufficiently in advance to avoid any possibility of delay to the Works as a whole.

The Contractor shall be fully responsible, and shall seek, the details of all work being carried out by the various trades on Site, particularly where such trades may interfere with each other, or where co-ordination is necessary. No claims for extra costs will be entertained arising from omissions, oversight, or neglect in this regard.

In advance of the delivery of the plant and equipment, the Contractor shall arrange for the supply of all-necessary foundation bolts, templates, nuts, plates, sleeves, anchorages, etc., as required and as may be directed by the Engineer.

35. ERECTION AND CHECKING OF WORK

The Contractor shall provide, and be solely responsible for, all skilled and unskilled labour, tools, lifting tackle and other equipment required for handling of plant and equipment when transporting to Site, within the Site and during erection.

All erection works shall be subject to approval by the Engineer.

All parts shall pass such tests as required by the Engineer to prove compliance with the Contract irrespective of any tests which may already have been carried out at the Manufacturer's Works. In particular, all special tests made at the Manufacturer's Works shall be repeated at limits approved by the Engineer.

36. WORKS TO BE DELIVERED UP CLEAN

On completion of the works, the site and the works shall be cleared of all plant, scaffolding, rubbish and unused materials and shall be delivered up in a clean and perfect condition in every respect to the satisfaction of the Engineer.

37. TESTING AND SITE PERFORMANCE

The Contractor shall allow for all testing of material and installations required by these specifications and he shall be responsible for all expenses incurred in completing such tests, including costs of materials and labour, equipment, transport and all other costs.

The Contractor shall give notice of the date of the specified tests to be performed on completion of installation. The notice shall be made in writing to the Engineer at least five (5) days to the date of the specified tests. Unless otherwise agreed the tests shall take place within seven (7) days of the stated date or on such day or days as the Engineer shall in writing notify the Contractor in writing. The tests shall be carried out under normal working conditions to the satisfaction of the Engineer and shall extend over such continuous periods as he may direct.

All skilled labour, supervision, apparatus, fuel and instruments required for carrying out the tests will be the responsibility and at the expense of the Contractor. The accuracy of the instruments shall be demonstrated if required. The Contractor shall ensure and avail proof that test instruments are in good working condition and have been calibrated by an authorized agent.

If any part of the plant or equipment fails to pass the specified tests, further tests of the said part shall, if required by the Engineer, be repeated. The Contractor shall, without delay, put in hand such modifications as found necessary so as to meet the requirements of the Contract and any expense which the Client may have incurred by reason of such further tests shall be deducted from the Contractor's Contract price.

Each completed system within the installation shall be tested as a whole under operating conditions to ensure that each component functions correctly in conjunction with the rest of the system.

38. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

The Contractor shall proceed with the works in such manner and in such order, as the Engineer shall direct so as to complete the works on the shortest possible time.

It is the responsibility of the Contractor to ensure that all material, fittings, equipment and items to be supplied are ordered and delivered to the site ready for installation at such times as to cause no hold up to the programme of work

NOTE:

- (a) The sub-contract completion period shall be the same as that of the main contract.
- (b) Liquidated damages and ascertained damages shall be calculated pro rata on the rate provided in the main contract.

39. SPECIALIST MANUFACTURERS

Where specialists are not nominated by the Client, the Contractor shall appoint specialist manufacturers and suitable specialists for any sections of the Works described herein in which he is not himself an experienced, recognized and approved specialist.

The Tenderer shall, on submission of his tender, indicate the names of all proposed specialist manufacturers and specialists, together with the precise sections of the Works for which each will be responsible. The Contractor may be required to seek alternative manufacturers or Contractors or to accept specialists nominated by the Engineer. It shall be deemed that the prices entered in the tender include for this requirement.

For plant and equipment supplied by suppliers other than the Contractor, the Contractor will be required to furnish an agreement between himself and the supplier stating that he is authorized by the supplier to deal in the plant and equipment and that he is authorized to stock the necessary spare parts or that the Client will be authorized to revert to the supplier in the event of breakdown of the plant or equipment.

The Contractor shall allow in his prices for phasing his work to meet the requirements of the other specialists, and for varying his programme or otherwise, to comply with the erection programme of such specialist. No additional costs will be allowed to the Contractor for and disruptions to his programme, or otherwise, in his compliance with the above requirements.

40. PAYMENT AND CERTIFICATES

Payments shall be made through certificates direct to the Contractor but authority for payment shall have to be granted by the Main Contractor. All payments shall be less retention as specified in the Contract agreement. The Contractor shall be paid only for work done and /or materials on site. Payments shall be subject to prevailing statutory deductions such as withholding tax, etc.

The percentage of certified value retained should be 10%. Limit of Retention shall be a sum equivalent to 5% of the Contract sum.

No certificate so issued by the Engineer/Architect shall in itself be considered conclusive evidence as to the sufficiency of any work or materials to which the terms and conditions of this agreement or from his liability to make good all defects as provided thereby.

41. VALUATION OF LUMP SUMS AND PRELIMINARY COSTS

Lump sums entered in these bills of quantities against any item of general condition or preliminaries will be included in appropriate valuations according to reasonable assessment by the engineer of actual costs involved in each item.

42. PAYMENT FOR MATERIALS ON SITE

All materials for incorporation in the works must be properly installed before payment is effected unless specifically exempted by the Engineer. This is to include the materials of the Contractor, and his nominated suppliers.

43. PAYMENT FOR MATERIALS OFF-SITE

Payment for any material off site will be subject to the Contractor providing a bank guarantee of equivalent value and clearly indicating that the bank undertakes to pay the client the full sum of the guarantee amount immediately upon the client's first written demand declaring the tenderer to be default and without cavil or argument. This shall be from an **Approved Bank**.

The Bank Guarantee validity period to be no sooner than the end of the Defects Liability Period of the project except where a special waiver is granted by the client in writing.

Advance payments will also be treated as Material off site save for being secured by an Advance Payment bank bond.

44. CLAIMS FOR EXTRAS

This is a fixed price contract and no claims whatsoever on extras will be entertained save where a variation to the contract is expressly directed by the engineer in writing.

45. FLUCTUATIONS

This is a fixed price Contract and no claims will be allowed on fluctuations. The tenderer's prices will be deemed to have allowed for forecasts on price fluctuations, inflation or exchange rate.

46. COMMISSIONING & TRAINING

The Contractor shall train the Client's Maintenance management team or his representative on the operation and maintenance of the various components forming the mentioned installation and shall provide drawings, diagrams and manuals to ensure the Maintenance Management Team or his representative is completely conversant with such installations.

Proof of training will be required and must have the names and signatures of those trained and the dates and what they were trained on.

The Contractor shall ensure that the services installations are left in complete safe working order and operating to the satisfaction of the Engineer.

47. TEST RECORDS

The Contractor shall make the necessary records of all the tests carried out, and when the tests have been successfully completed he shall provide the Engineer with test records and reports in a format to be agreed.

48. DUST, INSECT AND VERMIN PROOFING

All equipment, likely to be affected by ingress of dust, shall be effectively dust proofed and vermin proofed where no protection is afforded in its normal manufactured form. All materials used shall be in general resistant to attack by insects, micro-organisms or other fauna or flora.

Materials used for such protection shall be to the approval of the Engineer.

49. PAINTING & FINISHING

All plant and equipment installed under this Contract shall be painted or otherwise finished to approval in accordance with the appropriate international code for standard colours to be furnished by the Contractor prior to the shipment or manufacture of the plant or equipment including all pipework, ductwork, etc. Such finish shall be entirely compatible with the conditions of heat, humidity, exposure to the weather, and other relevant factors arising from the materials, location and condition of operation of the equipment.

The Engineer may request samples of paint finishes, the cost of which shall be deemed to have been included within the tendered prices for all works.

All final painting of equipment, fixtures, and accessories shall be carried out by the Contractor, except where it is the usual practice of the manufacturer of items of plant and equipment to apply a high standard of protective finishing paintwork in the shop before dispatch. This will be acceptable provided the Contractor at his own costs makes good any damage to paintwork, occurring in shipment, transportation and installation.

The interiors of electrical switchboards, control panels, and similar items, shall be finished in an approved enamel colour and shall comply with the appropriate international standards for enamel finish which shall be furnished by the Contractor prior to shipment or manufacture of the plant or equipment. The exteriors of such panels and enclosures shall be of international standards specification colour as specified by the Engineer.

50. LABELS

All items related to the installations shall be neatly and clearly labeled externally with identification marks corresponding with those on Drawings or in Technical Specifications. Final details shall be agreed upon by the Contractor and the Engineer.

Identification labels shall be of laminated plastic material engraved, black on white, with no less than 6mm "Lino" style letters and shall be fixed on or adjacent to all items by means of at least two brass screws or to the approval of the Engineer. Self-adhesive labels shall not be permitted.

All main switches, circuit breakers, isolators, valves, motors, switch-fuse, consumer service units, and distribution boards etc. shall be neatly and clearly labeled externally with identification marks corresponding with those on the Drawings or Technical Specifications using "Red Trafolyte Labels" of Minimum 10mm Height.

Final details shall be agreed upon by the Contractor and the Engineer.

All labels/plates shall be in English language

51. DEFECTS LIABILITY PERIOD

The defects liability period shall be as provided in the main contract.

Whereas it is not solely described in the contract, the default Defects Liability Period Shall be the Period of **Six (6) Months** from the date of issue of the Certificate of Practical Completion to the contractor.

52. COMPLETION DOCUMENTS

The contractor shall supply the Engineer with the following sets of completion documents in three (3) sets hard copy on scale of 1:100 and a soft copy in both PDF and CAD formats.

52.1 Record (As-Built) Drawings:

As stated above.

52.2 Maintenance manuals:

At the start of the defects liability period, the Contractor shall hand over to the Engineer, three (3) sets of maintenance and operations manuals for each plant and equipment installed. These manuals shall be in English and shall be fully illustrated.

52.3 Test Records:

As stated above.

53. WARRANTY AND PERFORMANCE STANDARDS

The Contractor must furnish the client through the Engineer with a general written warranty covering quality of workmanship, material and equipment and be compelled thereby for a period as shall be provided in the Contract Schedules.

Whereas in a case where the period is not mentioned, then the Warranty cover should be for a minimum of Two years (24 Months) after practical completion of the Contract.

The Contractor must make good, at his own expense, such repairs and replacements as may be required as a consequence of negligent workmanship or defective materials.

The Contractor must also procure such warranties and guarantees as aforesaid from all manufacturers and/or suppliers of materials or equipment incorporated in the project under this contract.

The Contractor must comply in all respects with given standards of workmanship as defined and described in the specifications and Bills of Quantities and relevant codes of Practice.

The Contractor must also comply with all tests of materials as required and/or directed by the Engineer.

**ELECTRICAL
INSTALLATIONS
PARTICULAR
SPECIFICATIONS**

2b. PARTICULAR SPECIFICATIONS FOR ELECTRICAL INSTALLATIONS

54. SCOPE

The Electrical Contractor shall supply labour and supply, deliver, install, connect, test, label and commission the electrical works, clean, complete and working to every detail as described in the specification and by related specifications and on the drawings listed in the Schedule or Drawings to the satisfaction of the Consulting Engineers.

The electrical Contractor shall be responsible for the supply, delivery, installation, connection, testing and setting to work of the entire electrical system in accordance with the Contract Documents.

The electrical Contractor shall provide all the necessary tools, skilled and un-skilled labour to comply and complete in accordance with the main contractor's works program.

55. STANDARDS & REGULATIONS

The electrical portion of the works shall comply with the current regulations of:

- The Electric Power Act
- Electric Power Rules
- The Kenya Power and Lighting Co. Ltd.
- The latest Kenya Bureau of Standards.
- Codes of Practice of the British Standards Institution
- The Regulations for Electrical Equipment in buildings issued by the Institution of Electrical Engineers and Technologists (I.E.T)
- This specification.

56. POWERSUPPLY

The supply voltage at the point of use shall be

- 240 volts single phase or
- 415 volts 3 phase 50 Hz.

This shall be a TN-C-S system via separate neutral and protective conductor throughout the system.

57. CONDUIT INSTALLATIONS

57.1 GENERAL

All conduits shall be installed strictly in accordance with the manufacturer's instructions.

All conduit fittings and accessories, including couplers, ordinary clips, saddles, pipe hooks, reducers, stopping plugs, lockouts and male and female bushes shall be manufactured dimensionally, similar to B.S.S. 31/1940. 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 Engineer's approval.

Where it eases the installation of cast-in-situ back entry boxes on the loop-in system, purpose made bends manufactured by Egatube and comprising a tight bend with a push socket at one end and a threaded socket at the other end may be used with the Engineer's approval.

57.2 INSTALLING OF CONDUITS

Conduits shall be installed on the loop-in system and shall either be cast-in-situ in the main concrete structure, concealed in chases cast in concrete walls, or chases cut in solid partition walls, run in ceiling spaces or in hollow partitions of floors, or concealed below the floor screed, whichever shall prove to be the most suitable method of installation for use in the building under construction. Unless it is clearly specified or shown on the drawing, the method of installing conduits shall be subjected to the approval of the Engineer.

Sunken conduits run in chases in walls shall be fixed by means of mild steel pipe hooks or non-metallic saddles spaced not more than 1 m apart. Where a conduit is concealed behind plaster it shall be sunk to a depth of either 10 mm below finished plaster level, or installed flush with the structural wall level before application of plaster, whichever is the lesser depth

Conduit fixed on the surface of walls or ceiling shall be fixed by spacer bar saddles fixed not more than 1 m apart.

Surface conduit shall also be fixed 230 mm on both sides of all boxes, the box itself securely fixed. Where such an arrangement of boxes and saddles would prove to be both unsightly and unnecessary, short lengths of conduit not exceeding 1 m in length between boxes need not be secured further than by connection to the adjacent boxes. In such cases the **Engineer reserves the right** to insist upon additional fixing being provided, should he for any reason whatsoever consider such additional fixing necessary.

Where two or more lines of conduit run parallel to each other, on the surface of walls, etc., the distance between them shall not be less than 15mm and conduits shall not cross.

Conduits shall be installed in such a manner as to prevent interference with other services and shall be kept at least 180 mm clear of gas or water pipes, and heat in excess of 68 degrees C.

A means of expansion shall be provided in conduit runs in excess of 6 m without any bend or set, by use of 'Egetude' expansion couplings, which shall also be used at building expansion joints.

Conduits 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 securely fixed to the shuttering with nails, or by means, which shall be visible as a marker on removal of the shuttering only where marks can be concealed.

Conduit shall be installed after the first grid of steel reinforcement work is securely fixed and all open ends of conduits 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.**

Immediately prior to installation of the wiring all conduit and fittings shall be dried and cleaned out by drawing through a cloth swab. Rawl plugs shall be used for fixing to brickwork, self-tapping screws for fixing to aluminium section, raw nuts, raw-anchors spring toggles, gravity toggles or raw bolts, shall be used for fixing to other materials as **approved by the Engineer.**

Corners shall be turned by easy bends or sets made in accordance with the manufacturer's instructions without altering the section or splitting conduit.

57.3 CONDUITS BENDING

The conduits shall be bent and formed strictly in accordance with the manufacturer's instructions: -

- i. Small sizes, i.e. 20 and 25 mm 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 degrees to allow for "spring back".
- ii. Large size 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.

57.4 CIRCULAR BOXES INSPECTION

Boxes will not be permitted in floors unless approved. Boxes cast-in-situ must face downwards from the ceiling/floor section. Small standard circular non-metallic conduit boxes, conforming dimensionally with B.S. 31/1940 with standard circular non-metallic (4mm) lids and nylon fixing screws, shall be provided and fixed at all junctions.

The above circular boxes or equivalent looping boxes shall be provided and securely fixed for all ceiling points. When the conduit is run on the surface, all circular boxes for ceiling points shall be fixed with screws.

Where ceiling roses occur and the ceiling box is recessed below the finished level of the ceiling, suitable extensive rings to accommodate the ceiling rose must be provided. Where ceiling boxes, including extension rings, are flush with the ceiling surface, break joints rings shall be provided to hide the joints.

Where a non-metallic outlet box of thermoplastic material is used for the suspension of lighting fitting, care shall be taken to ensure that the temperature of the box does not exceed 60°C. The weight suspended from the box shall not exceed 3 kg.

Where wiring system incorporates galvanized conduit and trunking, the trunking shall be deemed to be galvanized unless specified otherwise.

The number of cables to be installed in trunking shall be such as to permit easy drawing in without damage to the cables, and shall in no circumstance be such that a space factor of 45% is exceeded.

Conduits and trunking shall be mechanically and electrically continuous. Conduits shall be tightly screwed between the various lengths so that they butt at the socketed joints. The internal edges of conduit and all fittings shall be smooth, free from burrs and other defects. Oil and other insulating substances shall be removed from the screw threads. Where conduits terminate in fuse-gear, distribution board, adaptable boxes, non-spouted switchboxes, etc., they shall, unless otherwise stated, be connected thereto by means of smooth bore male brass brushes, compression washers and sockets. All exposed threads and abrasions shall be painted (using an oil paint for black enamelled tubing and galvanised tubing immediately after the conduits are erected. All bends and sets shall be made cold without altering the section of the conduit. The inner radius of the bend shall not be less than four (4) times the outside diameter of the conduit.

Not more than two right angle bends will be permitted without the inter-position of a draw-in box.

Where straight runs of conduit are installed, draw-in boxes shall be provided at distances not exceeding 15 m. No tees, elbows, sleeves, either of inspection or solid type, will be permitted.

Conduits throughout shall be of sufficient section and so arranged with draw-in boxes to allow easy drawing in and out of any one or all of the cables in the conduit.

Conduits shall be swabbed out prior to drawing in cables, and they shall be laid so as to drain off all condensed moisture without injury to end connections.

Conduits and trunking shall be run at least 150 mm clear of hot water and stem pipes, and at least 75 mm clear of cold water and other services unless otherwise approved by the Engineer.

Conduits installed and buried in walls shall allow a minimum of 15 mm cover. These conduits and those cast-in-situ concrete slabs shall be given one coat of rust prevention paint before installation of conduit and before concrete is placed. Sunk circular conduit boxes shall be provided with break joint rings of white moulded material or metal.

Surface conduit shall be run in square symmetrical lines and shall be marked on site for approval before installation. Conduits shall be fixed by means of distance saddles spaced at not more than 1.2 m for 20mm and 50mm conduit and 1.5 m for larger sizes.

Conduits shall be fixed at each side of conduit boxes at a distance not exceeding 250 mm, and the saddles shall be equally spaced.

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 galvanized, 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.S. 889, and C.P. 1003. In **NO CASE SHALL** conduits from different distribution boards be connected at one box, likewise cables from different distribution boards shall not be housed in the same conduit specified.

All conduit boxes except loop-in pattern concrete floor shall be fixed direct to the structure apart from the support provided by the conduits. Box lids where required, shall be heavy gauge metal, secured by means of zinc plated or cadmium steel screws. All adaptable boxes and lids of the same size shall be interchangeable.

Boxes used in conjunction with mineral insulated copper sheathed cable boxes shall be galvanized and painted after erection.

Draw-in boxes in the floor are generally to be avoided but where they are essential they must be grouped in positions **approved by the Engineer** and covered by suitable floor straps, either with non-ferrous tray or covers.

The floor trap covers are to be recessed and filled in with a material to match the floor surface.

The Contractor must take full responsibility for the fillings of all covers, but the fillings in materials will be supplied and carried out by the Main Building Contractor.

Where it is intended to fix enclosed lighting fittings directly to a box to suspend a fitting of weight in excess of 3 kg, Egetude steel insert clips shall be used.

57.5 SWITCH AND SOCKET OUTLET BOXES

All boxes intended for switches, socket outlets or other outlets shall be fitted with brass ferrules to accommodate fixing screws.

All other conditions are as stated in item above on Circular boxes.

57.6 STOPPING PLUGS

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

57.7 JOINTING

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

57.8 CAPACITY OF CONDUITWORK

The cables shall run in the conduits so as not to exceed the capacities as set out in the IEE Regulations.

Conduits shall be best quality new super high impact grade heavy gauge 'A' rigid PVC unplasticized conduits as manufactured by Egetude suitable for plain connections.

Conduits of sizes less than 20 mm shall not be used without the written authority of the Engineer.

58. TRUNKING INSTALLATIONS

Trunking shall only be installed in situations which will remain readily accessible throughout the life of the buildings. No cable trunking shall be installed behind a plastered ceiling or in other inaccessible situations.

All cable trunking shall comply with BS 4678, part 1 "Steel surface trunking" and part 2 for "Steel under floor (duct) trunking".

Sheet steel cable trunking may be used on installations employing steel conduits, for connecting two or more switchboards together or where several conduits would otherwise have to run alongside each other. Proper allowance should be made for the derating of cables installed together in a container system. The cables must be capable of carrying the current imposed by the equipment connected. Attention is drawn to Chapter 52 of the IEE Regulations, particularly Section 522, 523 and Appendix 4: the current carrying capabilities of cables indicated shall not be exceeded. The Engineer must be consulted as to precise details concerning trunking routes and applications.

All lengths of trunking shall be heavy gauge zinc coated steel connected together by internally fitted rectangular couplings of sufficient width to provide a minimum bearing face of 25mm, to which the lengths shall be bolted on site or welded at the factory.

Adequate provision shall be made to allow for expansion.

All Tee pieces and bends shall be formed with similar means of connection and the inner radii area shall be such that cables will not be bent through a radius less than that prescribed in the IEE Regulations. Only bends and tees of approved pattern will be accepted.

All fixing screws within the trunking shall be of the round head type. The trunking shall have an over-lapping well-fitted lid securely fixed to the trunking by approved means that will avoid damage to the cables. Self-tapping screws shall not be used.

All necessary accessories including long sleeve couplings, end piece, bends, sets, tees, reducers, branches, fillets, pin racks, cable retainers etc., shall be purpose-made units rather than being fabricated on site.

Where a change in direction of trunking run occurs, the deviation should be effected by a purpose-made unit manufactured on similar lines to the bends and tee pieces described above. Where this is not practical, changes in direction shall be fabricated in a neat workmanlike manner. All joints shall fit closely and gaps will not be permitted. All burrs and sharp edges shall be removed and no screw shall protrude into or out of the trunking.

Trunking shall be firmly attached to its associated equipment either by bolted flanges or by male bushes and couplings.

Where trunking is connected to equipment by means of flange connectors, the entry into the equipment shall be of the same cross-section as the trunking.

Where trunking does not terminate in equipment, the otherwise open end shall be capped with a cover suitably bolted in position.

Where communications, extra low voltage circuits (category 1) etc., are contained in a trunking, the requisite number of separate compartments shall be provided to segregate the wiring. Where conduits are taken off such trunking they shall not pass through other compartments unless prior permission is obtained from the Engineer.

The entire trunking is required to be recessed in the structure of the building; the finished edge of the trunking is to be installed flush with the plaster work.

Trunking runs shall be so arranged that the lid or cover plate is always on the top or side and not underneath, unless this cannot be avoided, in which case the Engineer's permission shall be obtained.

Wherever trunking passes through walls, vertical partitions etc., a fixed piece of trunking lid shall be fitted to the trunking extended 25 mm either side of the wall or other barrier, this is to allow removal of the adjacent lid without disturbing the building fabric. Care shall be taken to ensure that no opening is left between the trunking and the building structure through which fire might spread.

In addition, a suitable barrier of incombustible material shall be provided and fitted inside the trunking, in accordance with the IEE Regulations 528. On vertical runs of trunking internal incombustible barriers shall be fitted at the distance between floors or 5m, whichever is the less, in accordance with IEE Regulations 527.1.

All necessary trunking support work, hangers, brackets and fixing requirements shall be provided by the electrical Contractor.

Earth links of the appropriate size and type shall be installed at every jointing coupling manufactured bend, etc., throughout the entire trunking system. Where trunking is used to provide a protective conductor it shall comply with the requirements of Chapter 54 of the IEE Regulations, particularly Section 543; alternatively, a separate protective conductor shall be installed in the trunking to comply with section 543 of the IEE Regulations.

In cases where sheet steel trunking is installed and there is danger of movement, a flexible earth conductor shall be installed bonding all joints in the trunking. This shall be fitted in addition to the standard earth links. Cable

retaining strips shall be fitted at 1 m intervals. Insulated cable support pins shall be fitted at intervals of 4 m in vertical runs of trunking and at the top of the vertical trunking.

59. INSTALLATION OF CABLES

59.1 GENERAL

Cables shall be rated for the maximum connected load with due consideration to the following factors: -

- i. Voltage drops not in excess of 4% of the nominal voltage.
- ii. Ambient temperature.
- iii. Degree of excess-current protection.
- iv. Grouping
- v. Cables run under defined conditions.

59.2 BENDING OF CABLES

Bending of cables shall be in accordance with clause 522.8.3 of the IEE Regulations and no cable shall be bent to radius less than that specified by the cable manufacturers.

59.3 JOINTS IN CABLES

The wiring shall be carried out on the looping-in principle. All joints shall be made at the terminals of main switches, distribution boards, ceiling roses, switches and socket outlets, etc. and fixed apparatus only. **No joints** shall be made in conduits and other cable raceways unless specifically approved.

59.4 PVC / XPLE INSULATED CABLE

The wiring shall be carried out in 250 Volt grade or 440 Volt grade for 3 phase PVC / XLPE Insulated cables, as specified elsewhere run drawn in non-metallic conduits. The cables shall be of the sizes specified on the drawing.

59.5 WIRING INSTALLATION

Cables shall be drawn into accessories, distribution boards and switchgear **after** the erection of the conduit system. Under no circumstances shall it be permitted to draw cables into an incomplete section of the conduit installation.

59.6 CABLES IN CONDUITS AND TRUNKING

All cables shall be polyvinyl chloride (PVC) insulated to BS 6604, "PVC-insulated cables (non-armoured) for electric power lighting", 450/750-volt grade, or cross linked polyethylene (XPLE) unless an alternative is specified elsewhere in the contract documents.

The quality and size of cables contained in any one conduit shall comply with IEE Regulations.

No cable with a cross-section area of less than 1.5mm² shall be used. All cables installed in a conduit or trunking system shall be PVC / XLPE insulated conductors and shall be colour coded in accordance with the IEE Regulation 524.3 and 514.3.

Final sub-circuits shall be run in conduits separate from main or sub-main cables.

All cables in conduit shall be drawn in simultaneously.

All cables shall be drawn in without the use of excessive force, without the use of lubricants and the wiring shall be easily withdrawable.

59.7 TERMINATION OF CABLES

Cables shall be terminated in accordance with **Chapter 52 of the IEE Regulations, particularly Section 527.**

Cables shall be terminated by one of the following methods: -

- a) The cable conductors shall be sweated into lugs of the appropriate size for the cable and equipment terminal.
- b) The cable conductors shall be secured by compression-type lugs of the correct size for the cable and equipment terminal.
- c) The cable conductors shall be secured in pinch screw terminals.
- d) The cable shall be secured by means of clamps.

Where cables are required to terminate at connectors, as at lighting points, such connectors shall secure all the strands of stranded cables. Care shall be taken to ensure that cables are not damaged during preparation for termination.

Cables terminating at pinch screw terminals shall be twisted together and single cables shall have the conductor doubled back to ensure adequate surface for pinching screws.

Cables connected to lamp holders or other components at which heat is produced shall be insulated with heat resisting material capable of withstanding, without detriment, the temperature encountered.

All terminations on PVC/SWA/PVC insulated cables shall be by compression-type glands of an approved design and manufacture with facilities for clamping the armouring the outer sheath of the cable.

Glands mounted outdoors shall incorporate a seal to prevent ingress of moisture into the gland, and all glands shall be fitted with a thermoplastic shroud.

Where circular terminations are to be made, these shall be completed using Ross Counterney terminals.

Where cables are terminated in "Klippon" type terminals with parallel faced jaws, the individual cores shall be terminated using the appropriate flat or hook blade crimped lugs. Where the terminal faces are concaved, the cores shall be terminated in wires pin crimped lugs.

The electrical Contractor shall avoid multiple connections under one screw or one pin. Where more than two wires are required, a common termination jumper bar shall be used.

Terminals shall be mounted on rails or supports. All internal wiring is to be clearly marked by markers.

59.8 SEGRAGATION OF SERVICES

Cables of differing voltages shall be segregated so that there is no possibility of a fault in a power cable damaging any adjacent cables or imposing a different voltage upon them in accordance with **IEE regulation 528.**

59.9 IDENTIFICATION OF CABLES

All cables shall be fitted with non-corrosive cable identification bands at each end, and at all changes of direction where they leave a group of cables. All cable cores connected to equipment having marked terminals shall be fitted with non-corrosive identification bands bearing markings corresponding to those of the terminals at both ends.

60. EARTHING

All earthing shall be as PME Earthing (TN-C-S) System

The whole of the metallic portion of the installation, other than current carrying parts, shall be electrically and mechanically bonded to the consumer's main earth terminal and also if applicable, to the lightning protection system or other points specified.

The installation shall be earthed in accordance with the Seventeenth Edition of the Regulations for Electrical Installation issued by the IEE, BS CP1013, "Earthing" and BS 6651' "The protection of structures against Lightning". The electrical Contractor's attention is drawn to Chapter 54 of the IEE Regulations and to the Earthing and Lightning Protection Consultants Handbook publication CHB/4/95 by W. J. Furse & Co Ltd.

A main earth terminal shall be supplied and installed adjacent to the electricity supply cable termination. The terminal shall be of ample size and capacity to suit the installation. All items of equipment, switchgear, etc., shall be bonded to this earth terminal using PVC / XLPE insulated PVC / XLPE sheathed cables, coloured green and yellow as per table 51 and sized in accordance with **section 543 of the IEE Regulations**. An invarine label reading **"SAFETY ELECTRICAL CONNECTION - DO NOT REMOVE" in engraved upper case characters not less than 4.75mm high**, shall be permanently fixed immediately adjacent to or on the earth terminal.

A heavy duty copper clamp **complying with BS. 951** shall be used to bond the main protective conductor to the electricity supply cable armouring or metallic sheath (where applicable the armouring and sheath shall be bonded together).

All protective conductors shall, where possible, be enclosed within metal trunking or conduit serving switchgear, distribution board etc., so as to provide mechanical protection. Where protective conductors are run on building surfaces they shall be properly fixed and supported by means of PVC coated metal saddles along selected routes.

Earth continuity between separate items of switchgear, distribution boards etc., mounted adjacent to one another shall be affected by means of high conductivity continuous copper tape, or PVC / XLPE sheathed cable, coloured green and yellow **as per table 51** and sized in accordance with the **Section 543 of the IEE Regulations**, connecting all items to the earth terminal.

All items of switchgear, accessories, luminaires, conduits, and the outer sheaths of MICC cables, the armouring of all PVC/SWA/PVC cables together with all other items of electrical plant and equipment shall be effectively earthened by means of a protective conductor.

At every terminal point on the fixed wiring an integral earth terminal shall be provided e.g BESA boxes, accessory boxes etc. A protective conductor shall be provided and installed between this terminal and the earth terminal on the associated switch, socket outlet, luminaire etc.

Each circuit protective conductor shall be connected to a multiway earth terminal provided and fixed within each distribution board. The earth terminal shall be provided with an adequate number of ways such that not more than one conductor per terminal shall be installed and the earthing conductors shall be connected in the same sequence as the current carrying conductors.

All metal piped services, e.g., Heating, Water and Gas Services, wastes and piped services at sinks, baths and showers etc., shall be bonded to the earth terminal in accordance with the **IEE Regulations 411.3.1.2**.

A 50 mm section of each gas and water pipe, at position close to their entry into the relevant building, shall be cleaned and made smooth. A copper-earthing clamp designed to permit the connection of protective conductors shall be provided and sized in accordance with **Section 543 of the IEE Regulations**.

The clamp shall be a proprietary type or shall be fabricated from high conductivity copper strip, minimum size 40 mm x 4 mm which shall encircle the cleaned sections of the pipe. A permanent label indelibly marked with the words, "**SAFETY ELECTRICAL CONNECTION - DO NOT REMOVE**" in legible type not less than 4.75 mm high, shall be permanently fixed at the points of connections.

The final connection of bonding conductors from gas, water pipes and other services to the earthing terminal shall not be completed until earth electrode and earth impedance tests have been satisfactorily completed.

Bonding connections to pipework shall be as un-obstructive as possible and where practicable shall be made in service ducts or accessible voids and shall be indicated on the Record Drawings.

All materials and sundry item shall be provided whether or not specifically mentioned necessary to completely and effectively earth the installation. The installation shall be fully protected against dampness and corrosion and the effect of electrolytic action between dissimilar materials. A completely permanent installation shall be provided which shall be fully accessible for regular testing and inspection.

The value of earth resistance from any point of an installation to the general mass of earth shall be low enough to ensure operation of circuit protective devices and shall in any case not exceed the following:

- i. Four (4) ohms for electrical equipment**
- ii. One (1) Ohm for ICT Equipment**
- iii. Seven (7) ohms for lightning protection system**

Each earthing cable shall terminate in an approved design of cable lug.

Where earth conductors are run upon structures or walls they shall be fastened by means of heavy gauge non-ferrous fasteners not more than 0.75 m apart on horizontal runs and not more than 1.2 m apart on vertical runs and to give a minimum clearance of 4 mm from the fixing face.

In the event of the electrical Contractor not being able to establish a suitable earth connection to the electricity supply cable, earth electrodes shall be installed which shall be galvanized or copper clad steel extendable rods not less than 16 mm diameter and not less than 1.2 m in length. Connections to electrodes shall be made by means of solderless mechanical clamps.

To avoid corrosion, all earth system connections shall be cleaned bright and immediately covered with silicon MS4 compound or approved equal.

Earth pits, where required, shall be in accordance with the Contractor's relevant drawings, with the facility to disconnect the earth ring while measuring the electrode earth resistance.

Where fittings and accessories require earthing, an earth continuity conductor shall be run through the conduit. The earth continuity conductor shall be a green coloured PVC / XLPE insulated copper wire of minimum size 2.5 sq. mm and shall be continuous between terminals. Where the earth terminal is formed by a brass screw and washer, "Ross Courtney" type terminations shall be used. All switches, socket outlets, ceiling boxes etc., shall be supplied with an earth terminal.

Earth Continuity: 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 that particular final sub-circuit.

61. FUSED SWITCH UNITS, SWITCHFUSES AND ISOLATORS

The above units comply with **BS 5419** and shall be **500-volt type** and installed where specified and indicated on the relevant drawings.

All switchgear shall be provided with suitable locks for padlocking the switches in the 'OFF' position. The cover shall be interlocked with the operating mechanism to prevent it from being opened in the 'ON' position. This interlocking shall also prevent the switch from being closed with the cover open unless for maintenance purposes. The cover shall be gasketed to prevent ingress of dust.

The switch action mechanism shall be of the parallel operation (double break type having cartridge fuses mounted switches) and shall be **ASTA certified** to meet adequately all the duties specified.

The end plates shall be removable for drilling for conduit or cable entry and shall be fitted with additional distance pieces where necessary. Switchgear boards shall be fixed to the wall/floor by Rawl bolts or other approved fixings.

No building alteration shall be allowed when moving the switchboard into position, the switchboard being supplied in sections to be built in position, if so required.

Switchgear shall be delivered to site when required to suit the progress of the works. Care shall be taken to preserve the manufacturer's paint finish. Any refurbishing etc. shall be carried out, using paint obtained from the switchboard manufacturer, to the original standard of finish.

All fuses in switchgear shall be HRC fuses sized for the fused-switch units or switch-fuses etc., in which they are incorporated. They shall be ASTA certified for compliance with BS 88, Category of Duty 440 A.C 5 Class 01 and in all cases fuse links shall be selected to provide circuits discrimination.

62. CONTROL PANELS AND CUBICLES

The details specified shall apply as far as fused switches, bus-bars and rating etc are concerned. The panels shall be constructed from rolled steel channel minimum size 60 mm x 30 mm deep x 5 mm or equivalent angle section clad with sheet steel of 3 mm gauge. 2 mm gauge may be used for covers and doors of not more than 1 m square.

Terminals shall be of the "Klippon" standards rail-mounted feed-through type or approved equal. All terminals shall be identified by means of numbered or lettered marking tags, which shall be identical to the number of

letters applied to the cables. Cables shall be identified as terminations by means of cable markers as manufactured by "Klippon" or approved equal. 25% spare terminals capacity within wiring duct shall be provided. All components motors, starters, relays, timers, etc. shall be labelled showing their reference and function and these shall relate to the panels' schematic wiring diagram provided with the "As-built" drawing and manuals.

All control panels shall be fitted with multi-pole isolating switches through which all electricity supplies shall pass. The door(s) of the control panel shall not open unless the isolating switch is in the "off" position. A facility to lock the control panel isolating switch in the "off" position shall be included.

63. DISTRIBUTION BOARDS

a) General

All distribution boards, unless stated otherwise, shall be miniature Circuit Breaker Distribution Boards and shall be of surface or flush type, as specified or instructed on site. Facilities for local isolation of the distribution boards shall be provided by either a local fused-switch unit or an integral isolating switch, whichever is specified.

Where surface mounted on a flush installation, all conductors shall terminate behind the board in an adequate box. For surface mounting, trunking shall be fixed between the board and ceiling level, or conduits run directly into the board. Adequate earth continuity connection shall be made between the various components.

b) Miniature Circuit Breaker Distribution Boards

MCB distribution boards shall comply with BS. 5486 part 12 'Particular requirements for miniature circuit-breaker boards'. The cases shall be constructed of heavy gauge sheet steel, in such a manner as to afford rigidity and maximum ease of wiring for full size circuit and main cables.

The cover shall be provided with an efficient gasket or alternatively designed with generous overlapping edges to prevent the ingress of dust. Components shall not be manufactured from zinc alloy in conjunction with sheet steel where they are relied upon for earth continuity.

Where the cover is required to be lockable, cylinder type locks shall be provided, having two keys per lock. All locked distribution boards shall be handed to the Engineering Supervisor on completion of the works. The cases shall be provided with detachable cable/conduit terminating plates, which shall be reversible and interchangeable from top to bottom.

All screws and nuts used in the construction of the case shall be fitted with shakeproof washers and care taken to ensure efficient earth continuity. An external earthing terminal with cable socket shall be fitted.

All MCB banks shall be fitted to frames, with robust locking plates provided to ensure the frames rigidly in the fixed position.

The banks shall be so spaced to obviate the necessity for insulating barriers, but protection shall be provided by means of insulating shields to prevent accidental contact with main bus-bars and incoming mains cable.

Bus-bars shall be of high conductivity, hard drawn copper conductors connected to the MCB contacts by means of spring washered screws or bolts, unless plug-in type MCB's are specified.

Neutral bars shall be similar to the main bus-bars and shall have two screw terminals per way for rating of 30 amps or over. Single screw connections will be allowed for capacities up to 30 amps. The neutral bars shall have one terminal for each MCB within the board, and connection of conductors to the neutral bar shall be in the same order as the MCB ways.

Where installations are carried out with cables with a protective conductor, all distribution boards shall also contain internal earthing bars similar to the neutral bars detailed above, with one terminal for each MCB within the board. Earthing conductors shall be connected in the manner described for neutral conductors to neutral bars.

Where a main integral isolating switch is provided in an MCB case it shall be arranged to isolate incoming live and neutral main cables from the bus-bars. The isolator switch shall be rated at 500 volts and of the quick make-and break pattern with positive action. Incoming and outgoing terminals shall be fitted with two clamping screws and outgoing conductors to the bus-bars shall be high conductivity hard drawn copper rods.

Isolating switches shall comply with IEE Regulations, Part 537, and shall be capable of carrying their full rated load continuously and shall 'make' or 'break' their full rated load without undue burning of the contacts.

c) Miniature Circuit Breakers (MCB's)

All MCB's shall have movements which are positive in both directions (make and break) so as to enable units to be closed decisively by the operation of the handle, and to be able to assume the 'OFF' position unless the contacts are definitely separated, to safeguard against false indications.

The handle shall be trip free to make it impossible for the operator to hold the breaker in the closed position under faulty conditions. The operating mechanism and arc chambers of the circuit breaker shall be separated from the terminals and fixing screws.

Terminal identification shall be readily discernable as viewed from the front of the board with automatic and clear signal identification for both 'ON' and 'OFF' position.

All terminals shall be readily accessible from the front and each wiring chamber shall be closed by a screw fixed cover which protects the terminals and prevents dust from settling on the insulation.

Where the full capacity of a distribution board is not required the electrical Contractor shall fix blanking plates in the vacant MCB housings. All MCB's shall be rated at 500 volts minimum, and comply with BS 3871 "Miniature and moulded case circuits breakers" and 4752 part 1, "Circuit breakers"

64. LABELLING AND ENGRAVING

a) Labelling

All fused-switch units, switch fuses, switches, bus-bar chambers, distribution boards etc., and all items of equipment on the main panel shall be identified in accordance with **Section 514 of the IEE Regulations** and shall have securely fitted externally a white 'Traffolyte', 'Formica' or other approved plastic laminate label engraved with 6 mm high black letters detailing the function of the equipment and any reference number.

Red, Yellow, Blue, Black & Green plastic laminate phase discs shall be fixed inside all switchgear and distribution boards to indicate to which phase of the supply the various circuits are connected. The colour rings shall comply with **Part 524 of the IEE Regulations**.

Each TP or TP & N item of switchgear shall have fitted on the cover a white plastic laminate label having 'CAUTION' - 415 VOLTS' engraved in 10 mm high red lettering.

b) Engraving

The electrical Contractor shall allow for engraving of all switched fused spurs, double pole switch accessories and any other accessories which are customarily required.

The accessory plate shall be engraved in either black or red, capital letters 5 mm high, detailing and appliance or equipment being supplied by the accessory e.g., 'WATER PUMP' etc.

65. MOUNTING HEIGHTS

The approximate position of main switchgear, control equipment distribution boards, fittings and accessories shall be as indicated on the Drawings. Actual positions shall be determined on site by the Engineer.

Unless otherwise stated on the relevant drawings or directed by the Engineer the following mounting heights of all accessories above finished floor level shall be adhered to: -

- i. Lighting Switches - **1400 mm to center**
- ii. Socket Outlet and Spur - **300 mm to center (or 150 mm above work top level to center)**
- iii. Distribution Boards - **1800 mm to lower edges.**

All groups of accessories shall be in line either vertically or horizontally or as specified.

66. LUMINAIRES

All Luminaires shall be of the manufacture, size and type specified and shall comply in all respects to BS 4533 "Electric Luminaires".

The electrical Contractor shall supply and install all luminaires including lamps, lamp holders, control gear, capacitors, glassware, diffusers or other attachments, heat resistant internal cables, fuses and terminals and all necessary suspension gear. In case where Luminaires are supplied by the client the Contractor shall deliver to site, store, install, commission and set to work.

Unless otherwise stated, indoor luminaires shall be suitable for **Class 1 normal indoor environments**, giving a degree of protection against ingress of moisture or dust.

All Luminaires shall be assembled and installed in accordance with the respective manufacturer's instructions/recommendations, in the position and mounting heights specified.

Luminaires shall not be installed under dirty and hazardous site conditions, and any damage or deterioration to luminaires installed under these conditions shall be made good by the electrical Contractor.

The Luminaires shall be cleaned free of dust and dirt after completion of the installation. Where dirt, dust, corrosion or other conditions cause imperfections in the luminaires, they shall be replaced.

Luminaires, diffusers, attachments or glassware etc., shall be properly stored to final erection, in such a manner as to avoid damage of any kind.

Luminaire fixings shall generally be suitable for direct connection to conduit boxes or as otherwise specified. Luminaires not provided with suitable BESA box shall be modified as necessary.

Where a flexible cord supports, or partly supports, a luminaire the maximum mass supported by the cord shall not exceed the values set out in **IEE Regulations 522.8**

The minimum cross-section area flexible cord to be employed shall be 0.75mm².

Specified attention shall be given to Chapter 52 of the IEE Regulations, particularly Regulation 521-5 and 521-6, Appendices 1 to 15.

Pendant tungsten luminaires shall be fitted with heat resistant flexible cord complying with BS 6500, capable of continuous operation with a conductor temperature of 150 degrees C. The cable shall be of the circular multi-core type, finished white, if not otherwise specified.

Ceiling mounted tungsten luminaires; spotlights and other luminaires of the category 'hot' luminaires shall be wired internally with cables suitable for continuous operation at 185-degree C. Where cable tails are provided they shall be of the heat resistant type capable of operation at 185-degree C.

Exterior luminaires, fixed to the walls of buildings etc., shall be wired such that final circuit wiring terminates within the luminaire. All final circuit cables so installed shall be provided with heat resistant sleeves from the connection point within the luminaire for a distance of 300 mm.

All fluorescent and other discharge luminaires shall be provided with an integral fused connector block. The rating of the fuse shall be in accordance with the manufacturer's instructions to protect the internal wiring of the luminaire and to provide discrimination between final circuit protection and luminaire protection.

All recessed and semi-recessed luminaires in ceilings shall be connected by three core 0.75 mm² high temperature flexible cord from the terminals of the luminaires to a plug-in ceiling rose fixed and connected to an accessible outlet box in the wiring system, within the suspended ceiling immediately above the luminaire. The ceiling rose shall be accessible via the opening provided in the ceiling.

The electrical Contractor shall ensure that the methods of suspension for luminaires are electrically and mechanically sound.

Luminaires suspended by means of tubes shall be fitted to ball joints allowing a swing of at least 20 degrees all round. Reliable earthing between the fixed and moving parts shall be provided by means of a flexible braided copper tape.

Fluorescent luminaires shall be provided with a minimum of two fixings, except in the case of recessed modular luminaires or surface-mounted luminaires exceeding 300 mm in width, where four number fixings (one from each corner) shall be provided by means of conduit drops or threaded rods.

Normally visible luminaires support shall be conduit. All fluorescent luminaires shall be solidly mounted with all assembly nuts, bolts and accessories made tight to prevent vibrations and noise. Anti-vibration packing shall be fitted where necessary. Luminaires mounted direct to trunking shall be fixed by means of the manufacturer's recommended fixing assemblies.

Unless stated otherwise, all luminaire supports shall be fixed to the building primary structure. Luminaires shall not be supported from suspended ceiling unless otherwise specified. The electrical Contractor shall be responsible for mounting and fixing arrangements.

Break joint rings of approved colour shall be provided for all suspended luminaires and fluorescent batten luminaires where the batten is of insufficient width to cover completely the conduit box and its associated clearance hole in the ceiling.

The metalwork of all luminaires shall be effectively bonded to the earthing system in accordance with Chapter 54 of the IEE Regulations.

Care shall be taken to ensure that the internal wiring of luminaires and the cables of any fixed wiring shall not be in contact with high temperature areas in luminaires.

Lighting track shall be of the type, size, finish, number of circuits and manufacture specified and shall comply with the requirements of the relevant section of **BS.4533**. The positions of luminaires as shown on the Drawings are approximate only and exact position shall be determined after reference to the **Engineering supervisor**.

67. LIGHTING SWITCHES

Lighting switches shall be of the type, size and manufacture as specified.

Wall and ceiling switches shall comply with **BS 3676**. Wall and ceiling switches controlling A.C lighting circuits shall be rated 6 or 10 amps and be of the slow-break quick-make, type unless stated otherwise.

Where several switches on one phase are shown at one position, a ganged box shall be used.

Where switches at any location are connected to different phases, purpose-make phase barrier switches shall be installed. The phases shall be separated by means of rigidly fixed barriers and the cable for each phase shall be confined to the area enclosed by the barriers for that phase.

Switches connected to a particular phase shall have separate cover or covers fitted over each phase. The covers shall be engraved, "CAUTION 415 VOLTS".

The switch plate of the specified finish shall be fitted over phase cover to render the switch unit indistinguishable from the switches that are not phase barrier switches.

Alternatively, each gang shall have its own piping and box for each phase, physically separated from other phases with similar arrangements.

For flush position on a plastered or equivalent finish wall, the switches shall have overlapping plates.

In any places where the finish is fair-faced brickwork, the wiring shall be installed on the back of the wall and make a back entry into the accessories. Each switch in these areas shall be neatly recessed and shall incorporate an overlapping plate.

For surface-mounted positions and such Plant Rooms, Electrical Switch room etc., employing a surface-mounted system or wiring, switches shall be surface-mounted, having metal front plates of an aluminium finish, mounted in matching metal boxes.

68. SOCKET OUTLETS

All socket outlets and plugs shall be supplied and installed in accordance with the manufacture, type, sizes and finish specified.

All round pin 2A, 5A, 15A, and 30A socket outlets shall comply with the requirements of **BS 546**.

All sockets outlets shall be switched and complete with safety shutters, unless otherwise specified.

All switched sockets outlets shall be complete with steel boxes of the same manufacture, complete with earth terminal.

Assemblies shall comply fully with the requirements of the **IEE Regulations concerning the bonding** of protective conductor terminals and each such terminal shall be connected by a conductor, having a minimum cross-sectional area of 2.5 mm², to a permanent earthing terminal incorporated in the associated box providing an effective, solid connection to the earth continuity conductor of the installation.

Where the assembly does not provide a reliable electrical contact between the cover plate and box with effective connection of metal operating bars and toggles, then an insulated earthing lead shall be provided, solidly connected to the metal plate and operating bar or toggle and terminating at the fixed earthing terminal incorporated in the associated box. 13 amp sockets will generally be installed using ring circuits in accordance with **15 of the IEE Regulations**.

All plugs shall be of moulded rubber or other resilient material complying with **BS 1363 or BS 546**. The plug shall have internal cord grip. 13 amp plugs shall be fitted with cartridge fuse links to **BS 1362**. The fuse rating shall be selected to give protection to the flexible cord or cable connected.

All fuses installed within 13 Amp plug top, fused spurs, clock connections etc., shall be cartridge fuse links rated at 240 volts, **ASTA certified for compliance with BS 1362** 'General purpose fuse links for domestic and similar purposes', or **BS 464** 'Cartridge fuse links (rated at up to 5 amperes) for AC and DC service', or **BS 2950** 'Cartridge fuse-link for telecommunications and light electrical apparatus'.

All equipment which is locally fused shall have fitted fuses with characteristics which are recommended by the manufacturer of the equipment.

If any appliance or equipment suffers due to incorrect fusing of the appliances, such appliances or equipment shall be repaired or replaced at the electrical Contractor's cost, to the satisfaction of the Engineer.

69. INSPECTION AND TESTING

A visual inspection shall be made in accordance with IEE Regulations Chapter 61. References shall be made to Appendix 6 of the IEE Regulations, which is a checklist for initial inspection of installations.

The electrical installation shall be inspected and tested by the electrical Contractor in accordance with Chapter 61 of the IEE Regulations.

Where any part of installation is to be concealed within a building, fabric tests shall be made to ensure that the installation is satisfactory prior to concealment.

Upon completion of the works the whole installation shall be subjected to the tests detailed hereafter and every defect shall be noted, corrected and brought to the notice of the Engineer.

All tests shall be witnessed by the Engineer to his full satisfaction and he shall be given at least one week's notice in writing of the proposed tests.

All labour and test instruments shall be provided by the electrical Contractor and the instruments shall be correctly calibrated and certified for the limits of accuracy required and shall be operated by a competent person. If, in the Engineer's opinion, a particular instrument is not suitable, then an acceptable alternative shall be provided. The Engineer shall be at liberty to demand the use of any testing instrument or apparatus that he may reasonably consider to be necessary in the execution of the testing.

In the event of the installation failing to pass the test, the Engineer has the full authority of the Employer to deduct from the Contract Price all reasonable expenses incurred, due to him being required to attend a repetition of the test.

The following items, where relevant, shall be tested in the sequence indicated. Standard methods of testing, in respect of some of the following regulations of this section, are given in Appendix 6 of the IEE Regulations.

- i. Continuity of ring final circuit conductors.
- ii. Continuity of protective conductors, including main supplementary equipotential bonding.
- iii. Earth electrode resistance.
- iv. Insulation resistance.
- v. Insulation of site-built assemblies.
- vi. Protection of barriers or enclosures provided during erection.
- vii. Insulation of non-conducting floors and walls.
- viii. Polarity.
- ix. Earth fault loop impedance.
- x. Operation of residual current devices and fault voltage operated protected devices.

Upon completion of all tests and commissioning, two copies of detailed certificates shall be provided by the electrical Contractor to show that the equipment, materials, installation etc., have been tested and commissioned. One copy of each, duly completed and signed shall be submitted to the Engineer within 15 days of the results being obtained. The second copy of the certificates shall be retained to be included with operator and maintenance manuals. The results of the test and details of completion for the electrical test shall be detailed on the Test and Completion Certificates respectively; issued by the National Inspection council for Electrical Installation Contracting or other approved authority.

70. SUPPLY AND DISTRIBUTION

a) Metering

The K.P&L.Co. (Power Utility Company) Meter is to be located in the meter board

HT Meter from Power Utility Provider shall be as specified in the Utility provider requirements

All switch fuses, fuse switches, MCBs, MCCB's including meters shall be of reputable manufacture meeting current British standards as stipulated in the general specifications. Any other quality that does not strictly meet these standards shall not be acceptable.

b) Supply

The premise is to be fed from the HV / LV switchboard. This feeds power panels, rising mains, distribution boards and consumer units located at various load centers.

These boards feed various sub-mains boards, which in turn feed the final sub-circuits

71. LIGHTING AND SMALL POWER INSTALLATIONS

a) Installation system

With the exception of where otherwise noted on the drawings, the installation shall throughout be carried out in PVC or XLPE cables of not less than 1.5mm² copper drawn in high grade PVC conduit.

b) Lighting control system accessories

The switching arrangements for the indoor lighting shall be as indicated on the drawings.

Types of Manufacturer for accessories and fixed apparatus to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as MK, ABB,, Clipsal, Philips or Legrand but shall be subject to the approval of the Engineer.

c) Connections to fixed appliances

The Contractor shall supply and interconnect flexible cords between spur units'/outlet boxes and the appliances where flex connections are needed.

All connections shall be made by white heat-resisting PVC / XLPE flexible cords having fuse rating in accordance with the respective circuits subjected to a minimum of 1.5mm².

d) Mounting heights and locations

All mountings heights stated shall mean the heights from finished floor level to underside of the accessory.

- i. Lighting control switches - 1400mm above floor level and 100mm away from architrave. If mounted in a column they shall be located in the center.
- ii. Socket Outlets - 300mm above finished floor except for areas that are otherwise stated on the drawings.
- iii. Connection Units and Outlets - Connection units having cord outlets shall be located as to limit the length of the flex cord to approx. 600mm and be located slightly higher than the inlet on the appliances. The same applies to outlet boxes.
- iv. Conduit Boxes (General) - Where one fitting is shown in a room the box shall be in the centre (unless otherwise stated). Where two or more fittings are to be installed, they shall be half of the between two

fittings. Where one row of fittings is to be installed they shall be located in the center. Where installed between beams they shall be in between two beams. All boxes shall be with covers.

v.

e) Wall and ceiling finishing's

The Contractor is to obtain information regarding ceiling claddings before the installation is commenced as he will be held responsible if the conduit boxes as well as for switches and socket outlets, telephone etc are not installed at the right depth.

f) Lighting fittings

The Contractor shall supply, deliver to site, install and commission all the fittings.

Types of Manufacturer for light fittings and associated accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as Thorn & Philips but shall be subject to the approval of the Engineer.

Where appliance's fittings shall be supplied complete with bulbs or tubes, the tubes shall be as Thorn or Osram Manufacturers. The bulbs shall also be Phillips, Osram or GE makes. Equivalent makes may be substituted but shall be subject to the approval of the Engineer.

g) Installing and location

Details of installation and location of various fittings are as shown on relevant drawings.

Fluorescent and incandescent fittings shall, in addition to being fixed to the conduit boxes, also be fixed by means of PVC covered raw plugs (no wooden plugs) at the fixing centres.

h) Outdoor Installations

A rubber gasket shall be fitted on the conduit boxes for the outdoor fittings in order to provide a waterproof seal.

All switch panels shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as MK, ABB,, Clipsal, Philips or Legrand but shall be subject to the approval of the Engineer.

Each switch panel shall be fed from a particular phase as NOT more than one shall be allowed inside one panel. Separate conduits shall be installed to each panel.

i) Power installations

The Contractor shall include for all installations shown on the drawings and specified in the bills of quantities.

The Contractor shall satisfy himself that there is a continuous conduit, trunking and/or duct system to facilitate installation of the entire power installation and shall be held responsible where continuity does not exist.

j) Installation system

The installation system for the indoor installation shall be carried out in concealed PVC conduits, PVC ducts and surface mounting trunking. The size of the cables shall not be less than 2.5mm² for ring main circuits.

72. FIRE ALARM INSTALLATIONS (Where Applicable)

The installation for the above shall be carried out using fire-tuff 1.5mm² copper cables drawn in high-impact grade PVC conduits.

The Contractor shall ensure a continuous link-up between individual break-glass call units, automated devices, bells and the panels. Also the link between individual occupancies and the main panel that shall be located in the block shall be ensured.

The fire alarm system must be intelligent type and fully addressable.

73. STRUCTURED CABLING, SECURITY, CCTV, ACCESS CONTROL & BMS INSTALLATIONS (Where Applicable)

a) Installation system

In the bid for electrical installation, supports for all cables in the structured cabling, security, CCTV, Access Control & BMS systems shall be included.

The electrical bidder shall include for trunking, conduits etc. to ensure a continuous supply system from the telephone / ICT room / Server room to any individual outlet.

The ICT and security contractors shall do all cabling and the backbone superhighway along the vertical building riser.

The same shall have appropriate plug on points for the occupants on each floor.

Holes in structures shall be provided by the main contractor.

The conduits shall at each point terminate in deep switch-boxes as specified for lighting control switches.

b) Mounting heights and locations

Mounting heights shall be as for socket outlets.

c) Blank-off plates

All Blank off plates shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as MK, ABB,, Clipsal, Philips or Legrand but shall be subject to the approval of the Engineer.

Blank plates shall be flat type and shall match wall colour.

74. EXCLUSIONS

Exclusions (This clause DOES NOT apply for this contract)

Excluded from this Sub-Contract is;

- i. Control panels for motor-starters and internal wiring between control-panels, motors, thermostats etc.
- ii. Supply and installation, including wiring, of alarm security and equipment. This excludes conduits, draw-wires, boxes, holes in trunking system and blank-off plates, which forms part of this Sub-Contract.
- iii. All telephone system and equipment. This excludes conduits, draw-wires, boxes, holes in trunking systems and blank-off plates which forms part of this contract.

75. DEFINITIONS & INTEPRATION OF ELECTRICAL TERMS

The terms, phrases and abbreviations shall be deemed to have the following meanings wherever used hereinafter and in all contract documents.

i. Lighting Point:

"Install a lighting point complete with concealed diameter 20mm Ø H.G. PVC conduit, conduit couplers, conduit bends, Patress box, wiring in 3x1.5mm² PVC / XLPE S/C CU cables and all accessories, complete from the light point to the consumer to the light switch point but excluding the light switch".

ii. Socket Outlet:

"Install 13A power outlet comprising Trunking/concealed diameter 20mm Ø H.G. PVC conduit, conduit couplers, conduit bends, box, ring mains wiring in 6x2.5mm² PVC / XLPE S/C CU cables and all accessories including 13A switched Socket plate.
All socket outlets must have safely shutters on both live and neutral.

iii. Telephone Point:

"Install telephone cord outlet point complete with Trunking/ concealed diameter 25mm Ø H.G.PVC conduit box, and draw wire. "

All Telephone outlets must have Continuous links interlinking all the points.

iv. 20A DP Outlet:

"Install outlet for 20A DP switch comprising Trunking/ of concealed diameter 25mmØ H.G PVC conduit, wiring in 3x2.5mm² PVC / XLPE S/C CU cables,box and 20A DP switch plate with neon light and all accessories".

v. Security Alarm Call Point.

"Install outlet for security alarm call point comprising Trunking/concealed diameter 20mm Ø HG PVC conduit, draw wire and box including blanking plate.

All call points must be interconnected.

vi. Consumer Unit:

"Supply and install SP/N power consumers' unit complete with SP/N Integral isolator".

vii. Distribution Board:

"Supply and install TP/N power distribution board, complete with TP/N integral isolator."

viii. Earthing:

Protective multiple earthing to Kenya Power and Lighting Co. (K. P. & L. Co.) Standards comprising 1200mm deep-driven pure electrolytic copper earth electrode, electrode clamps, yellow/green earth lead, earth pit complete with cover and all accessories".

ix. Labelling:

"Comprehensive, concise and instructive permanent labelling of all the sub-circuits, complete with identification of the sizes of all the sub-circuit cables, permanent traffolyte identification of the board such as "DB A" and identification of the sizes of the sub-mains and their origin e.g. "Board A: Supply, 4.x16mm²; SOURCE, DB1"

x. Blanking Plates:

"Supply and install blanking plates in all the spare ways."

xi. Switched Spur Outlet:

"Install 13A fused, switched spur outlets with neon light and 5A Integral fuse complete with Concealed diameter 20mm Ø H.G PVC Conduit, box, wiring in 3x2.5mm² wiring for power supply and all accessories".

xii. Trunking:

"Supply and install 250x50mm white stove-enamelled 3-compartment metal trunking (to details shown) complete with bends, end plates cover, screws etc and all accessories.

xiii. Cooker outlet:

"Install 45A DP cooker control unit, complete with concealed box, concealed diameter 25mm Ø H.G.PVC conduit, box, wiring in 3x6.0mm² PVC / XLPE S/C CU cables and all accessories including 45A DP cooker control unit, with an integral socket fitted with neon lights, and cooker connector unit.

xiv. 32A TP outlet:

"Install outlet for 32A TP switch comprising of concealed diameter 32mmØ HG PVC conduit, wiring in 4 x 6.0+6.0mm² etc. PVC / XLPE S/C CU cables, box, 32A TP switch plate with neon light and all accessories.

xv. Specifications

All light fittings and associated accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as Thorn & Philips but shall be subject to the approval of the Engineer.

All Sockets, telephone outlets, TV outlets, switches, spur outlets, fixed apparatus and all other related accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as MK, ABB,, Clipsal, Philips or Legrand but shall be subject to the approval of the Engineer.

All Isolators and associated accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be Hager but shall be subject to the approval of the Engineer.

All Distribution boards / Consumer units and associated accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be ABB but shall be subject to the approval of the Engineer.

All Conduits and associated accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be Metro but shall be subject to the approval of the Engineer.

All conduits/ducts must be heavy gauge. Where steel pipes are specified, they must be minimum of **Class B** in strength.

xvi. Contract

The electrical contract shall be for supplying, delivering, fixing / installing, testing, commissioning and setting to work to the full satisfaction of the Engineer and the Contractor's price must include all costs for the entire process.

The installation shall be carried out strictly in accordance with the provision of the **17th Edition of Wiring regulations as published by the Institution Electrical Engineers, Great Britain**, the most current relevant **standards issued by the Kenya Bureau of Standards**, and with strict adherence to the safety requirements and **by-laws of the Kenya Power and Lighting Co. Ltd.**

All equipment and accessories supplied for the contract must be certified by the Kenya Bureau of Standards and a certificate issued upon request.

The Contractor shall ensure that the highest standards of workmanship and highest quality materials are used at all times. Inferior workmanship and low quality materials shall be rejected and replaced at the Contractors own cost.

Other than ceiling fixture accessories, light fittings etc, all the other mounting heights will be re-confirmed with the Engineer on site.

All light fittings must be completed with appropriate lamp, bulb, tube, starter, control gear, etc as applicable.

2c. PARTICULAR QUALIFICATION FOR BIDDERS – ELECTRICAL INSTALLATIONS

TABLE 01:

NOTE: All Attachments should be bound in 1No. document with fliers separating the particular sections which shall be presented as part of the Bid. **Presentation shall follow the order stated below.**

BIDDERS REQUIREMENTS			
Item	Feature	Minimum Requirements	Bidder's Response / Comment (√ or X)
A	<u>MANDATORY REQUIREMENTS FOR BID EVALUATION</u>		
A1	Company / Firm Registration Certificate	Attach Certificate	
A2	Registration with Relevant Bodies & Category as Applicable		
	(Note: For any document Listed, Documentary Evidence of the Certificate Should be attached)		
		NCA	
		LOCAL AUTHORITY	
		P.I.N. Registration Certificate	
		VAT Registration Certificate	
		Tax Compliance Certificate	
		ERC	
		Manufacturers Authorization Letter	
		OTHER (Fill in Pen)	
A3	Company Profile A detailed soft company profile indicating the principal place of business MUST be attached to the Bid (Hard Copy or Soft copy in CD / USB Flash drive)	Attach Copy	
A4	Power of attorney of the signatory of the Bid (if Joint Venture)	Attach Copy	
A5	Long Lead Items Program of Works: Bidder to attach a Proposed program (Work method and schedule), Descriptions, drawings, and charts, as necessary, which show the lead times for the long lead items timelines	Attach	
BIDDERS REQUIREMENTS			

Item	Feature	Minimum Requirements	Bidder's Response / Comment (✓ or X)
A6	Indicate Total Annual Revenue of Construction work performed in the last 3 years in KShs. <ul style="list-style-type: none"> Attach Proof of Financial Statements Attach Bank Contacts: Name, Address & Telephone Numbers of the banks that may provide references if contacted by Employer 	2023	
		2024	
		2025	
B	<u>OTHER REQUIREMENTS</u>		
B1	Brochures of Equipment's offered	Attach with all details	
B2	Financial Resources Access: <ul style="list-style-type: none"> Evidence of access to Financial Resources to meet the qualification requirements: cash in hand, lines of credit, etc. List here as appropriate & Note that Proof in Documentary Evidence may be require to be provided upon request 	Attach	
B3	Equipment Guarantee (By bidder) and warranty period specified by manufacturer Note: Minimum of 24 Months is required Note: Schedule to be attached of all equipment on warranty	Attach: Note: Warranty shall be specific from date of completion of project.	
B4	Annual Maintenance Charges <ul style="list-style-type: none"> After Expiry of DLP and Warranty Period, Indicate the proposed charges to be levied for annual maintenance of equipment & accessories NOTE: The above are to be Labour only charges excluding parts which shall be fitted only with prior approval by the client. 	1 st Year (KShs.)	<u>Kshs.</u>
		2 nd Year (KShs.)	<u>Kshs.</u>
		3 rd Year (KShs.)	<u>Kshs.</u>
B5	Foreign Currency	State Foreign currency used in the pricing (if any) and rate of exchange to KShs.	1..... (Foreign Currency) = KShs.
BIDDERS REQUIREMENTS			
Item	Feature	Minimum Requirements	Bidder's Response / Comment (✓ or X)

<p>B6</p>	<p>Response Time</p>	<p>In event of emergency, the response time shall be how many hours (Preferred is 3 Hours)</p>	<p>..... Hours</p>
<p>B7</p>	<p>Delivery Period of Equipment from Date of Award (Fill Where Applicable)</p>		
	<p>Days</p>		
	<p>Weeks</p>		
	<p>Months</p>		
	<p>Years</p>		
<p>B8</p>	<p>Delivery Period of Site Works from Date of Award (Fill Where Applicable)</p>		
	<p>Days</p>		
	<p>Weeks</p>		
	<p>Months</p>		
	<p>Years</p>		

TABLE 02:

1.11	Work of a similar nature and volume performed as Prime Contractor over the last five years. The values should be indicated in the same currency used above. Also list details of work under way or committed, including expected completion date.			
PROJECT NAME & COUNTRY	CLIENT / CONTACT PERSON	LEAD CONSULTANT	TYPE OF WORK DONE & YEAR OF COMPLETION	CONTRACT VALUE (KShs.)

TABLE 03:

1.12	Qualification and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data.		
POSITION	NAME	QUALIFICATIONS	YEARS OF EXPERIENCE IN PROPOSED POSITION
PROJECT MANAGER			
SITE FOREMAN			
OTHER(S)			

TABLE 04:

1.13 Proposed contracts and firms involved.			
SECTION OF THE WORKS	VALUE OF CONTRACT	CONTRACTOR (NAME & ADDRESS)	EXPIRIENCE IN SIMILAR WORK

TABLE 05:

1.14 Information on current litigation in which the Bidder is involved.		
OTHER PARTY(IES)	CAUSE OF DISPUTE	AMOUNT INVOLVED

TABLE 06:

1.15	Additional Requirements:	
	Bidders should provide any additional information required in these documents to fulfill the requirements thereof if applicable	

Signed (As in form of Tender) _____

Official Stamp & Date _____

**FIRE ALARM
PARTICULAR
SPECIFICATIONS**

2d. PARTICULAR SPECIFICATIONS – FIRE ALARM

The items described in the schedules to be priced are to meet the under listed minimum specifications and of the stated model or equal and approved.

STANDARDS

The Fire alarm system should follow the following standards:

- EN54:2 1998
- EN54:4 1998
- EN50130-4

BMS CONNECTION

The fire alarm system should be BMS compatible

The BMS protocol to be used is to be “BACNET IP protocol”

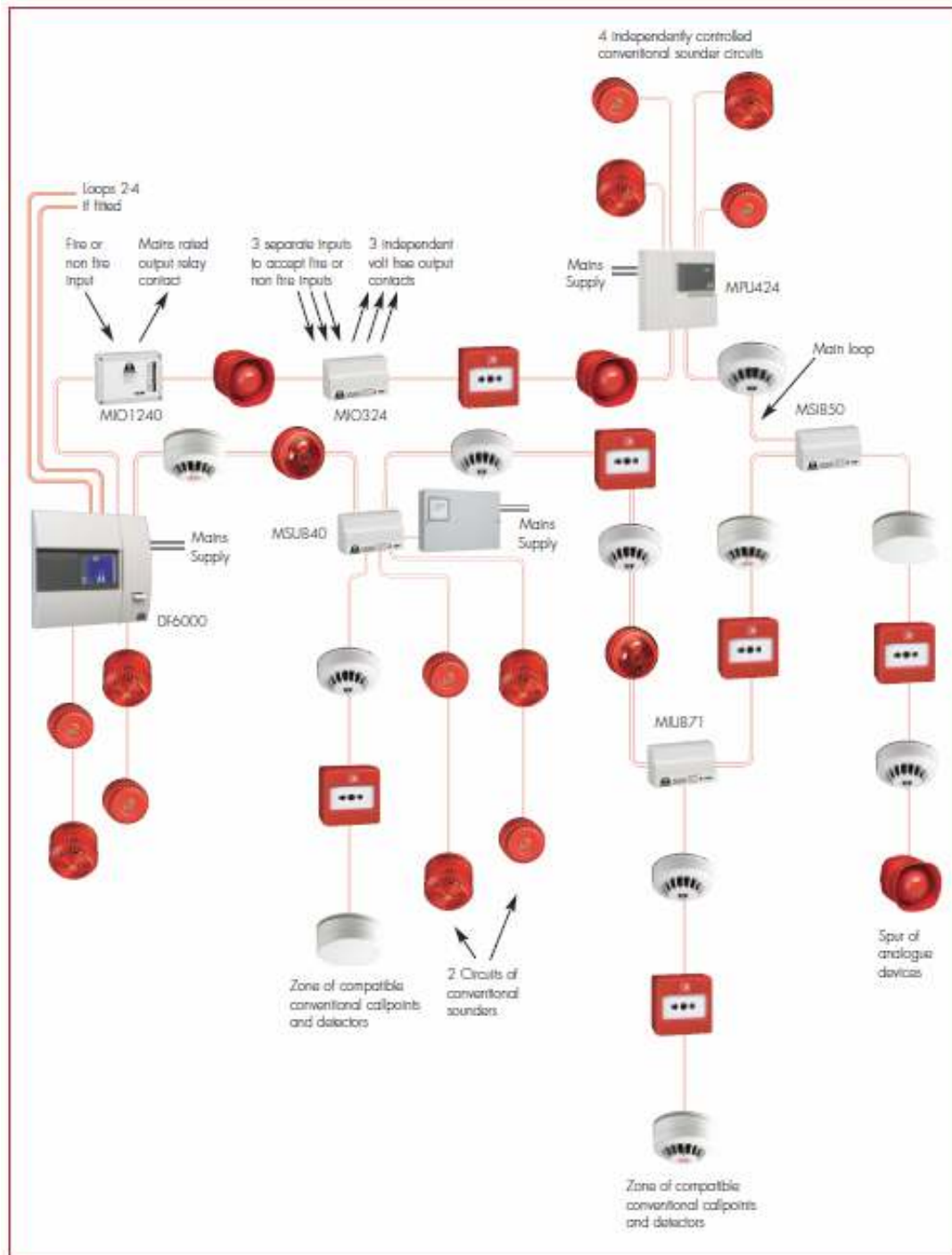
FIRE ALARM CABLING

The fire alarm cabling should follow the following guidelines:

- i.) Fire alarm cables shall be fireproof cables as FIRETEC or Prysmian FP200
- ii.) Enhanced fire resistance cables should be used where there is a requirement to ensure cable integrity over a longer period of time e.g. connection between sub-panels.
- iii.) All Fire alarm devices shall be wired in 2 Core 1.5mm² Copper cables & shall be identified by colour
- iv.) Conductors shall consist of plain annealed copper and a tinned annealed copper circuit protective conductor.
- v.) The insulation shall be of a robust cross-linked thermosetting type complying with BS EN 50363-5 type EI5. The insulation shall be RED in colour
- vi.) The cables shall be rated at 300/500V
- vii.) Fire alarm cables shall be segregated from the cables of other systems
- viii.) Fire alarm cables shall be clearly marked,
- ix.) Fire alarm cables shall be routed through parts of the building that provide minimum risk
- x.) Cables should meet the performance requirements of BS6387 Category CWZ, EN 50200 PH30 & PH60, BS EN 50200 Annex E, BS EN 60332-1-2, BS EN 60332-3-24, BS EN 61034-2 and produce less than 0.5% acidic gases when tested in accordance with BS EN 50267-2-1.
The sheath should comply with the BS7655 Type LTS3 standard.
The insulation shall comply with BS EN 50363-5 type EI5.
- xi.) The cable shall also meet the environmental standards ISO 9001 and ISO 14001.

EQUIPMENT

ADDRESSABLE FIRE ALARM ARCHITECTURE



Kindly, **tick (√)** where it meets and **cross (X)** where it does not meet specifications on the appropriate tables below.

FIRE ALARM PANEL



The Fire Alarm Panel should meet the following specifications as a minimum.

FIRE ALARM PANEL		
Feature	Minimum Requirements	Bidder's Response / Comment (√ or X)
<u>GENERAL</u>		
Type	Addressable	
Color	Panel should be Light grey in color unless otherwise stated	
Installation	Panel Should be recessed to flush with the wall unless otherwise stated	
Operation	It should operate as a standalone or part of a networked system	
Programming options	Should have powerful programming options to allow configuration over whether messages from specific panels are transmitted around the network or remain local	
Standards	EN54:2 1998 EN54:4 1998 EN50130-4	
<u>COVERS</u>		
Type	Panel should have a hinged front door to enable access to all internal components and wiring	
Access	All hinged covers on the panel should be lockable	
Locking Mechanism	Panel door should only be accessible through the use of a special key (To be supplied with Panel)	
<u>DISPLAY</u>		
Screen	Panel should come with a Touch screen with minimum dimensions as 120mm x 90mm which will provide comprehensive user information and also act as a multifunctional keypad.	
Pushbuttons	Additional dedicated pushbuttons should be allowed if required.	
Indicators	Panel should incorporate zone indication LED's to show status and spread of a fire to even a user who is familiar with the operation of the system	
<u>PRINTER</u>		
Type	Panel should come with an inbuilt printer.	
Accessibility	Printer should be in a lockable access area and change of paper should be able to be done by even non skilled personnel without exposure to any live components.	
Operation	Printer should be able to be set to print on demand or to automatically print all system events as they occur.	

<u>ELECTRICAL / POWER</u>		
System	Panel should have integral power supplies and batteries which should be supplied with the panel as a standard	
Mains	230V AC +10% / -15%	
Battery	2 x 4 A/H	
Nominal Operating Voltage	24V	
<u>DETECTION CAPACITY</u>		
Loops	The number of loops should be able to accommodate all devices in the particular system as mentioned in the bills of quantities	
Loop Addresses	Up to 150 Addresses per loop	
Standard	EN54	
Networking	Panel should be able to be networked to accommodate more devices	
<u>ALARM CAPACITY</u>		
Loop Devices	Up to 80 loop powered sounders, beacons or interfaces per loop	
Stages	3 stages of cause and effect programming per output device	
Extension	Additional sounders can be connected via additional sounder control circuits	
Sounders power	1.5A of Panel connected sounders	
<u>SYSTEM FUNCTIONALITY</u>		
Modes	Panel should have 3 modes of operation: <ul style="list-style-type: none"> • Normal Mode • User maintenance • Engineer mode 	
Access	User maintenance & Engineer mode should only be accessed by entering relevant pass codes Maintenance mode allows access to system test functions, enable and disable menus, view analogue level menus and functions such as evacuate, silence alarms and reset Engineer mode allows alteration of system configuration and programming of site specific data such as device text and sounder programming Engineer mode also allows adding and removal of devices and alteration of existing text	
Expansion	Panel should ensure simplicity of future expansion. If an additional device is added after the system has been programmed, the panel should allocate the next available address, It should not alter any of the existing address number allocation thus enabling simple updating of 'as fitted' drawings etc. Similarly if a device is removed, the relevant address should be saved as a spare address for future use, the addresses of the remaining devices are not affected	
Addressing	All devices should be soft addressed during commissioning however once allocated, addresses are locked until manually altered thus enabling simple system additions and deletions without affecting other addresses	
Short Circuit	In event of an external short circuit occurring, short circuit isolators on output of devices nearest to each side of the short circuit open thus isolating the short circuit	
Communication	Panel should drive communication from both ends of the loop	

	thus maintaining full communication with all devices	
<u>INTERFACE OPTIONS</u>		
Outputs	<ul style="list-style-type: none"> • Monitored output to fire routing equipment • Monitored output to fire protection equipment • Monitored output to fault monitoring equipment 	
Inputs	<p>Multiple Programmable remote inputs (up to 180 per panel) can be set for:</p> <ul style="list-style-type: none"> • Override of day night mode setting • Photo-thermal detectors go to thermal only • Rate of rise detectors go to fixed high temperature mode • High temperature heat detectors go to rate of rise mode • Disabling of pre assigned group of addresses 	
Others	<ul style="list-style-type: none"> • Class change • Non latching zone input • Evacuate • Zone monitor units can be used to connect zones of suitable conventional detectors or loop powered beam detectors. • Sounder circuit controllers can be used to provide additional conventional sounder circuits without wiring back to main panel • Mains rated input/output unit available • 3 way 24V rated input/output unit available • Spur isolator available to allow spurs of analogue addressable devices • Shop unit interface allows the connection of a conventional detection zone along with a power supply and 2 or more conventional sounder circuits, ideal for linking small self-contained units onto a main addressable panel • 4 or more Conventional sounder circuits provided as standard 	
<u>ENVIROMENTAL</u>		
Temp. range	IP30. -5°C to +40°C. Humidity 75% max (non-condensing)	

REPEATER PANEL

The Repeater Panel should meet the following specifications as a minimum.

REPEATER PANEL		
Feature	Minimum Requirements	Bidder's Response / Comment (√ or X)
<u>GENERAL</u>		
Type	Addressable	
Color	Panel should be Light grey in color unless otherwise stated	
Installation	Panel Should be recessed to flush with the wall unless otherwise stated	
Compatibility	Should be compatible with the main fire alarm panel	
Operation	To be connected to either the detection loop of a single panel or to a network as part of a networked system	
Standards	EN54:2 1998 EN54:4 1998 EN50130-4	
<u>COVERS</u>		
Type	Panel should have a hinged front door to enable access to all internal components and wiring	
Access	All hinged covers on the panel should be lockable	
Locking Mechanism	Panel door should only be accessible through the use of a special key (To be supplied with Panel)	
<u>DISPLAY</u>		
Screen	2 Line 40 Character backlit LCD	
Pushbuttons	Additional dedicated pushbuttons should be allowed if required.	
<u>ELECTRICAL / POWER</u>		
System	Panel should have integral power supplies and batteries which should be supplied with the panel as a standard	
Mains	230V AC +10% / -15%	
Battery	3.2A/H	
Standby	24 Hours + 30 Minutes alarm	
<u>SYSTEM FUNCTIONALITY</u>		
Modes	Panel should have 3 modes of operation: <ul style="list-style-type: none"> • Normal Mode • Supervisor • Engineer mode 	
Access	User maintenance & Engineer mode should only be accessed by entering relevant pass codes Supervisor mode allows silence, evacuate and reset commands	

	to be sent to host panel (loop connected) or to network (network connected) Engineer mode enables password to be changed if required and allows access to text download menu	
Networking	When connected to network, all text is transmitted via network, changes to other network panels update automatically When connected to a detector loop, text for host is downloaded to repeater and updated manually as required	
Indication	Zonal fire and fault indication is by means of 2 line LCD Display	
<u>ENVIROMENTAL</u>		
Temp. range	IP30. -5°C to +40°C. Humidity 75% max (non-condensing)	

INTERFACE INPUT / OUTPUT UNIT



The Interface input / output unit is to enable simple interfacing between the fire alarm system and other equipment such as Basement mechanical ventilation fans, fire escape pressurization systems or access control systems.

The inputs should be fully monitored for open and short circuits.

The Interface Input/output unit should meet the following specifications as a minimum.

INTERFACE INPUT/OUTPUT UNIT		
Feature	Minimum Requirements	Bidder's Response / Comment (✓ or X)
<u>GENERAL</u>		
Type	Addressable	
Color	White in color unless otherwise stated	
Compatibility	Should be compatible with the main fire alarm panel	
Standards	EN54:2 1998 EN54:4 1998 EN50130-4	
<u>PARTICULAR SPECIFICATIONS</u>		
Inputs	3 minimum	
Outputs	3 minimum	
Output relay rating	24V DC 1A	
IP rating	IP40	
	Should consumes 3 addresses and allows separate location text for each channel of the device	
I / O Operation	All inputs and outputs operate independently of each other	
Inputs Monitoring	Inputs are monitored for open and short circuits	
Outputs programming	Outputs can be programmed for: <ul style="list-style-type: none"> • Global triggering • Triggering by specific devices or zones • Delay before activation • Pulsing or continuous operation 	
Input Functions	Input can be used to <ul style="list-style-type: none"> • Trigger a fire or fault • Trigger on evacuate • Control day/night mode • Isolate pre assigned group of addresses 	
<u>ENVIROMENTAL</u>		
Temp. range	IP30. -5°C to +40°C. Humidity 75% max (non-condensing)	

SHOP INTERFACE UNIT



The Shop Interface Unit is to enable small units with conventional fire detection to be fully integrated with a main analogue addressable fire system. It is ideal for applications such as connecting individual shop units, office suites, etc. into a main building system

The Shop Interface unit should meet the following specifications as a minimum.

SHOP INTERFACE UNIT		
Feature	Minimum Requirements	Bidder's Response / Comment (✓ or X)
<u>GENERAL</u>		
Type	Addressable	
Color	White in color unless otherwise stated	
Compatibility	Should be compatible with the main fire alarm panel	
Standards	EN54:2 1998 EN54:4 1998 EN50130-4	
<u>PARTICULAR SPECIFICATIONS</u>		
Inputs	2 minimum <ul style="list-style-type: none"> • One suitable for detectors and call points, • One for call points only 	
Output relay rating	24V DC 1A max	
Sounder Circuit Rating	400mA per circuit max	
IP rating	IP40	
Input Fault Monitoring	Open and short circuit monitored (Triggering requires specific resistance)	
Power Supply Monitoring	Monitors external volt free fault contact	
Devices	Should Accepts a zone of up to 20 compatible conventional detectors plus an unlimited number of conventional call points	
	Should use end of line monitoring to monitor zone wiring integrity	
	Call points continue to function even if detectors are removed	
	Should have facilities to accept either mixed zone of call points and detectors or for call points and detectors to be connected to separate circuits	
	Facilities for connection of a power supply which is then monitored for fault (P.S.U. requires fault contact)	
	Includes programmable changeover relay which operates in the event of fire	
	Incorporates two conventional sounder circuits powered under fire conditions via external monitored power supply	
<u>ENVIROMENTAL</u>		
Temp. range	IP30. -5°C to +40°C. Humidity 75% max (non-condensing)	

SMOKE DETECTOR (PHOTOELECTRIC)



The Photoelectric Smoke Detector should meet the following specifications as a minimum.

SMOKE DETECTOR (PHOTOELECTRIC)		
Feature	Minimum Requirements	Bidder's Response / Comment (√ or X)
<u>GENERAL</u>		
Type	Addressable	
Color	White in color	
Color Code	The logo on the detector should be colour coded to indicate the exact device type without the need to remove the detector for inspection	
Compatibility	Should be compatible with the main fire alarm panel	
Protection	In-built Short circuit Isolators	
Standards	EN54 pt7:2000 + A1:2002	
View	360° viewable LED design	
IP rating	IP40	
Area coverage	100m ²	
System wiring	Min. 1.5mm, 2 core loop or spur via a common mounting base	
Indication	360° visibility light pipe. Visible from any angle (RED LED)	
Status	Different Colors to indicate the different status of detector or LED indicates detector status by setting it to flash to confirm communication with control panel & illuminates continuously under fire conditions	
Mounting	Surface Mount	
Depth	Low profile with maximum depth as 55mm including base	
Addressing Mode	Auto Address	
Operating Voltage	18 to 30V dc	
Max standby Current	220µA	
Max alarm Current	5mA	
<u>ENVIROMENTAL</u>		
Temp. range	-20°C to +60°C. Humidity 95% max (non-condensing)	

HEAT DETECTOR

The Heat Detector should meet the following specifications as a minimum:

HEAT DETECTOR		
Feature	Minimum Requirements	Bidder's Response / Comment (✓ or X)
<u>GENERAL</u>		
Type	Addressable	
Functionality	Programmable from the panel to operate in three modes: <ul style="list-style-type: none"> • Rate of rise • Medium fixed temperature • High fixed temperature 	
Color	White in color	
Color Code	The logo on the detector should be color coded to indicate the exact device type without the need to remove the detector for inspection	
Compatibility	Should be compatible with the main fire alarm panel	
Protection	In-built Short circuit Isolators	
Standards	EN54 pt5:2000 + A1:2002	
View	360° viewable LED design	
IP rating	IP40	
Area coverage	100m ²	
System wiring	Min. 1.5mm, 2 core loop or spur via a common mounting base	
Indication	360° visibility light pipe. Visible from any angle (RED LED)	
Status	Different Colors to indicate the different status of detector or LED indicates detector status by setting it to flash to confirm communication with control panel & illuminates continuously under fire conditions	
Mounting	Surface Mount	
Depth	Low profile with maximum depth as 55mm including base	
Addressing Mode	Auto Address	
Operating Voltage	18 to 30V dc	
Max standby Current	220µA	
Max alarm Current	5mA	
<u>ENVIROMENTAL</u>		
Temp. range	-20°C to +60°C. Humidity 95% max (non-condensing)	

OPTICAL-HEAT DETECTOR

The Photo Thermal Detector should meet the following specifications as a minimum.

OPTICAL-HEAT DETECTOR		
Feature	Minimum Requirements	Bidder's Response / Comment (✓ or X)
<u>GENERAL</u>		
Type	Addressable	
Functionality	With Optical-Heat detector, sensitivity of smoke detection element varies according to changes in temperature. If temperature is stable then smoke detection sensitivity is reduced to provide enhanced false alarm rejection, if there is a significant rate of rise in temperature, smoke detection sensitivity is increased to maximum to provide earliest possible detection of fast clean burning fires	
Variance	Optical-Heat detector can be set to operate in thermal only mode	
Color	White in color	
Color Code	The logo on the detector should be color coded to indicate the exact device type without the need to remove the detector for inspection	
Compatibility	Should be compatible with the main fire alarm panel	
Protection	In-built Short circuit Isolators	
Standards	EN54 pt5:2000 + A1:2002 EN54 pt7:2000 + A1:2002	
View	360° viewable LED design	
IP rating	IP40	
Area coverage	100m ²	
System wiring	Min. 1.5mm, 2 core loop or spur via a common mounting base	
Indication	360° visibility light pipe. Visible from any angle (RED LED)	
Status	Different Colors to indicate the different status of detector or LED indicates detector status by setting it to flash to confirm communication with control panel & illuminates continuously under fire conditions	
Mounting	Surface Mount	
Depth	Low profile with maximum depth as 55mm including base	
Addressing Mode	Auto Address	
Operating Voltage	18 to 30V dc	

Max standby Current	220 μ A	
Max alarm Current	5mA	
<u>ENVIROMENTAL</u>		
Temp. range	-20°C to +50°C. Humidity 95% max (non-condensing)	

STROBE LIGHT (CEILING MOUNT)

Strobe Light (Ceiling Mount) is a component of a fire alarm system for giving visual warning of fire.



The Strobe Light (Ceiling Mount) should meet the following specifications as a minimum.

STROBE LIGHT (CEILING MOUNT)		
Feature	Minimum Requirements	Bidder's Response / Comment (✓ or X)
<u>GENERAL</u>		
Type	Addressable	
Operating Voltage	17 to 32 V dc	
Connections	4-Way Terminal Block	
Operating method	After the initiation of alarm Strobe unit should also trigger to give light flashes at intervals of required frequencies.	
Colour	White	
IP rating	IP54	
Compatibility	Should be compatible with the main fire alarm panel	
Protection	In-built Short circuit Isolators	
Flasher	Flasher Frequency at 1/2 Hz	
Flasher Lamp	LED	
Mounting	Ceiling Mount	
<u>ENVIROMENTAL</u>		
Temp. range	-10°C to +55°C	

MANUAL CALL POINT (BREAK GLASS)

Manual Call point (or Break glass) is a device for the manual instigation of a fire alarm condition.

TYPE 01: HINGED COVER CALL POINT



The Manual Call Point (Break glass) should meet the following specifications as a minimum.

HINGED COVER CALL POINT (BREAK GLASS)		
Feature	Minimum Requirements	Bidder's Response / Comment (✓ or X)
<u>GENERAL</u>		
Type	Addressable	
Operating Voltage	24V dc	
Connections	4-Way Terminal Block	
Operating method	Glass element with plastic safety film or resettable plastic element with integral alarm indicator	
Test/reset facility	Unique key	
Colour	Red to EN54-11	
IP rating	IP42	
Compatibility	Should be compatible with the main fire alarm panel	
Protection	In-built Short circuit Isolators	
Indication	Red Status LED	
Status Notification	LED set to blink to indicate normal communication with the panel under normal conditions LED automatically illuminates if call point is triggered	
Mounting	Surface Mount / Recessed	
Depth	Maximum depth as 87mm including base for Surface mount	
<u>ENVIROMENTAL</u>		
Temp. range	-10°C to +55°C	
<u>ACCESSORIES</u>		
Semi recess Bezel	To be used for all flush call points	

Hinged Clear cover	All break glass should come with protective hinged cover designed to prevent accidental activation of call point. (as in image above)	
Resettable Plastic Element	All Call points should come with a Resettable plastic element which is designed to replace the standard glass element for speed and simplicity of resetting after activation. The Resettable element should contain a high visibility flag which along with the high visibility front mounted LED provides clear indication of when the call point has been triggered	
Replacement Test Key	All Call Points Should be supplied with a test key. This will be used to test the call point as well as to open the call point for installation purposes or to replace the element.	
Replacement Glass Elements	Each Call point should come with a spare glass element to be handed over to the system owner for replacement in future.	

TYPE 02: PULL RESETTABLE CALL POINT



The Pull Resettable Manual Call Point (Break glass) should meet the following specifications as a minimum.

PULL RESETTABLE CALL POINT (BREAK GLASS)		
Feature	Minimum Requirements	Bidder's Response / Comment (√ or X)
<u>GENERAL</u>		
Type	Addressable	
Operating Voltage	15.2 to 19.95 V dc	
Connections	4-Way Terminal Block	
Operating method	Initiation of alarm is by first lifting the upper door marked "LIFT THEN PULL HANDLE" then pull the alarm handle Activation is by switching on a toggle switch done by the alarm handle. Resetting of the toggle switch can only be done by accessibility through a Unique Key on the device. No replacement parts needed.	
Test/reset facility	Unique key	
Colour	Red to EN54-11	
IP rating	IP42	
Compatibility	Should be compatible with the main fire alarm panel	
Protection	In-built Short circuit Isolators	
Indication	Status LED's	
Status Notification	Green LED – Flashes when Polled	

	Red LED – Flashes when in Alarm Both Red & Green – Glow steady When in alarm (Standalone)	
Mounting	Surface Mount / Recessed	
Depth	Maximum depth as 87mm including base for Surface mount	
<u>ENVIROMENTAL</u>		
Temp. range	0°C to +49°C	

WALL SOUNDER BEACON & FLASHER UNIT (COMBINED)

Wall Sounder Beacon & Flasher Unit is a component of a fire alarm system for giving both an audible and visual warning of fire.



The Wall Sounder Beacon & Flasher Unit should meet the following specifications as a minimum.

WALL SOUNDER BEACON & FLASHER UNIT (COMBINED)		
Feature	Minimum Requirements	Bidder's Response / Comment (√ or X)
<u>GENERAL</u>		
Type	Addressable	
Operating Voltage	17 to 32 V dc	
Connections	4-Way Terminal Block	
Operating method	After Initiation of alarm Sounder should come on to produce audible sound at required levels and flasher unit should also trigger to give light flashes at intervals of required frequencies.	
Colour	Red to EN54-11	
IP rating	IP42	
Compatibility	Should be compatible with the main fire alarm panel	
Protection	In-built Short circuit Isolators	
Tone	To be settable at panel <ul style="list-style-type: none"> • Continuous 984Hz • Pulsed 984 / 0Hz pulse 1Hz • Two Tone 644 / 984Hz @ 1Hz cycle • Slow whoop 500-1200Hz in 3.5 seconds / 0.5secs gap 	
Volume @ ± 3dB	To be settable at panel <ul style="list-style-type: none"> • Low volume : 92dB @ <6.5mA • Medium volume : 97dB @ <7.5mA • High volume : 100dB @ <8.5mA 	
Flasher	Flasher Frequency at 1/2 Hz	

Flasher Lamp	LED	
Mounting	Wall Mount	
<u>ENVIROMENTAL</u>		
Temp. range	-10°C to +55°C	

2e. PARTICULAR QUALIFICATION FOR BIDDERS – FIRE ALARM

TABLE 01:

NOTE: All Attachments should be bound in 1No. document with fliers separating the particular sections which shall be presented as part of the Bid

BIDDERS REQUIREMENTS			
Item	Feature	Minimum Requirements	Bidder's Response / Comment (√ or X)
A	<u>MANDATORY REQUIREMENTS FOR BID EVALUATION</u>		
A1	Company / Firm Registration Certificate	Attach Certificate	
A2	Registration with Relevant Bodies & Category as Applicable		
	(Note: For any document Listed, Documentary Evidence of the Certificate Should be attached)		
		NCA	
		LOCAL AUTHORITY	
		P.I.N. Registration Certificate	
		VAT Registration Certificate	
		Tax Compliance Certificate	
		Manufacturers Authorization Letter	
		OTHER (Fill in Pen)	
A3	Company Profile A detailed soft company profile indicating the principle place of business MUST be attached to the Bid (Hard Copy or Soft copy in CD / USB Flash drive)	Attach Copy	
A4	Power of attorney of signatory of Bid (if Joint Venture)	Attach Copy	
A5	Long Lead Items Program of Works: Bidder to attach a Proposed program (Work method and schedule), Descriptions, drawings, and charts, as necessary, which show the lead times for the long lead items timelines	Attach	
BIDDERS REQUIREMENTS			

Item	Feature	Minimum Requirements	Bidder's Response / Comment (√ or X)
A6	Indicate Total Annual Revenue of Construction work performed in the last 3 years in KShs. <ul style="list-style-type: none"> Attach Proof of Financial Statements Attach Bank Contacts: Name, Address & Telephone Numbers of the banks that may provide references if contacted by Employer 	2023	
		2024	
		2025	
B	<u>OTHER REQUIREMENTS</u>		
B1	Brochures of Equipment's offered	Attach with all details	
B2	Financial Resources Access: <ul style="list-style-type: none"> Evidence of access to Financial Resources to meet the qualification requirements: cash in hand, lines of credit, etc. List here as appropriate & Note that Proof in Documentary Evidence may be require to be provided upon request 	Attach	
B3	Equipment Guarantee (By bidder) and warranty period specified by manufacturer Note: Minimum of 24 Months is required Note: Schedule to be attached of all equipment on warranty	Attach: Note: Warranty shall be specific from date of completion of project.	
B4	Annual Maintenance Charges <ul style="list-style-type: none"> After Expiry of DLP and Warranty Period, Indicate the proposed charges to be levied for annual maintenance of equipment & accessories NOTE: The above are to be Labour only charges excluding parts which shall be fitted only with prior approval by the client. 	1 st Year (KShs.)	<u>Kshs.</u>
		2 nd Year (KShs.)	<u>Kshs.</u>
		3 rd Year (KShs.)	<u>Kshs.</u>
B5	Foreign Currency	State Foreign currency used in the pricing (if any) and rate of exchange to KShs.	1..... (Foreign Currency) = KShs.
BIDDERS REQUIREMENTS			
Item	Feature	Minimum	Bidder's Response /

		Requirements	Comment (√ or X)
B6	Response Time	In event of emergency, the response time shall be how many hours (Preferred is 3 Hours) Hours
B7	Delivery Period of Equipment from Date of Award (Fill Where Applicable)		
		Days	
		Weeks	
		Months	
		Years	
B8	Delivery Period of Site Works from Date of Award (Fill Where Applicable)		
		Days	
		Weeks	
		Months	
		Years	

TABLE 02:

1.11	Work of a similar nature and volume performed as Prime Contractor over the last five years. The values should be indicated in the same currency used above. Also list details of work under way or committed, including expected completion date.			
PROJECT NAME & COUNTRY	CLIENT / CONTACT PERSON	LEAD CONSULTANT	TYPE OF WORK DONE & YEAR OF COMPLETION	CONTRACT VALUE (KShs.)

TABLE 03:

1.12	Qualification and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data.		
POSITION	NAME	QUALIFICATIONS	YEARS OF EXPERIENCE IN PROPOSED POSITION
PROJECT MANAGER			
SITE FOREMAN			
OTHER(S)			

TABLE 04:

1.13		Proposed contracts and firms involved.		
SECTION OF THE WORKS	VALUE OF CONTRACT	CONTRACTOR (NAME & ADDRESS)	EXPIRIENCE IN SIMILAR WORK	

TABLE 05:

1.14		Information on current litigation in which the Bidder is involved.		
OTHER PARTY(IES)	CAUSE OF DISPUTE	AMOUNT INVOLVED		

TABLE 06:

1.15	Additional Requirements: Bidders should provide any additional information required in these documents to fulfill the requirements thereof if applicable	

Signed (As in form of Tender) _____

Official Stamp & Date _____

2f. SPECIAL NOTES TO ALL TENDERERS

1. **CONTRACT TYPE:** This is a fixed price Contract and no claims shall be entertained on whatever ground. The Contractor is advised to include all such costs as he projects may arise in his unit rates. Any variations in the exchange rate will also be no excuse for any variations in the contract sum.
2. **COPYRIGHT:** The copyright of this specification is vested in the Engineers and no part thereof may be reproduced without their express permission, given in writing.
3. **CURRENCY:** The specifications must be priced in [Kenya Currency i.e. Shillings and Cents](#) unless Otherwise as may be expressly stated
4. **QUALIFICATION:** The tenderer shall not otherwise qualify the text of this specification. Any alteration or qualification made without authority will be ignored and the text of the specification as printed adhered to.
5. **BILLS OF QUANTITIES:** The Bills shall be read in conjunction with the Preliminaries, General Conditions of Contract, Technical Specifications and Drawings
6. **PAGES IN DOCUMENT:** The tenderer is required to check the number of pages in this document and should any be found to be missing or the figures indistinct, he/she must inform the Engineers at once and have the same rectified. Should the tenderer be in doubt the precise meaning of any item, word or figures or for any reason whatsoever observe any apparent omission of words or figures, he must inform the Engineers in order that the correct meaning may be decided upon before the date for the submission of the tenders.
7. **RATES & PRICES:** The rates and prices tendered in the priced Bills of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Plant, equipment, labor, supervision, materials, erection, maintenance, insurance, profit, together with all general risks, liabilities and obligations set out or implied in the Contract, including taxes and duties (including V.A.T). The quantities given are provisional and are for guidance only. The whole works shall be re-measured upon practical completion.
8. **FILLING OF RATES:** A rate or price shall be entered against each item in the priced Bills of Quantities, whether quantities are stated or not. The cost of items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bills of Quantities.
9. **PRICE ALLOWANCES:** The tenderer shall be deemed to have made allowances in his unit prices generally to cover items of preliminaries or additions to prime cost Sums or other items priced against the respective items.
10. **TAXES:** The tenderer's price shall include all government taxes including duties, VAT, etc. No claims whatsoever will be allowed if the tenderer does not price them as aforementioned. VAT must be calculated for all sums as filled in the document which includes contingencies, PC Sums etc.
11. **COST:** The whole cost of complying with the provision of the Contract shall be included in the Items provided in the Bills of Quantities, and where no items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.
12. **TENDER EXPENSES:** In no case will expense incurred by the tenderer in preparation of this tender be reimbursed.

13. REFERENCES: General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bills of Quantities. Reference to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bills of Quantities.

14. PC SUMMS & CONTINGENCIES: Provisional Sums and contingencies included and so designated in the Bills of Quantities shall be expended in whole or in part at the sole discretion of the Engineer.

Under no circumstances shall the contingencies in the BQ be used to cater for contractor's omissions or underquoting of items listed in the Bills.

Under no Circumstances shall the contractor claim any costs e.g. profits, attendance, etc. connected to the PC sums and contingencies if the client were to omit or relocate the same to others

15. ERRORS: No liability whatsoever will be admitted nor claim allowed in respect of errors in the completed tender due to mistakes in this document which should have been rectified in the manner described above.

Errors in pricing will be corrected by the Engineer for any arithmetic errors in computation or summation as follows: -

- a) Where there is a discrepancy between amounts in figures and in words, the amount in words will govern; and
- b) Where there is a discrepancy between the unit rate and the total amount derived from the multiplication of the unit price and the quantity, the unit rate as quoted will govern, unless in the opinion of the Engineer, there is an obviously gross misplacement of the decimal point in the unit prices, in which event the total amount as quoted will govern and the unit rate will be corrected.

16. MATERIALS ORDERING: The Contractors shall be solely responsible for the accurate ordering of materials in accordance with the drawings and these specifications.

17. CLIENT SUPPLY ITEMS: The client retains the right to decide if the contractor would supply specific fittings / items as specified and the fittings / items or whether the same shall be handled via direct procurement by the client.

Under no Circumstances shall the contractor claim any costs e.g. profits, attendance, etc. connected to the "Client Supplied" items if the client were to Omit or relocate any items noted as "Client Supply" in the Bills to others.

Signed (As in form of Tender) _____

Official Stamp & Date _____

EVALUATION CRITERIA (ELECTRICAL AND FIRE ALARMS)

A TENDER INTRODUCTION

All the returned bids were evaluated for responsiveness and compliance with tender conditions.

A responsive bid is one that conforms to the stipulated tendering procedures and also reflects as closely as possible, the actual scope of the task to be performed. The following are generally considered as indications of responsiveness:

- (i) Completion of Form of Tender
- (ii) Consistency and fairness of the unit rates
- (iii) Completion of document
- (iv) Complying with the technical specifications stipulated in the Tender document

B PRELIMINARY EVALUATION

MANDATORY EVALUATION		
ITEM	MANDATORY REQUIREMENT	
1	Filled 1. Form of Tender 2. Form of undertaking 3. Form of Bond	Client to confirm
2	Certificate of incorporation/registration /CR12	
3	Valid tax compliance certificate	
3	Valid registration with National Construction Authority (NCA1) in Electrical Works	
4	NCA Current and Valid Annual Contractor Practicing License of the Category at Least NCA 4.	
4	Copy of Current Class of licenses with the Energy & Petroleum Regulatory Authority (EPRA- A1)	
5	Business Permit	
6		
5	Company Profile (emphasis on Electrical and Fire Works)	
7	Valid County Government Electrical Licences	
8	Catalogues for Equipment (All the material specified in the BoQ) to be supplied.	
9	Signed and stamped Business Probity and Litigation History (Appendix 2)	
		RESULT

C DETAILED TECHNICAL EVALUATION

ITEM	DESCRIPTION	Marks Total 70
1	Compliance With Technical Specifications: (Note: Tender Evaluation Committee to carryout analysis showing how decision on this requirement has been arrived at) <i>Evidence of the requested items shall be attached by the Bidder for Evaluation.</i>	
<i>1a</i>	<i>Technical Compliance as per Technical Compliance Schedule Below (100% yes 22 otherwise 0 mark)</i>	22
<i>1b</i>	<i>Procurement schedule for local and long lead Equipment / items</i>	7
2	Experience of the Firm in Electrical and Fire Installations projects Above 10 years – 7 marks Above 5 years – 3 marks Less than 5 years – 1 mark Proof: • Provide Three (3No.) projects of similar nature, complexity or magnitude in the last 5 years • Attach contracts or completion certificates from respective Architects, Clients and indicate the year the project was carried out.	7
3	Qualification And Experience of the KEY Personnel Academic Qualifications and Experience (Evidence to be provided)	
<i>3a</i>	Director of the firm: - 1No. Holder of at least a Diploma with 10yrs experience in relevant Engineering field	3
<i>3b</i>	Project Managers: - 1No. Holder of at least a degree with 10yrs experience in relevant Engineering field	3
<i>3c</i>	Site Agents/Foremen 1No. Site Agents with degree or Diploma in Electrical Engineering as a minimum with minimum 5 years experience (<i>Failure to provide relevant minimum years of experience, C.Vs , employment contracts and copies of relevant certificates will score Zero</i>)	3
<i>3d</i>	Artisans with Trade Test Certificate in Relevant Field: - 5No. Holder of at least a Certificate in electrical engineering with 10yrs experience in relevant Engineering field. Must be NCA Registered. (<i>Failure to provide relevant minimum years of experience, C.Vs , employment contracts and copies of relevant certificates will score Zero</i>)	3
<i>3e</i>	Occupational Health & Safety – First Aider (Bidder to provide CVs supported by academic/professional certificates) One (1No.) First Aid Providers trainer registered under the Company or collaborating companies.	1

Financial Reports		
4a	<p>Financial capability: Analysis on Audited Financial Statements, Financial position, Bank statements, Turnover; • Average Annual Turnover equal to or greater than the expected turnover of the Bid sum: - 10Marks • Average Annual Turnover above 50% but below 100% of the expected turnover of the Bid sum: - 6Marks • Average Annual Turnover greater than 25% and below 50% of the expected turnover of the Bid sum: - 2Marks • Average Annual Turnover less 25% of the expected Turnover of the Bid sum: - 0 Marks</p>	10
4b	<p>Financial Resources: Evidence of Financial Resources (Certified Accounts, Cash at Hand, Lines of Credit, Overdraft facility, etc.) • Has financial resources to finance the projected monthly cash flow for 3 months: -6Marks • Has financial resources to finance the projected monthly cash flow for 2 months minimum: - 3Marks • Has financial resources to finance the projected equal to the projected monthly cash flow: - 1Marks • Has financial resources to finance the projected less than the projected monthly cash flow: - 0Marks</p>	6
5	<p>Adequacy of Tools and Equipment • Bidder must give proof of ownership or leasing</p>	
	Transportation Equipment	
	2No. Trucks	1
	2No. Pickups'	1
	Various Drilling, cutting, joining and welding tools	2
	Various Testing Equipment	1
TOTAL Marks		70
PASSMARK 49		

Note: Only bids that score 70% and above in the technical evaluation shall proceed to the financial evaluation stage.

D. FINANCIAL EVALUATION

Tender sums submitted by bidders who attain a score of 70% and above in the technical evaluation stage shall be analysed. Refer to Table D1 below for details:

D1. COST ANALYSIS

	EVALUATION	
	ENGINEER'S ESTIMATE	TENDERER
Tender sum		
Number of the tenderer before Analysis		
Difference from the Engineer's Estimate		
Percentage Difference from the Engineer's Estimate		
Corrected Figure (After Analysis)		
Error		
Percentage Error		

D2. AWARD ANALYSIS

Award shall be made to the bidder with the highest combined score (quality-cost). Refer to Table D2 below for details:

TENDERER	TECHNICAL SCORE (/100)	FINANCIAL SCORE(/100)	COMBINED SCORE = TECHNICAL SCORE + FINANCIAL SCORE

Note: Technical score = 70% weight,
 Financial score = 30% weight
 Combined score = Technical Score + Financial Score

SECTION 03:

Bills of Quantities

ELECTRICAL INSTALLATIONS

NOTES:

A GENERAL

- a1 The Electrical Contractor shall supply labour and supply, deliver, install, fix, connect, test, label and commission the works, clean, complete and working to every detail as described below and in the related specifications and /or on the drawings to the satisfaction of the Consulting Engineers.
- a2 Bidders must adhere to the underlisted requirements failure to which will lead to automatic disqualification. Any other makes of products or any deviation from the specifications apart from the underlisted must be subject to prior approval by the engineer in writing.
- a3 The client has the right to choose between the contractor to supply Specific items as specified or the client doing a direct procurement and the contractor to do the fix only as supplied. Under no Circumstances shall the contractor claim any costs e.g. profits, attendance, etc. if the client were to Omit any items in the Bills

B LOW VOLTAGE SWITCHBOARDS & SWITCHGEAR

- b1 Switchboards shall be Locally Prefabricated with Local Support
- b2 Switchboards shall be Blockset Type
NB: Technical product Catalogues of the specified models should be attached as part of the Bid document.
- b3 Switchboards shall be Prefabricated and shall comply with standard IEC 60439-1 as well as with derived national standards NF EN 60 439-1, VDE 0660 Part 5, DIN 41-488, BS 5486, NBN C63 439 and CEI Italy 542 concerning the construction of type-tested assemblies (TTA). Under Whose License Certificate shall be issued.
- b4 Switchboards degree of protection shall be defined in compliance with standard IEC 60529 as follows Under Whose License Certificate shall be issued.
 - IP 20 with a door or with front plates;
 - IP 31 with a door
 - IP 42 with a door and gasket kit;
 - IP 54 with a door and gasket kit.
- b5 Switchboards shall comply with standard IEC 60068.2.30 (Hot and damp climates) and with standard IEC 60068.2.11 (salt mist).
- b6 Switchboards shall be compatible with all system earthing arrangements defined in standard IEC 60984 (IT, TT or TN).
- b7 Switchboards shall have a permissible asymmetric short-circuit current of up to 100 kA for 1 second. The busbars shall be designed for mounting on insulated supports that are sufficient in number to accept the electrodynamic forces resulting from the flow of the peak asymmetric short-circuit current (220 kA peak). The different short-circuit current levels shall be:
 - 29 kA: peak value of I_{sc} 65 kA
 - 49 kA: peak value of I_{sc} 105 kA
 - 84 kA: peak value of I_{sc} 187 kA
 - 99 kA: peak value of I_{sc} 220 kA (for double busbars arrangement)
- b8 Switchboards shall have an earthing circuit including a bar that can be removed for isolation purposes during the necessary insulation measurements (removal of the bar shall require a tool).
- b9 Switchboards shall be suitable for front and/or rear connections (to be precised).

- b10 Switchboards shall have Cable entry shall be via the bottom and/or the top (to be precised).
- b11 Switchboards shall be 2200mm high, in compliance with standard DIN 41-488.
- b12 Switchboards shall have natural ventilation or controlled ventilation shall make it possible for the switchgear and control gear components to operate within the recommended temperature ranges
- b13 Switchboards shall have small depths, thus optimising layout in electrical rooms
- 399 mm up to 1600A
 - 600mm up to 6300A.
- b14 Switchboards shall make it possible to implement fixed or withdrawable distribution and motor-control sections, positioned side by side, which together form an assembly referred to as an electrical switchboard.
- b15 Switchboards selection of Switchgear and Controlgear components shall be made in compliance with standard IEC 60947. The selected switchgear and controlgear brands shall be equal to the ones mentioned in the type tests reports of the equipment.
- b16 Switchboards shall have breakers of same type/manufacturer. No mix of breakers of different types will be allowed in the system. The entire installation should be an end to end solution from one manufacturer.
- b17 Switchboards shall have digital meters on each which must have its minimum specification as PM5310 power digital meter by Schneider or equivalent. This must be able to record real time readings, Power analysis (Past & Present), Energy readings & Demand readings, Maximum Power ever experienced by the Switchboards
- b18 Switchboards shall have Phase Indicator Lights on the outer side of the panel.
- b19 Switchboards shall conform to the following mandatory requirements:
- Short Circuit Rating for the Switchboard (Certificate to be issued).
 - Short Circuit Rating for the Switchboard (Certificate to be issued).
 - ISO 9001 (Certificate to be issued).
 - ISO 14001 (Certificate to be issued).
 - Temperature Rise Test for Switchboard (Certificate to be issued).
- b20 Switchboards shall be BMS compatible with BACnet protocol
- b21 Switchboards Busbars shall be made of electrolytic copper, (type Cu ETP as defined by standard ISO 1337).
- b22 Switchboards shall ensure the safety of life and property as well as provide a high level of continuity of service. Operating safety shall be ensured by the use of compartments in compliance with standard IEC 60439-1 and according to form types 1, 2b, 3b and 4.
- b23 Switchgear Enclosures, front plates and doors of low-voltage switchboards shall be made of 2 mm thick, steel sheetmetal which shall have received an anti-corrosion coating (hot polymerised polyester/epoxy powder).
- b24 Switchgear shall be as Schneider or Terrasaki

C EARTHING

- c1 All earthing treatment where required shall be by use of appropriate compounds such as Bentonite / Marconite to achieve stipulated impedance. Under no circumstance should charcoal or common salt be used.
NOTE: Manufacturers Proof will be required
- c2 Earthing values shall be: { <(Less than) }
- Electrical = < 4 Ohms
 - ICT = < 1 Ohm

- Lightning Protection = < 7 Ohms
- c3 All earth Inspection chambers should be of HEAVY GAUGE as a minimum, with Lockable lid & should be engraved 'EARTH'. This should be as Furse
- c4 All cables with Multiple runs have their measurements catered for in the quantities. Rate should be for single Run only
- c5 All earthing Cables Colour code shall be Yellow/Green or Green

D DISTRIBUTION BOARDS & CONSUMER UNITS

- d1 All Distribution board & Consumer Units should come with the main integral isolator as specified.
- d2 Distribution board & Consumer Units incomers should have a short circuit breaking capacity of 25kA to IEC standards.
- d3 Distribution board & Consumer Units incomers should have Rated Live busbars, Neutral busbar & Earth busbar to IEC standards.
- d4 All Distribution board & Consumer Units incomers should be incorporated with ELCB's
- d5 MCB's should have a short circuit breaking capacity of 10-15kA to IEC standards.
- d6 CU's to have translucent polycarbonate cover
- d7 DB's to be as Merlin Gerlin, Terrasaki, Hager, Legrand or Equal & Approved
- d8 CU's to be as Merlin Gerlin, Terrasaki, Hager, Legrand or Equal & Approved

E CABLING

- e1 All Sub-Mains cables should be XLPE CU cables.
- e2 All Single core Submains cables shall have appropriate heat shrinks on both ends to mark respective phases. This should be catered for in the rates.
- e3 Colour code for 3-phase system cabling should be: Red for red phase, Yellow for yellow Phase, Blue for blue phase, Black for Neutral & Yellow/Green for Earth cables.
- e4 All cables with Multiple runs have their measurements catered for in the quantities. Rate should be for single Run only
- e5 All equipotential bonding of trays, trunking and all metallic components shall be done in 6mm cables complete with glands. This shall be considered for in the rates.
- e6 All HT Cabling to be as Elsewedy Cables, EAC, Kenwest or Equal & Approved
- e7 All LV Cables shall be as East African Cables, Kenwest or Equal & Approved
- e8 All cables Labelling tags shall be as Legrand and should be done on both ends

F LIGHTING

- f1 Lighting points shall as a mandatory requirement have cables from the conduit round box neatly concealed using a ceiling rose c/w a biscuit ring and upto 1 meter long 1.5mm sq 3 core white flex from the connector block to the Light fittings. Pricing for this must be included in the rates.
- f2 4 Amp cable connector blocks must be used to connect the flex cable to the concealed cables. Pricing for this must be included in the rates.
- f3 All LED Chips for Light Lamps shall be of cree model and should come with a heat sink
- f4 All LED light fittings & Drivers shall have a 50,000Hrs operation lifespan as a minimum.
- f5 All Emergency Light fixtures shall have an Emergency kit for 3hr autonomy
- f6 All Emergency Light fixtures shall work normally under normal working conditions and only use the battery in event of Power source failure.
- f7 All Emergency Light fixtures shall have an indicator light incorporated as part of the fixture showing the status of the charge on the battery
- f8 All electrical fittings must comply with the current IEEE wiring regulations
- f9 All light fittings must be complete with 3 In-line terminals (L, N, E)
- f10 All fittings must have a tolerance of 220V to 260V
- f11 All metallic parts of any light fittings must be earthed
- f12 All lamps shall be energy saving lamps or LED as specified for the particular fittings.
- f13 All Lamp holders for the E-14 & E-27 lamps must be metallic clips
- f14 Special Light fittings shall be as Thorn, Philips, Leme Lighting or Equal & Approved

G ACCESSORIES

- g1 Equipment Isolators Shall be located not more than 2 Meters from the actual equipment. This should be considered when quoting for the points.
- g2 Equipment Isolators shall be as Hager or equivalent to approval

H SWITCHES, SOCKETS & ACCESSORIES

- h1 All Switches to be as MK, Maximus or equivalent to approval
- h2 All Sockets to be as MK, Maximus or equivalent to approval
- h3 All DP Switches & Accessories to be as MK, Maximus or equivalent to approval

PROPOSED UMMA UNIVERSITY ACCOMMODATION

Electrical Installations					
4 Bed Hostels					
A11	Lighting Points, conduiting supply and install- Slab, Drops, Boxes				
ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs)	COST (Kshs)
A11.01	1 way switching lighting points in 20mmØ HG PVC Conduits.	No.	10		-
A11.02	2 way switching lighting points in 20mmØ HG PVC Conduits.	No.	0		-
A11.03	Intermediate lighting point in 20mmØ HG PVC Conduits.	No.	0		-
A11.04	Sub-total for lighting, conduiting & wiring c/f to the Price Collection Page				-
A12	Lighting Points- Supply Cabling				
A12.01	1 way switching lighting points wired in 3x 1.5mm ² PVC S/C CU Cables	No.	10		-
A12.02	2 way switching lighting points wired in 3x 1.5mm ² PVC S/C CU Cables	No.	0		-
A12.03	Intermediate lighting point wired in 3x 1.5mm ² PVC S/C CU Cables	No.	0		-
A12.04	Sub-total for lighting, conduiting & wiring c/f to the Price Collection Page				-

A13	Lighting Points- Labour wiring				
A13.01	1 way switching lighting points wired in 3x 1.5mm ² PVC S/C CU Cables drawn in 20mmØ HG PVC Conduits.	No.	10		-
A13.02	2 way switching lighting points wired in 3x 1.5mm ² PVC S/C CU Cables drawn in 20mmØ HG PVC Conduits.	No.	0		-
A13.03	Intermediate lighting point wired in 3x 1.5mm ² PVC S/C CU Cables drawn in 20mmØ HG PVC Conduits.	No.	0		-
A13.04	Sub-total for lighting, conduiting & wiring c/f to the Price Collection Page				-
A2	<u>Power Points- conduiting supply and install-Slab, Drops, Boxes</u>				
A21.01	Ring mains socket outlet points in 25mmØ HG PVC Conduits.	No.	5		-
A21.02	Instant water heater in 25mmØ HG PVC conduits	No.	1		-
A21.03	Direct controlled water heater point in 25mm Ø HG PVC Conduits from the CU via a DP switch to the 1.5Kw heater in the cylinder.	No.	0		-
A21.04	Sub-total for Power outlets, conduiting & wiring c/f to Price Collection Page				-
A2	<u>Power Points- Supply Cabling</u>				
A22.01	Ring mains socket outlet points wired in 3x2.5mm ² PVC S/C CU Cables drawn in 25mmØ HG PVC Conduits.	No.	5		-

A22.02	Instant water heater wired in 4.0 mm ² S/c CU cables in 25mmØ HG PVC conduits	No.	1		-
A22.03	Direct controlled water heater point wired in 3 x 2.5mm ² copper cable drawn in 25mm Ø HG PVC Conduits from the CU via a DP switch to the 1.5Kw heater in the cylinder.	No.	0		-
A22.04	Sub-total for Power outlets, conduiting & wiring c/f to Price Collection Page				-
A23	<u>Power Points- Labour wiring</u>				
A23.01	Ring mains socket outlet points wired in 3x2.5mm ² PVC S/C CU Cables drawn in 25mmØ HG PVC Conduits.	No.	5		-
A23.02	Instant water heater wired in 4.0 mm ² S/c CU cables in 25mmØ HG PVC conduits	No.	1		-
A23.03	Direct controlled water heater point wired in 3 x 2.5mm ² copper cable drawn in 25mm Ø HG PVC Conduits from the CU via a DP switch to the 1.5Kw heater in the cylinder.	No.	0		-
A23.04	Sub-total for Power outlets, conduiting & wiring c/f to Price Collection Page				-

A3 Lighting fittings (Supply) (All light fittings to be complete with 10W energy saver bulbs)

A3.01	1 gang 1 way plate switch	No.	8		-
A3.02	2 gang 1 way plate switch	No.	1		-
A3.03	3 gang 1 way plate switch	No.	0		-
A3.04	1 gang 2 way plate switch	No.	0		-
A3.05	2 gang 2 way plate switch	No.	0		-
A3.06	3 gang 2 way plate switch	No.	0		-
A3.07	4 gang 2 way plate switch	No.	0		-

A3.08	Intermediate switch	No.	0		-
A3.09	4ft Tube Light - 18W 4 Feet LED T8 Tube Light, and fitting, 18 Watts, Daylight colour temperature, Glass material construction, Base Type T8, suitable for operation on AC 220–240V supply.	No.	2		-
A3.10	2ft Tube Light - 9W, 2 Feet LED T8 Tube Light, Daylight colour temperature, Glass material construction, Base Type T8, suitable for operation on AC 220–240V supply.	No.	1		-
A3.11	Toilet Ball filling -ball-type light fitting complete with lamp holder, decorative glass globe, mounting canopy, suspension/ceiling attachment, internal wiring and all necessary accessories	No.	4		-
A3.12	Reading Light: 5W Wall-mounted LED reading light with adjustable arm, 4000K,	No.	4		-
A3.13	Waterproof mirror light	No.	1		-
A3.14	Sub-total for Lighting fittings (Supply) c/f to Price Collection Page				-
A4	<u>Lighting fittings (Fix)</u>				
A4.01	1 gang 1 way plate switch	No.	8		-
A4.02	2 gang 1 way plate switch	No.	1		-
A4.03	3 gang 1 way plate switch	No.	0		-
A4.04	1 gang 2 way plate switch	No.	0		-
A4.05	2 gang 2 way plate switch	No.	0		-
A4.06	3 gang 2 way plate switch	No.	0		-
A4.07	4 gang 2 way plate switch	No.	0		-

A4.08	Intermediate switch	No.	0		
A4.09	4ft Tube Light - 18W 4 Feet LED T8 Tube Light, and fitting, 18 Watts, Daylight colour temperature, Glass material construction, Base Type T8, suitable for operation on AC 220–240V supply.	No.	2		
A4.10	2ft Tube Light - 9W, 2 Feet LED T8 Tube Light, Daylight colour temperature, Glass material construction, Base Type T8, suitable for operation on AC 220–240V supply.	No.	1		
A4.11	Toilet Ball fitting -ball-type light fitting complete with lamp holder, decorative glass globe, mounting canopy, suspension/ceiling attachment, internal wiring and all necessary accessories	No.	4		
A4.12	Reading Light: 5W Wall-mounted LED reading light with adjustable arm, 4000K,	No.	4		
A4.13	Waterproof mirror light	No.	1		
A4.14	Sub-total for Lighting fittings (Fix) c/f to Price Collection Page				
A5	<u>Power outlets fittings (Supply)</u>				
ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs)	COST (Kshs)
A5.02	13A twin switched socket plate with safety shutters.	No.	5		
A5.06	32A DP controled switch with neon indicator for instant shower.	No.	1		
A5.03	32A cord outlet plate	No.	1		
A5.04	Sub-total for Power outlets fittings c/f to Price Collection Page				
A6	<u>Power outlets fittings (Fix)</u>				
A6.02	13A twin switched socket plate with safety shutters.	No.	5		

A6.06	32A DP controled switch with neon indicator for instant shower.	No.	1			-
A6.03	32A cord outlet plate	No.	1			-
A6.04	Sub-total for Power outlets fittings c/f to Price Collection Page					-
A11	Lighting Points, conduiting supply and install- Slab, Drops, Boxes					-
A12	Lighting Points- Supply Cabling					-
A13	Lighting Points- Labour wiring					-
A21	Power Points- conduiting supply and install- Slab, Drops, Boxes					-
A22	Power Points- Supply Cabling					-
A23	Power Points- Labour wiring					-
A3	Lighting fittings (Supply) (All light fittings to be complete with 10W energy saver bulbs)					-
A4	Lighting fittings (Fix)					-
A5	Power outlets fittings (Supply)					-
A6	Power outlets fittings (Fix)					-
A7	Total for Electrical Installations for 1No. Unit					-
A8	Total number of units					154

A9	Contingency				600,000
A10	Total Exclusive of VAT to electrical price summary page.				600,000

Electrical Installations					
2 Bed PWD Hostels					
A1	Lighting Points, conduiting supply and install- Slab, Drops, Boxes				Total
ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs)	COST (Kshs)
A11.01	1 way switching lighting points in 20mmØ HG PVC Conduits.	No.	8		-
A11.02	2 way switching lighting points in 20mmØ HG PVC Conduits.	No.	4		-
A11.03	Intermediate lighting point in 20mmØ HG PVC Conduits.	No.	2		-
A11.04	Sub-total for lighting, conduiting & wiring c/f to the Price Collection Page				-
A12	Lighting Points- Supply Cabling				Total
A12.01	1 way switching lighting points wired in 3x 1.5mm ² PVC S/C CU Cables	No.	8		-
A12.02	2 way switching lighting points wired in 3x 1.5mm ² PVC S/C CU Cables	No.	4		-
A12.03	Intermediate lighting point wired in 3x 1.5mm ² PVC S/C CU Cables	No.	2		-
A12.05	Sub-total for lighting, conduiting & wiring c/f to the Price Collection Page				-

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs)	COST (Kshs)
A13	Lighting Points- Labour wiring				Total
A13.01	1 way switching lighting points wired in 3x 1.5mm ² PVC S/C CU Cables drawn in 20mmØ HG PVC Conduits.	No.	8		-
A13.02	2 way switching lighting points wired in 3x 1.5mm ² PVC S/C CU Cables drawn in 20mmØ HG PVC Conduits.	No.	4		-
A13.03	Intermediate lighting point wired in 3x 1.5mm ² PVC S/C CU Cables drawn in 20mmØ HG PVC Conduits.	No.	2		-
A13.05	Sub-total for lighting, conduiting & wiring c/f to the Price Collection Page				-
A2	<u>Power Points- conduiting supply and install- Slab, Drops, Boxes</u>				Total
A21.01	Ring mains socket outlet points in 25mmØ HG PVC Conduits.	No.	3		-
A21.02	Instant water heater in 25mmØ HG PVC conduits	No.	1		-
A21.04	Direct controlled water heater point in 25mm Ø HG PVC Conduits from the CU via a DP switch to the 1.5Kw heater in the cylinder.	No.	0		-
A21.06	Water booster pump power point wired in in 25mm Ø HG PVC conduits via a DP Switch .	No.	0		-
A21.07	TV outlet points complete with draw wire in concealed 25mm Ø HG PVC conduits	No.	0		-
A21.08	Data & Voice outlet point complete with draw wire in concealed 25mm Ø HG PVC conduits	No.	0		-
A21.09	Sub-total for Power outlets, conduiting & wiring c/f to Price Collection Page				-

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs)	COST (Kshs)
A2	Power Points- Supply Cabling				Total
A22.01	Ring mains socket outlet points wired in 3x2.5mm ² PVC S/C CU Cables drawn in 25mmØ HG PVC Conduits.	No.	3		-
A22.02	Instant water heater wired in 4.0 mm ² S/c CU cables in 25mmØ HG PVC conduits	No.	1		-
A22.04	Direct controlled water heater point wired in 3 x 2.5mm ² copper cable drawn in 25mm Ø HG PVC Conduits from the CU via a DP switch to the 1.5Kw heater in the cylinder.	No.	0		-
A22.06	Water booster pump power point wired in 3 x 2.5mm ² CU cables drawn in 25mm Ø HG PVC conduits via a DP Switch .	No.	0		-
A22.07	TV outlet points complete with draw wire in concealed 25mm Ø HG PVC conduits	No.	0		-
A22.08	Data & Voice outlet point complete with draw wire in concealed 25mm Ø HG PVC conduits	No.	0		-
A22.09	Sub-total for Power outlets, conduiting & wiring c/f to Price Collection Page				-

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs)	COST (Kshs)
A23	<u>Power Points- Labour wiring</u>				Total
A23.01	Ring mains socket outlet points wired in 3x2.5mm ² PVC S/C CU Cables drawn in 25mmØ HG PVC Conduits.	No.	3		-
A23.02	Instant water heater wired in 4.0 mm ² S/c CU cables in 25mmØ HG PVC conduits	No.	1		-
A23.03	Direct controlled water heater point wired in 3 x 2.5mm ² copper cable drawn in 25mm Ø HG PVC Conduits from the CU via a DP switch to the 1.5Kw heater in the cylinder.	No.	0		-
A23.04	Water booster pump power point wired in 3 x 2.5mm ² CU cables drawn in 25mm Ø HG PVC conduits via a DP Switch .	No.	0		-
A23.05	TV outlet points complete with draw wire in concealed 25mm Ø HG PVC conduits	No.	0		-
A23.06	Data & Voice outlet point complete with draw wire in concealed 25mm Ø HG PVC conduits	No.	0		-
A23.07	Sub-total for Power outlets, conduiting & wiring c/f to Price Collection Page				-

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs)	COST (Kshs)
A3	Lighting fittings (Supply) (All light fittings to be complete with 10W energy saver bulbs)				
A3.01	1 gang 1 way plate switch	No.	5		-
A3.02	2 gang 1 way plate switch	No.	0		-
A3.03	3 gang 1 way plate switch	No.	0		-
A3.04	1 gang 2 way plate switch	No.	2		-
A3.05	2 gang 2 way plate switch	No.	2		-
A3.06	3 gang 2 way plate switch	No.	0		-
A3.07	4 gang 2 way plate switch	No.	0		-
A3.08	Intermediate switch	No.	1		-
A3.09	4ft Tube Light - 18W 4 Feet LED T8 Tube Light, and fitting, 18 Watts, Daylight colour temperature, Glass material construction, Base Type T8, suitable for operation on AC 220–240V supply.	No.	2		-
A3.10	2ft Tube Light - 9W, 2 Feet LED T8 Tube Light, Daylight colour temperature, Glass material construction, Base Type T8, suitable for operation on AC 220–240V supply.	No.	1		-
A3.11	Toilet Ball filling -ball-type light fitting complete with lamp holder, decorative glass globe, mounting canopy, suspension/ceiling attachment, internal wiring and all necessary accessories	No.	4		-
A3.12	Reading Light: 5W Wall-mounted LED reading light with adjustable arm, 4000K,	No.	2		-

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs)	COST (Kshs)
A3.13	Waterproof mirror light		1		-
	Total				-

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs)	COST (Kshs)
A4.01	1 gang 1 way plate switch	No.	5		-
A4.02	2 gang 1 way plate switch	No.	0		-
A4.03	3 gang 1 way plate switch	No.	0		-
A4.04	1 gang 2 way plate switch	No.	2		-
A4.05	2 gang 2 way plate switch	No.	2		-
A4.06	3 gang 2 way plate switch	No.	0		-
A4.07	4 gang 2 way plate switch	No.	0		-
A4.08	Intermediate switch	No.	1		-
A4.09	4ft Tube Light - 18W 4 Feet LED T8 Tube Light, and fitting, 18 Watts, Daylight colour temperature, Glass material construction, Base Type T8, suitable for operation on AC 220–240V supply.	No.	2		-
A4.10	2ft Tube Light - 9W, 2 Feet LED T8 Tube Light, Daylight colour temperature, Glass material construction, Base Type T8, suitable for operation on AC 220–240V supply.	No.	1		-
A4.11	Toilet Ball fitting -ball-type light fitting complete with lamp holder, decorative glass globe, mounting canopy, suspension/ceiling attachment, internal wiring and all necessary accessories	No.	4		-
A4.12	Reading Light: 5W Wall-mounted LED reading light with adjustable arm, 4000K,	No.	2		-
A4.13	Sub-total for Lighting fittings (Fix) c/f to Price Collection Page				-

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs)	COST (Kshs)
A5	<u>Power outlets fittings (Supply)</u>				
A5.01	13A twin switched socket plate with safety shutters.	No.	3		-
A5.02	32A DP controled switch with neon indicator for instant shower.	No.	1		-
A5.04	Sub-total for Power outlets fittings c/f to Price Collection Page				-
A6	<u>Power outlets fittings (Fix)</u>				
A6.01	13A twin switched socket plate with safety shutters.	No.	3		-
A6.02	32A DP controled switch with neon indicator for instant shower.	No.	1		-
A6.03	TV.	No.	0		-
A6.04	Data.	No.	0		-
A6.05	Sub-total for Power outlets fittings c/f to Price Collection Page				-

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs)	COST (Kshs)
A1	Lighting Points, conduiting supply and install- Slab, Drops, Boxes				-
A2	Lighting Points- Supply Cabling				-
A3	Lighting Points- Labour wiring				-
A4	Power Points- conduiting supply and install- Slab, Drops, Boxes				-
A5	Power Points- Supply Cabling				-
A6	Power Points- Labour wiring				-
A7	Lighting fittings (Supply) (All light fittings to be complete with 10W energy saver bulbs)				-
A8	Lighting fittings (Fix)				-
A9	Power outlets fittings (Supply)				-
A10	Power outlets fittings (Fix)				-
A11	Contingency				20,000
A12	Total for Electrical Installations for 2 Bed PWD Hostel Unit				-
A13	Total number of units				4
A14	Total Exclusive of VAT to electrical price summary page.				20,000

Common Services electrical Installations**Ground & First and Typical floors (common areas)**

B1	Lighting points- conduiting supply and install- Slab, Drops, Boxes				
ITEM	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B1.01	1 way switching lighting points wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the lighting DB to the individual lighting points	No.	113		-
B1.02	Ditto for emergency lighting	No.	36		-
B1.03	Ditto for toilet and kitchen extract fans.	No.	0		-
B1.04	2 way switching lighting points. wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the DB to the individual lighting points	No.	13		-
B1.05	Ditto for emergency lighting	No.	12		-
B1.06	Intermediate switching lighting points. wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the DB to the individual lighting points	No.	0		-
B1.07	Sensor controlled switching lighting points. wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the DB to the lighting points	No.	42		-
B1.08	Total for Internal Lighting points & Wiring c/f to Price Summary Page				-

B2 Lighting points-Supply Cabling					
ITEM	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B2.01	1 way switching lighting points wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the lighting DB to the individual lighting points	No.	113		-
B2.02	Ditto for emergency lighting	No.	36		-
B2.03	Ditto for toilet and kitchen extract fans.	No.	0		-
B2.04	2 way switching lighting points. wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the DB to the individual lighting points	No.	13		-
B2.05	Ditto for emergency lighting	No.	12		-
B2.06	Intermediate switching lighting points. wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the DB to the individual lighting points	No.	0		-
B2.07	Sensor controlled switching lighting points. wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the DB to the lighting points	No.	42		-
B2.08	Total for Internal Lighting points & Wiring c/f to Price Summary Page				-

B3 Lighting points -Labour wiring

ITEM	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B3.01	1 way switching lighting points wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the lighting DB to the individual lighting points	No.	113		-
B3.02	Ditto for emergency lighting	No.	36		-
B3.03	Ditto for toilet and kitchen extract fans.	No.	0		-
B3.04	2 way switching lighting points. wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the DB to the individual lighting points	No.	13		-
B3.05	Ditto for emergency lighting	No.	12		-
B3.06	Intermediate switching lighting points. wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the DB to the individual lighting points	No.	0		-
B3.07	Sensor controlled switching lighting points. wired in 3 x 1.5mm ² PVC S/C CU cables drawn in 20mm Ø HG PVC conduits running from the DB to the lighting points	No.	28		-
B3.08	Total for Internal Lighting points & Wiring c/f to Price Summary Page				-

B4 Light fittings (Supply)

ITEM	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B4.01	10A 1 gang 1way plate switch	No.	34		-
B4.02	10A1 gang 2 way plate switch	No.	22		-
B4.03	10A 2 gang 2 way switch plate	No.	17		-
B4.04	10A 2 gang 1 way switch plate	No.	0		-
B4.05	10A 3 gang 1 way switch plate	No.	0		-
B4.06	10A 3 gang 2 way switch plate	No.	17		-
B4.07	Timer Switch	No.	1		-
B4.08	SENSOR: Ceiling Surface Mount Indoor Occupational sensors: PIR detector with a 360 degree view angle and a hard shell spherical lens. The sensor/detector should have a minimum adjustable range of 15meters or more mounted at a height of 4000mm. This Should be as Honeywell, Pierlitte or equivalent to Engineers approval.	No.	27		-
B4.09	Corridors shallow recessed luminaire with circular opal diffuser and white stand-off ring, with integral HPF control gear for 16W compact LED lamp with an inbuilt sensor.	No.	165		-
B4.10	Corridors shallow recessed luminaire with circular opal diffuser and white stand-off ring, with integral HPF control gear for 16W compact flourescent lamp. As Thorn Novaline. (Emergency)	No.	50		-
B4.11	Aluminium bulkhead with hemispherical bowl, visor and ring, finished matt grey using integral gear for 18W compact flourescent lamp, for wall mounting as Thorn Equator.	No.	65		-
B4.12	External security lighting system as Thorn Piazza	No.	0		-
B4.13	External security Flood Light Rated IP66 with a photocell sensor, as Thorn Leo.	No.	0		-

ITEM	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B4.14	1200mm/1x36W HPF LED waterproof fittings as Philips	No.	10		-
B4.15	Ditto as above (emergency)	No.	3		-
B4.16	Exit; Self contained pendant Double Sided LED Exit sign with non-maintained emergency lighting for 3hours duration as OMS	No.	39		-
B4.17	Close ceiling fitting straight Batten Holder c/w light bulb.This should be White finish as Crabtree 3422.	No.	0		-
B4.18	Safety ceiling Rose C/W lamp and pendant lampholder.This should be White finish as Crabtree 5855.	No.	0		-
B4.19	1200mm/1x36W HPF bare LED tube fittings as philips.	No.	27		-
B4.20	Close ceiling fitting Straight Batten Holder with moisture proof ball fitting c/w light bulb.This should be White finish as Massive Sonia 72894/01/31.	No.	1		-
B2.23	Simple single arm wall bracket of moulded white thermoset plastic to approval c/w bulb. This should be as cabree or equal and approved.	No.	0		-
B2.24	Waterproof mirror light c/w Shaver unit and pull switch as Thorn FLST 13, Crabtree or equal and to approval. IP65	No.	0		-
B2.27	Total for Parking spaces Light fittings (Supply)c/f to Price Summary Page				-

B3 Light fittings(fix)

ITEM	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B3.01	10A 1 gang 1 way plate switch	No.	34		-
B5.02	10A1 gang 2 way plate switch	No.	22		-
B5.03	10A 2 gang 2 way switch plate	No.	17		-
B5.04	10A 2 gang 1 way switch plate	No.	0		-
B5.06	10A 3 gang 2 way switch plate	No.	17		-
B5.07	Timer Switch	No.	1		-
B5.08	SENSOR: Ceiling Surface Mount Indoor Occupational sensors: PIR detector with a 360 degree view angle and a hard shell spherical lens. The sensor/detector should have a minimum adjustable range of 15meters or more mounted at a height of 4000mm. This Should be as Honeywell, Pierlitte or equivalent to Engineers approval.	No.	27		-
B5.09	Corridors shallow recessed luminaire with circular opal diffuser and white stand-off ring, with integral HPF control gear for 16W compact LED lamp with an inbuilt sensor.	No.	165		-
B5.10	Corridors shallow recessed luminaire with circular opal diffuser and white stand-off ring, with integral HPF control gear for 16W compact flourescent lamp. As Thorn Novaline. (Emergency)	No.	50		-
B5.11	Aluminium bulkhead with hemispherical bowl, visor and ring, finished matt grey using integral gear for 18W compact flourescent lamp, for wall mounting as Thorn Equator.	No.	65		-
B5.12	External security lighting system as Thorn Piazza	No.	0		-
B5.13	External security Flood Light Rated IP66 with a photocell sensor, as Thorn Leo.	No.	0		-

ITEM	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B4.14	1200mm/1x36W HPF LED waterproof fittings as Philips	No.	10		-
B5.15	Ditto as above (emergency)	No.	3		-
B5.16	Exit; Self contained pendant Double Sided LED Exit sign with non-maintained emergency lighting for 3hours duration as OMS	No.	39		-
B5.17	Close ceiling fitting straight Batten Holder c/w light bulb.This should be White finish as Crabtree 3422.	No.	0		-
B5.18	Safety ceiling Rose C/W lamp and pendant lampholder.This should be White finish as Crabtree 5855.	No.	0		-
B5.19	1200mm/1x36W HPF bare LED tube fittings as philips.	No.	27		-
B5.20	Close ceiling fitting Straight Batten Holder with moisture proof ball fitting c/w light bulb.This should be White finish as Massive Sonia 72894/01/31.	No.	1		-
B5.21	Simple single arm wall bracket of moulded white thermoset plastic to approval c/w bulb. This should be as cabree or equal and approved.	No.	0		-
B5.22	Waterproof mirror light c/w Shaver unit and pull switch as Thorn FLST 13, Crabtree or equal and to approval. IP65	No.	0		-
B5.23	Total for Parking spaces Light fittings(fix) c/f to Price Summary Page				-

B6 Cable Raceways and Power Supply & fix

B6	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B6.01	TRUNKING: 100 x 50mm, 2 compartment stove enamelled factory fabricated metallic trunking c/w angle bends, Tees, end caps, mounting brackets & accessories to approval. Shall include equipotential bonding.	LM	8		-
B6.02	RISERS CABLE TRAY (POWER): 300 x 50mm galvanised steel factory fabricated Cable tray c/w angle bends, Tees, end caps, mounting brackets & accessories to approval. Shall include equipotential bonding.	LM	55		-
B6.03	RISERS CABLE TRAY (DATA): 300 x 50mm galvanised steel factory fabricated Cable tray c/w angle bends, Tees, end caps, mounting brackets & accessories to approval. Shall include equipotential bonding.	LM	55		-
B6.04	HORIZONTAL CABLE TRAY (POWER): 300 x 50mm POWDER COATED WHITE fabricated Cable tray c/w angle bends, Tees, end caps, mounting brackets & accessories to approval. Shall include equipotential bonding.	LM	400		-
B6.05	HORIZONTAL CABLE TRAY (DATA): 300 x 50mm POWDER COATED GREY fabricated Cable tray c/w angle bends, Tees, end caps, mounting brackets & accessories to approval. Shall include equipotential bonding.	LM	0		-
B6.06	CABLE LADDER (POWER): 500 x 100mm POWDER COATED WHITE factory fabricated Cable Ladder c/w angle bends, Tees, end caps, mounting brackets & accessories to approval. Shall include equipotential bonding.	LM	0		-
B6.07	CABLE TIES: Allow for cable ties at one meter interval along the cable trays and cable ladders above.	Item	6		-
B6.08	2 x 100mm heavy gauge PVC sleeves for power and data where cables have to go through slabs & beams and Interconnecting ducts	LM	249		-

B6.09	Total for Trunking installations and Power Supply c/f Price Summary Page					-
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B7 Power points -conducting supply and install- Slab, Drops, Boxes

ITEM	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B7.01	Socket outlets in 3x 2.5mm ² PVC CU cables drawn in 20mm HG PVC conduits.	No.	111		-
B7.02	CCTV outlet points in 25mm HG PVC conduits c/w draw wire.	No.	75		-
B7.03	Fire alarm outlet points in 25mm HG PVC conduits c/w draw wire.	No.	65		-
B7.04	TV outlet points in 25mm HG PVC conduits c/w draw wire.	No.	27		-
B7.05	Data outlet points in 25mm HG PVC conduits c/w draw wire.	No.	10		-
B7.06	Instant heater outlets I wired in 3x 4.0 mm ² PVC CU cables drawn in 25mm HG PVC conduits.	No.	0		-
B7.07	Three phase outlet points wired in 6mm sq 4C armoured cu cables drawn in 38 mm Ø for basement sump.	LM	0		-
B7.08	Cable glands for cable above.	No.	0		-
B7.09	Cable glands for cable above.	No.	0		-
B7.10	Three phase outlet points wired in 6mm sq 4C armoured cu cables drawn in 38 mm Ø for hosereelpumps Isolators from the DB.	LM	0		-
B7.11	Cable glands for cable above.	No.	0		-

ITEM	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B7.12	Cable lugs for cable above.	No.	0		-
B7.13	Three phase outlet points wired in 4mm sq 4C armoured cu cables drawn in 38 mm Ø for portable water booster pumps.	LM	0		-
B7.14	Cable glands and cable lugs for cable above.	LM	0		-
B7.15	Cable glands and cable lugs for cable above.	LM	0		-
B7.16	Three phase outlet points wired in 16mm sq 4C armoured cu cables drawn in 38 mm Ø for Lifts Isolator.	LM	0		-
B7.17	Cable glands and cable lugs for cable above.	LM	0		-
B7.18	Cable glands and cable lugs for cable above.	LM	0		-
B7.19	Total for Power Points & Wiring c/f Price Summary Page				-

B8 Power points -Supply Cabling

ITEM	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B8.01	Socket outlets in 3x 2.5mm ² PVC CU cables drawn in 20mm HG PVC conduits.	No.	111		-
B8.02	TV outlet points in 25mm HG PVC conduits c/w draw wire.	No.	0		-
B8.03	Data outlet points in 25mm HG PVC conduits c/w draw wire.	No.	10		-
B8.04	Instant heater outlets I wired in 3x 4.0 mm ² PVC CU cables drawn in 25mm HG PVC conduits.	No.	0		-
B8.05	Three phase outlet points wired in 6mm sq 4C armoured cu cables drawn in 38 mm Ø for basement sump.	LM	0		-
B8.06	Cable glands for cable above.	No.	0		-
B8.07	Cable glands for cable above.	No.	0		-
B8.08	Three phase outlet points wired in 6mm sq 4C armoured cu cables drawn in 38 mm Ø for hosereelpumps Isolators from the DB.	LM	0		-
B8.09	Cable glands for cable above.	No.	0		-
B8.10	Cable lugs for cable above.	No.	0		-
B8.11	Three phase outlet points wired in 4mm sq 4C armoured cu cables drawn in 38 mm Ø for partable water booster pumps.	LM	0		-
B8.12	Cable glands and cable lugs for cable above.	LM	0		-
B8.13	Cable glands and cable lugs for cable above.	LM	0		-
B8.14	Three phase outlet points wired in 16mm sq 4C armoured cu cables drawn in 38 mm Ø for Lifts Isolator.	LM	0		-
B8.15	Cable glands and cable lugs for cable above.	LM	0		-
B8.16	Cable glands and cable lugs for cable above.	LM	0		-

B8.17	Total for Power Points & Wiring c/f Price Summary Page				-
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B9 Power points- Labour Wiring

ITEM	DESCRIPTION	Unit	QTY	RATE (Kshs.)	COST (Kshs.)
B9.01	Socket outlets in 3x 2.5mm ² PVC CU cables drawn in 20mm HG PVC conduits.	No.	111		-
B9.02	TV outlet points in 25mm HG PVC conduits c/w draw wire.	No.	27		-
B9.03	Data outlet points in 25mm HG PVC conduits c/w draw wire.	No.	10		-
B9.04	Three phase outlet points wired in 6mm sq 4C armoured cu cables drawn in 38 mm Ø for basement sump.	LM	0		-
B9.05	Cable glands for cable above.	No.	0		-
B9.06	Cable glands for cable above.	No.	0		-
B9.07	Three phase outlet points wired in 6mm sq 4C armoured cu cables drawn in 38 mm Ø for hosereelpumps Isolators from the DB.	LM	0		-
B9.08	Cable glands for cable above.	No.	0		-
B9.09	Cable lugs for cable above.	No.	0		-
B9.10	Three phase outlet points wired in 4mm sq 4C armoured cu cables drawn in 38 mm Ø for partable water booster pumps.	LM	0		-
B9.11	Cable glands and cable lugs for cable above.	LM	0		-
B9.12	Cable glands and cable lugs for cable above.	LM	0		-
B9.13	Three phase outlet points wired in 16mm sq 4C armoured cu cables drawn in 38 mm Ø for Lifts Isolator.	LM	0		-
B9.14	Cable glands and cable lugs for cable above.	LM	0		-
B9.15	Cable glands and cable lugs for cable above.	LM	0		-

B9.16	Total for Power Points & Wiring c/f Price Summary Page				-
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B10 Power outlets fittings (Supply)

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs.)	COST (Kshs.)
B10.01	13A twin switched socket plate with safety shutters.	No.	94		-
B10.02	15 A twin switched socket plate with safety shutters.	No.	14		-
B10.03	32A DP controled switch with neon indicator for water heater	No.	0		-
B10.04	32A cord outlet plate	No.	0		-
B10.05	Telephone socket plate as RJ 45	No.	10		-
B10.06	TV co-axial socket plate	No.	10		-
B10.07	Sub-total for Power outlets fittings c/f to Price Collection Page				-

B11 Power outlets fittings (Fix)

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs.)	COST (Kshs.)
B11.01	13A twin switched socket plate with safety shutters as MK.	No.	94		-
B11.02	15A twin switched socket plate with safety shutters as MK.	No.	14		-
B11.03	32A DP controled switch with neon indicator for water heater	No.	0		-
B11.04	32A cord outlet plate	No.	0		-
B11.05	Telephone socket plate as RJ 45	No.	10		-
B11.06	TV co-axial socket plate	No.	10		-
B11.07	Sub-total for Power outlets fittings c/f to Price Collection Page				-

B12 Sub - mains and distribution

ITEM	DESCRIPTION	Unit	Qty	RATE (Kshs.)	COST (Kshs.)
B12.01	DB CS 001 (Main commons) 8Way 100A rated TPN SURFACE Wall mounted Distribution Board	No.	10		-
B12.02	10A SP MCB	No.	90		-
B12.03	20A SP MCB	No.	30		-
B12.04	32A SP MCB	No.	36		-
B12.05	40A SP MCB	No.	7		-
B12.06	SP Blanking plate	No.	18		-
B12.07	TP Blanking plate	No.	1		-
B12.08	Cable to DB Above: 10mm sq 4-Core PVC SWA PVC XLPE CU Cable	LM	75		-
B12.09	Cable glands for above cables	No.	12		-
B12.10	Cable lugs for for above cables	No.	48		-
B12.11	DB P1 (Pumps): 6Way 100A rated TPN SURFACE Wall mounted Distribution Board	No.	1		-
B12.12	10A SP MCB	No.	0		-
B12.13	20A SP MCB	No.	0		-
B12.14	32A TP MCB	No.	3		-
B12.15	40A SP MCB	No.	0		-
B12.16	SP Blanking plate	No.	2		-
B12.17	TP Blanking plate	No.	0		-
B12.18	Cable to DB Above: 10mm sq 4-Core PVC SWA PVC XLPE CU Cable	LM	5		-
B12.19	Cable glands for above cables	No.	2		-
B12.20	Cable lugs for for above cables	No.	8		-

B12.21	DB L1 (Lifts): 8Way 100A rated TPN SURFACE Wall mounted Distribution Board	No.	0		-
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ITEM	DESCRIPTION				AMOUNT (Kshs.)
B12.22	10A SP MCB	No.	0		-
B12.23	20A SP MCB	No.	0		-
B12.24	32A SP MCB	No.	0		-
B12.25	40A TP MCB	No.	0		-
B12.26	SP Blanking plate	No.	0		-
B12.27	TP Blanking plate	No.	0		-
B12.28	Cable to DB Above: 10mm sq 4-Core PVC SWA PVC XLPE CU Cable	LM	0		-
B12.29	Cable glands for above cables	No.	0		-
B12.30	Cable lugs for for above cables	No.	0		-
B12.31	CONTACTOR c/w OVERRIDE: 20A Rated 240V 2 Pole AC1 contactor as Telemechanique for the control of external lights CU. This should be c/w enclosure and manual override switch.	No.	1		-
B12.32	10A SP MCB	No.	0		-
B12.33	20A SP MCB	No.	0		-
B12.34	32A SP MCB	No.	0		-
B12.35	40A TP MCB	No.	0		-
B12.36	SP Blanking plate	No.	0		-
B12.37	RISING MAINS 02 to CU's Above: 10mm sq PVC 3 Core XPLE flexible CU Cables.	LM	0		-
B12.38	Cable glands for above cables	No.	0		-
B12.39	Cable lugs for for above cables	No.	0		-
B12.40	LABELLING (Internal): Labelling of Consumer Units with its final sub circuits. Should be done in Traffolytte labels properly anchored on the specific devices and waterproof Printed tags for the cables & MCB's	Item	1		-

B12.41	Sub-total c/f to GROUND FLOOR WORKS PRICE COLLECTION PAGE					-
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B13	Commons Collection page				
ITEM	DESCRIPTION				AMOUNT (Kshs.)
B13.01	Lighting points- conduiting supply and install- Slab, Drops, Boxes				-
B13.02	Lighting points-Supply Cabling				-
B13.03	Lighting points -Labour wiring				-
B13.04	Light fittings (Supply)				-
B13.05	Light fittings(fix)				-
B13.06	Cable Raceways and Power Supply & fix				-
B13.07	Power points -conduiting supply and install- Slab, Drops, Boxes				-
B13.08	Power points -Supply Cabling				-
B13.09	Power points- Labour Wiring				-
B13.10	Power outlets fittings (Supply)				-
B13.11	Power outlets fittings (Fix)				-
B13.12	Sub - mains and distribution				-
B13.14	Rooftop Aircraft Beacon				
B13.15	Contingency				350,000
B13.16	Total Exclusive of VAT to electrical price summary page.				350,000

C MAIN POWER DISTRIBUTION - SWITCHGEAR, RISING MAINS, EARTHING & CABLING

C1	Switchgear				Total
ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
C1.01	<p>Commons LV Board : Custom made LV Meterboard. This should be as per the schematic drawing & have the following specifications:</p> <ul style="list-style-type: none"> • As Terrasaki to Approval • Free Standing Panel • Form 2b Panel • Single side view & Access • The Meterboard should comprise of a 3-Phase 80kA Surge Arrestor Type Dehnventil DVTT 225 or equivalent complete with appropriate protection • Verified Assembly as per IEC 61439-1&2 • The Panel to be fabricated using a minimum of 16 SWG or 2mm thick steel sheets • Should include phase indicator LED lights & all associated instrumentation • Should include Digital Energy Meter as PM5310 or higher. • Panel shall include appropriate Neutral & Earth Bars • Should contain a connector block for termination of outgoing cables. • Should contain a Cable Chamber for running of outgoing cables. • Meterboard shall incorporate Appropriate surge protector c/w protection 	No.	1		-

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
	<ul style="list-style-type: none"> • The Main Incomer shall be: <ul style="list-style-type: none"> ▶ 1No. 80A TP Rated MCCB (Adjustable) with Shunt trip for Firemans switch • The Busbars shall be: <ul style="list-style-type: none"> ▶ 3No. 80A TP Rated • The outgoers shall be as follows: <ul style="list-style-type: none"> ▶ 100A 3-P MCB's - No. 3 ▶ Neutral Terminal for MCB's above ▶ Neutral Terminal for MCB's above 				
OUTGOERS					
a	350A TP MCCB's for Rising Mains • Qty - 1				
b	100A TP MCCB's for Pump output • Qty - 1				
c	100A TP MCCB for Output to DBx • Qty - 1				
d	3-PHASE Blanked Spareways for upto 63A 3P MCCB • Qty - 2				
	Taking delivery on site, Positioning, termination, and testing and commissioning				
C1.02	Commons LV Board described above.	Item	1		-
C1.03	LABELLING (Internal & External): Labelling of Panels with permanent Engraved labels of Visible Font. Engraved plate shall be Grey in Colour with white legible markings. All to Engineers approval	Item	1		-
C1.04	Sub-total c/f to SWITCHGEAR, EARTHING & CABLING PRICE COLLECTION PAGE				-

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
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C2 MAINTAINED POWER

400A TPN rated with all necessary accessories. To be complete with tap - off units per each floor fixing bolts, nuts etc for proper installation of the rising mains.

C2.01	Fabricated incomer with 400 TPN MCCB for rising mains protection isolation to match the Switchgear. The MCCB should be adjustable on a scale of 0.75 to 1 and with adjustable overcurrent settings, having a short circuit breaking capacity of 50KA at 415Vac, 50Hz. The Isolator should also have a set of digital energy multimeter for indication of voltage & current	No.	1		-
C2.02	End Feeder Unit for termination of the cable feed to the busbar	No.	1		-
C2.03	Standard length busbar (3M) with male & female ends and all other fixing accessories	LM	18		-
C2.04	End Closer Unit for termination of the busbar	No.	1		-
C2.05	Vertical expansion units	No.	1		-
C2.06	Vertical Fixing Unit (60mm)	No.	1		-
C2.07	100A TPN Plug-In Tap-Off Box (IP55 rated) installed at all floors	No.	8		-
C2.08	Fire barrier kit on every floor to match the rising mains as Zucchini S120 Fire barrier kit or equivalent to engineers approval.	Floors	5		-
C2.09	Sum for all fixing accessories including suspension brackets	Item	1		-

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
C2.10	Sub -Total for MAINTAINED POWER RISING MAINS c/f to RISING MAINS PRICE COLLECTION PAGE				-

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
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C3 Systems Earthing (PME) - Protective multiple earthing

<p><i>Pricing to include earth treatment where required using appropriate compounds such as Bentonite and marconite to achieve stipulated impedance. Under no circumstance should charcoal or common salt be used. NOTE: Manufacturers Proof will be required</i></p>					
C3	<u>LV ROOMS EARTHING:</u>				
C3.01	EARTH MATT: Supply & Install Earthing Matt for Body Earthing of Switchgear complete with a copper lattice matt measuring 1000mm X 1000mm constructed with copper tapes measuring 25mm X 3mm (total length of each matt will be 15M) adjacent to switchgear rooms. This should be extended to the Concrete inspection chamber with appropriate Cable / CU rod. This shall include treatment Compound as stated above.	No.	1		-
C3.02	EARTH INSPECTION PIT: 300mm x 300mm Concrete Inspection Chamber clearly marked "EARTH"	No.	1		-
C3.03	COPPER BAR: Supply & Install a Earth Potential Copper Bar measuring 600m long X 50mm Wide X 6mm Thick, mounted on insulators in room(s)	No.	1		-
C3.04	PIT - EARTH BAR CONNECTION CABLE: Connect the copper lattice matt through the Inspection Chamber and the Earth potential Copper bar in Equipment room SC CU cable c/w appropriate cable lugs, cable lugs & any other accessories required. Cable size as 120 mm sq PVC SC XLPE CU Cables	LM	23		-

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
C3.05	EARTH BAR - EQUIPMENT CABLING: Connect the Earth potential Bar and Equipment with SC CU cable c/w appropriate cable lugs, cable lugs & any other accessories required. Cable size as 70mm sq PVC SC XLPE CU Cables	LM	20		-

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
C5	<u>LIGHTNING PROTECTION EARTHING:</u>				-
C5.01	EARTH MATT: Supply & Install Earthing Matt for system complete with a copper lattice matt measuring 1000mm X 1000mm constructed with copper tapes measuring 25mm X 3mm (total length of each matt will be 15M) This should be extended to the earth inspection chamber with appropriate 95mm SC Cable	No.	2		-
C5.02	EARTH INSPECTION PIT: Heavy Gauge (5000Kgs) minimum Earth Inspection pit, with Lockable lid & should be engraved 'EARTH' or with earth Symbol	No.	2		-
C6	<u>ACCESSORIES</u>				
C6.01	CABLE TIES: Allow for cable ties at one meter interval along the cable trays and cable ladders above at every 300mm interval.	Item	1		-
C6.02	LABELLING: Labelling of all submains cables at both source & end with permanent Tag labels of Visible Font. All to Engineers approval	Item	1		-
C6.03	Sub-total c/f to SWITCHGEAR, EARTHING & CABLING PRICE COLLECTION PAGE				-

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
C7	LV Distribution Boards Cabling & Accessories				
C7.01	Turret 3 Phase Power distribution board installed outside. Busbar rating: 300A Rating Main Incomer: 1No. 250A Incomers, 2No. 100A Outgoers, 1No. Spareway with powder coated matt finish paint, compartmental type, CRCA metallic Sheet, Indication on front side R, Y, B, ON, OFF, Surge Protector and Trip Earthing provision. All breakers to have Over Current and Earth Fault Protection	No.	1		
C3.02	Cable to DBs Above: 300mm sq 4-Core PVC SWA PVC XLPE CU Cable	LM	800		
C3.03	Cable glands for above cables	No.	8		-
C3.04	Cable lugs for for above cables	No.	32		-
C7.06	4Way 100A TPN Distribution board to each floor	No.	5		-
C7.07	10A SP MCB	No.	10		-
C7.08	20A SP MCB	No.	10		-
C7.09	32A SP MCB	No.	10		-
C7.10	Cable to DBs Above: 16mm sq 4-Core PVC SWA PVC XLPE CU Cable	LM	30		-
C7.11	Cable glands for above cables	No.	20		-
C7.12	Cable lugs for for above cables	No.	80		-

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
C3.12	Cable to Duct: 35mm sq 4C PVC PVC CU Cables.	LM	80		-
C7.14	Cable glands for above cables	No.	4		-
C7.15	Cable lugs for for above cables	No.	16		-

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
C7.16	Cable to PUMP Panel: 16mm sq PVC PVC CU Cables.	LM	50		-
C7.17	Cable glands for above cables	No.	2		-
C7.18	Cable lugs for for above cables	No.	8		-
C7.19	Cable to DBx: 10mm sq PVC PVC CU Cables.	LM	50		-
C7.20	Cable glands for above cables	No.	2		-
C7.21	Cable lugs for for above cables	No.	8		-
C7.22	CABLE TIES: Allow for cable ties at one meter interval along the cable trays and cable ladders above at every 300mm interval.	Item	1		-
C7.23	LABELLING: Labelling of all submains cables at both source & end with permanent Tag labels of Visible Font. All to Engineers approval	Item	1		-
C7.24	Sub-total c/f to SWITCHGEAR, EARTHING & CABLING PRICE COLLECTION PAGE				-

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
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ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
C8	SWITCHGEAR, EARTHING & CABLING PRICE COLLECTION PAGE				
ITEM	<u>DESCRIPTION</u>				COST (Kshs)
C8.01	Switchgear & Meterboards				-
C8.02	Rising Mains				-
C8.03	Systems Earthing (PME)				-
C8.04	LV Distribution Boards Cabling & Accessories				-
	Contingency				400,000
C8.05	TOTAL EXCLUSIVE OF VAT TO ELECTRICAL PRICE SUMMARY PAGE				400,000

D <u>Fire Alarm(Detection System)</u>	
<ul style="list-style-type: none"> • <i>The Contractor shall supply labour and supply, deliver, install, fix, connect, test, label and commission the works, clean, complete and working to every detail as described below and in the related specifications and /or on the drawings to the satisfaction of the Consulting Engineers.</i> 	
<ul style="list-style-type: none"> • <i>The Fire alarm system shall be an Addressable Fire Alarm system</i> 	
<ul style="list-style-type: none"> • <i>All Main Panels and Repeater panels shall be Network ready.</i> 	
<ul style="list-style-type: none"> • <i>All systems quoted for MUST meet the minimum threshold outlined in the technical specifications</i> • <i>Fire Alarm Models shall be as Bosch, Menvier, Protec, GE, EST. Any other must be approved by the Engineer.</i> • <i>NB: Technical product Catalogues of the specified models should be attached as part of the Bid document.</i> • <i>NOTE: Kindly Note that all Bidders Will be required to give the Authorization Letter from the Local Authorized agent for Fire Alarm. This will be Mandatory in the Evaluation.</i> 	

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs.)	COST (Kshs.)
D1.01	<p>FIRE ALARM PANEL 8 IOOP : Addressable fire control panel as described in the particular specifications of this document. Special considerations to be made for this installation are:</p> <p>The panel should be able to;</p> <p>a Loop & Communicate with all the other panels in the Premises</p> <p>b Control all fire alarm devices. If not then include mimic panels in the quotation and specify in the section for "any additional items" below</p> <p>c Be compatible with the fire escape pressurization fans to enable trigger the fans whenever a signal for fire is detected.</p> <p>d Be compatible with Lifts & Security devices e.g. Access Control, CCTV & Other Systems in the building for ease of management.</p> <p>e c/w an inbuilt integral Printer</p> <p>f Be Network Ready</p> <p>g Cater for All the devices listed below with an additional 20%</p>	No.	1		-

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs.)	COST (Kshs.)
D1.02	SMOKE DETECTORS (PHOTOELECTRIC): Addressable Ionisation Smoke detector c/w Bases and all other accessories as described in the particular specifications of this document	No.	215		-
D1.03	WALL SOUNDER BEACON & FLASHER UNIT (COMBINED): Wall mounted Loop powered wall sounder combined with a flasher beacon (as one unit) as described in the particular specifications of this document	No.	16		-
D1.04	MANUAL CALL POINT (resettable kit) - As TYPE 01 WITH HINGED COVER: Surface manual call point. This should be a resettable kit breakglass unit as opposed to a glass as described in the particular specifications of this document	No.	16		-

ITEM	DESCRIPTION	UNIT	Qty	RATE (Kshs.)	COST (Kshs.)
D1.05	CABLING: Wiring of fire alarm points using 1.5mm ² fire reterdant cable as FIRETEC or FP200 as described in the particular specifications of this document	No.	248		-
D1.06	Input/ Output modules	No.	8		-
D1.07	Programming by the Supplier specialist	Item	1		-
D1.08	Allow sum for installations coordination and attendance to other specialists engaged by the client.	Item	1		-
D1.09	Sum for training of client / user (At least 5 No. Users). The trained personnel must sign against the items they were trained on and this submitted to the engineer	Item	1		-
D1.10	Sum for Testing and commissioning of the entire installations set complete with all accessories, interconnections, controls and any the necessary programming.	Item	1		-
D1.11	Any other additional items, please specify below and attach catalogues. (If none write NIL)	Item	1		-
D1.12	Contingency				200,000
D1.13	Total Exclusive of VAT to electrical price summary page.				200,000

ELECTRICAL INSTALLATIONS PRICE SUMMARY PAGE

ITEM	DESCRIPTION	COST (Kshs)
1	4 Bed Hostels (154 Units) (Lighting fixtures, Power Outlets and associated cabling)	600,000
2	2 Bed PWD Hostels (4 Units)(Lighting fixtures, Power Outlets and associated cabling)	20,000
3	Common Services (Game Room, Corridor, Reception, Custodian's office, Prayer room, Students' Lounge, Dhobi & Drying area)	350,000
4	Power Distribution- Submains, Earthing & Cabling	400,000
5	Lightning Protection	50,000
6	Fire Alarm	200,000
7	ATTENDANCE & LIAISON: Allow sum for attendance to other specialists, Contractors & Management team e.g. ICT, security, plumber, HVAC, lifts, etc.	
8	KPLC LIAISON: Allow sum for Liaison with KPLC for permanent Power Connection for entire premises.	
9	DOCUMENTATION: Sum for Completion documents: Comprising Workshop drawings, manufacturer's technical product catalogues, users manuals, maintenance manuals, as installed drawings, test certificates, etc. { NOTE: Penultimate Valuation will not be paid until these are fully availed & signed off by the engineer }	

ITEM	DESCRIPTION	COST (Kshs)
10	TESTING & COMMISSIONING: Sum for Testing and commissioning of the entire installations Including LV and Switchgear complete with all accessories, interconnections, controls, and the necessary programing.	-
11	TRAINING: Sum for Training of client personel / users (At least 5No Staff)	-
12	DLP SUM: Sum for 6 months comprehensive maintenance from date of practical completion i.e. for maintainance and replacement of consumables such as blown out devices	-
13	Preliminaries	81,000
14	Total Exclusive of VAT	1,701,000
15	Add: 16% VAT	272,160
16	Total for 1No. Block Electrical Installations Inclusive of VAT	1,973,160
17	2No. Blocks	2
18	Total for 2No. Block Electrical Installations Inclusive of VAT	3,946,320

Total amount in words: Kshs _____

Name of firm / company _____

Official rubber-stamp _____

P.I.N. No.: _____ V.A.T. Reg. No. : _____

Signed by: _____ Date _____