KENYA CIVIL AVIATION AUTHORITY

PROPOSED REFURBISHMENT OF ELECTRICAL POWER SUPPLY DISTRIBUTION TO KENYA CIVIL AVIATION AUTHORITY'S STATIONS

TENDER No. KCAA/009/2019-2020

TENDER SPECIFICATIONS AND BILLS OF QUANTITIES FOR ELECTRICAL, UPS, AVS, GENERATOR SETS AND IP CCTV SURVEILLANCE SYSTEM INSTALLATION WORKS

DATE OF NOTICE: TUESDAY, 22ND OCTOBER, 2019

CLOSING DATE: THURSDAY, 7TH NOVEMBER, 2019 AT 11.00 AM

CHIEF ENGINEER (ELECTRICAL)
MINISTRY OF TRANSPORT, INFRASTRUCTURE, PUBLIC WORKS, HOUSING AND URBAN DEVT.
STATE DEPARTMENT OF PUBLIC WORKS
P.O BOX 41191 – 00100
NAIROBI

CHIEF ARCHITECT
M.T.I.PW.H&UD
STATE DEPARTMENT OF PUBLIC WORKS
P.O BOX 30743 – 00100
NAIROBI

CHIEF ENGINEER (MECHANICAL - BS)
M.T.I.PW.H&UD
STATE DEPARTMENT OF PUBLIC WORKS
P.O BOX 41191 – 00100
NAIROBI

CHIEF ENGINEER (STRUCTURAL)
M.T.I.PW.H&UD
STATE DEPARTMENT OF PUBLIC WORKS
P.O BOX 30743 – 00100
NAIROBI

CHIEF QUANTITY SURVEYOR
M.T.I.PW.H&UD
STATE DEPARTMENT OF PUBLIC WORKS
P.O BOX 30743 – 00100
NAIROBI

THERE WILL BE A MANDATORY PRE-BID / SITE MEETING ON WEDNESDAY, 30TH OCTOBER 2019, AT 11:00 AM AT KCAA HEADQUARTERS

OCTOBER, 2019

TABLE OF CONTENTS

DEFINITIONS

The following terms and expressions used in the contract document shall have the following meanings:

The Employer	Director General Kenya Civil Aviation Authority P.O. Box 30163-00100 NAIROBI
Architect	Chief Architect M.T.I.PW.H&UD - State Department of Public Works P.O. Box 30743 – 00100 NAIROBI
Electrical Engineer	Chief Engineer (Electrical) M.T.I.PW.H&UD - State Department of Public Works P.O. Box 41191 - 00100 NAIROBI
Mechanical Engineer	Chief Engineer (Mechanical - BS) M.T.I.PW.H&UD - State Department of Public Works P.O. Box 41191 - 00100 NAIROBI
Quantity Surveyor	Chief Quantity Surveyor M.T.I.PW.H&UD - State Department of Public Works P.O. Box 30743 - 00100 NAIROBI
Structural Engineer	Chief Engineer (Structural) M.T.I.PW.H&UD - State Department of Public Works P.O. Box 30743 – 00100 NAIROBI
Project Manager	Chief Engineer (Electrical) M.T.I.PW.H&UD - State Department of Public Works P.O. Box 41191 – 00100 NAIROBI
Contractor	The firm appointed to carry out Standby Generator set, UPS, AVS, CCTV Surveillance System and Electrical Installation Works
Site location	The Site is located at **the Kenya Civil Aviation Authority Stations – JKIA Tower, JKIA Radar, Stony-Athi, Ngong Hills and Mua Hills Radar stations.**

FORM OF TENDER

To: The Director General,
Kenya Civil Aviation Authority,
P.O Box 30163-00100,
NAIROBI.

PROPOSED REFURBISHMENT OF ELECTRICAL POWER SUPPLY DISTRIBUTION TO KENYA CIVIL AVIATION AUTHORITY'S STATIONS. TENDER No. KCAA/009/2019-2020.

In accordance with the Instructions to Tenderers, Conditions of Contract, Specifications and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct, install and complete such Works and remedy any defects therein for the sum of:

Kshs……..…..... (Amount in ***figures]***

Kenya Shillings…….....
…….
……. ***[Amount in words]***

1. We undertake, if our tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Employer's Representative's notice to commence, and to complete the whole of the Works comprised in the Contract within the time stated in the Appendix to Conditions of Contract.
2. We agree to abide by this tender **for a period of 120 days from the date of tender opening,** and shall remain binding upon us and may be accepted at any time before the expiry of that period.
3. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, shall constitute a binding Contract between us.
4. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this …… day of ……20…….

Signature ……in the capacity of …….

duly authorized to sign tenders for and on behalf of:

……..***[Name of Tenderer[***

of……..***[Address of Tenderer]***

PIN No. …….

VAT CERTIFICATE No. ……

Witness: Name …….

Address …….

Signature ……

FORM OF TENDER SECURITY

Appendix

I

To: The Director General,
Kenya Civil Aviation
Authority, P.O Box 30163-
00100, **NAIROBI.**

WHEREAS.....(hereinafter called "the Tenderer") has submitted his tender dated.....for the construction of
…….....
.....(name of Contract)

KNOW ALL PEOPLE by these presents that WE.....having our registered office at .....(hereinafter called "the Bank"), are bound unto .....(hereinafter called "the Employer" in the sum of Kshs.....for which payment well and truly to be made to the said Employer, the Bank bind itself, its successors and assigns by these presents sealed with the Common Seal of the said Bank this .....Day of .....20.....

THE CONDITIONS of this obligation are:

1. If after tender opening the tenderer withdraws his tender during the period of tender validity specified in the instructions to tenderers

   Or

2. If the tenderer, having been notified of the acceptance of this tender by the Employer during the period of tender validity:

a)fails or refuses to execute the form of Agreement in accordance with the Instructions to Tenderers, if required; or

b)fails or refuses to furnish the Performance Security, in accordance with the Instructions to

Tenderers; We undertake to pay to the Employer up to the above amount upon receipt of his first written

demand, without
the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force for a period of 150 days from the date of tender opening, and any demand in respect thereof should reach the Bank not later than the said date.

_____ _____

[date] [signature of the Bank]

_____ _____

[witness] [seal]

FORM OF TENDER SECURITY

Appendix

II

To: The Director General,
Kenya Civil Aviation
Authority, P.O Box 30163-
00100, **NAIROBI.**

WHEREAS.....[Name of tenderer] (hereinafter called "the Tenderer") has submitted his tender dated.....for the construction of
.....
.....(name of Contract)

KNOW ALL PEOPLE by these presents that WE.....of .....[Insurance Company]..having our registered office at .....(hereinafter called "the Bank" or 'the Guarantor'), are bound unto .....(hereinafter called "the Employer" in the sum of Kshs.....for which payment well and truly to be made to the said Employer, the Guarantor binds itself, its successors and assigns by these presents sealed with the Common Seal of the said Bank/ Guarantor this .....Day of .....20.....

THE CONDITIONS of this obligation are:

1. If after tender opening the tenderer withdraws his tender during the period of tender validity specified in the instructions to tenderers

2. If the tenderer, having been notified of the acceptance of this tender by the Employer during the period of tender validity:

a)fails or refuses to execute the form of Agreement in accordance with the Instructions to Tenderers, if required; or

b)fails or refuses to furnish the Performance Security, in accordance with the Instructions to

Tenderers; We undertake to pay to the Employer up to the above amount upon receipt of his first written

demand, without
the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force **for a period of 150 days from the date of tender opening**, and any demand in respect thereof should reach the Bank not later than the said date.

_____ _____

[date] [signature of the Bank/Guarantor]

_____ _____

[witness] [seal]

SECTION A INSTRUCTIONS TO TENDERERS

INSTRUCTIONS TO TENDERERS

CONTENTS

AWARD OF CONTRACT

INSTRUCTION TO TENDERERS

Note: The tenderer must comply with the following conditions and instructions and failure to do so is liable to result in rejection of the tender.

GENERAL

1. Definitions

(a) "**Tenderer"** means any person or persons partnership firm or company submitting a sum or sums in the Bills of Quantities in accordance with the Instructions to Tenderers, Conditions of Contract Parts I and II, Specifications, Drawings and Bills of Quantities for the work contemplated, acting directly or through a legally appointed representative.

(b) **"Approved tenderer**" means the tenderer who is approved by the Employer.

(c) Any noun or adjective derived from the word **"tender"** shall be read and construed to mean the corresponding form of the noun or adjective **"bid".** Any conjugation of the verb "tender" shall be read and construed to mean the corresponding form of the verb "bid."

(d) **"Employer"** means a Central Government Ministry, Local Authority, State Corporation or any other Public Institution.

2. Eligibility and Qualification Requirements

2.1 This invitation to tender is open to all tenderers who have been prequalified.

2.2 To be eligible for award of Contract, the tenderer shall provide evidence satisfactory to the Employer of their eligibility under Sub clause 2.1 above and of their capability and adequacy of resources to effectively carry out the subject Contract. To this end, the tenderer shall be required to update the following information already submitted during prequalification:-

(a) Details of experience and past performance of the tenderer on the works of a similar nature within the past five years and details of current work on hand and other contractual commitments.

(b) The qualifications and experience of key personnel proposed for administration and execution of the contract, both on and off site.

(c) Major items of construction plant and equipment proposed for use in carrying out the Contract. Only reliable plant in good working order and suitable for the work required of it shall be shown on this schedule. The tenderer will also indicate on this schedule when each item will be available on the Works. Included also should be a schedule of plant, equipment and material to be imported for the purpose of the Contract, giving details of make, type, origin and CIF value as appropriate.

(d) Details of subcontractors to whom it is proposed to sublet any portion of the Contract and for whom authority will be requested for such subletting in accordance with clause 4 of the Conditions of Contract.

(e) A draft Program of Works in the form of a bar chart and Schedule of Payment which shall form part of the Contract if the tender is accepted. Any change in the Program or Schedule shall be subjected to the approval of the Engineer.

(f) Details of any current litigation or arbitration proceedings in which the Tenderer is involved as one of the parties.

2.3 Joint Ventures

Tenders submitted by a joint venture of two or more firms as partners shall comply with the following requirements:-

(a) The tender, and in case of a successful tender, the Form of Agreement, shall be signed so as to be legally binding on all partners.

(b) One of the partners shall be nominated as being in charge; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners.

(c) The partner in charge shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture and the entire execution of the Contract including payment shall be done exclusively with the partner in charge.

(d) All partners of the joint venture shall be liable jointly and severally for the execution of the Contract in accordance with the Contract terms, and a relevant statement to this effect shall be included in the authorization mentioned under (b) above as well as in the Form of Tender and the Form of Agreement (in case of a successful tender).

(e) A copy of the agreement entered into by the joint venture partners shall be submitted with the tender.

Cost of Tendering

The tenderer shall bear all costs associated with the preparation and submission of his tender and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the tendering process.

3. Site Visit

3.1 The tenderer is advised to visit and examine the Site and its surroundings and obtain for himself on his own responsibility, all information that may be necessary for preparing the tender and entering into a contract. The costs of visiting the Site shall be the tenderer's own responsibility.

3.2 The tenderer and any of his personnel or agents will be granted permission by the Employer to enter upon premises and lands for the purpose of such inspection, but only upon the express condition that the tenderer, his personnel or agents, will release and idemnify the Employer from and against all liability in respect of, and will be responsible for personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which but for the exercise of such permission, would not have arisen.

3.3 The Employer shall organize a site visit at a date to be notified. A representative of the Employer will be available to meet the intending tenderers at the Site.

Tenderers must provide their own transport. The representative will not be available at any other time for site inspection visits.

Each tenderer shall complete the Certificate of Tenderer's Visit to the Site, whether he in fact visits the Site at the time of the organized site visit or by himself at some other time.

TENDER DOCUMENTS

4. Tender Documents

4.1 The Tender documents comprise the documents listed herebelow and should be read together with any Addenda issued in accordance with Clause 7 of these instructions to tenderers.

a. Form of Invitation for Tenders
b. Instructions to Tenderers

c. Form of Tender
d. Appendix to Form of Tender e. Form of Tender Surety
f. Statement of Foreign Currency Requirements g. Form of Performance Security
h. Form of Agreement
i. Form of Advance payment Bank Guarantee j. Schedules of Supplementary Information
k. General Conditions of Contract – Part I
l. Conditions of Particular Application – Part II
m. Specifications
n. Bills of Quantities o. Drawings

4.2 The tenderer is expected to examine carefully all instructions, conditions, forms, terms, specifications and drawings in the tender documents. Failure to comply with the requirements for tender submission will be at the tenderer's own risk. Pursuant to clause 22 of Instructions to Tenderers, tenders which are not substantially responsive to the requirements of the tender documents will be rejected.

4.3 All recipients of the documents for the proposed Contract for the purpose of submitting a tender (whether they submit a tender or not) shall treat the details of the documents as "private and confidential".

5. Clarification of Tender Documents

5.1 A prospective tenderer requiring any clarification of the tender documents may notify the Employer in writing or by telex, cable or facsimile at the Employer's mailing address indicated in the Invitation to Tender. The Employer will respond in writing to any request for clarification which he receives earlier than 5 days prior to the expiry of 28 days deadline for the submission of tenders. Written copies of the Employer's response (including the query but without identifying the source of the inquiry) will be sent to all prospective tenderers who have purchased the tender documents.

6. Amendment of Tender Documents

6.1 At any time prior to the deadline for submission of tenders the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective tenderer, modify the tender documents by issuing Addenda.

6.2 Any Addendum will be notified in writing or by cable, telex or facsimile to all prospective tenderers who have purchased the tender documents and will be binding upon them.

6.3 If during the period of tendering, any circular letters (tender notices) shall be issued to tenderers by, or on behalf of, the Employer setting forth the interpretation to be placed on a part of the tender documents or to make any change in them, such circular letters will form part of the tender documents and it will be assumed that the tenderer has taken account of them in preparing his tender. The tenderer must promptly acknowledge any circular letters he may receive.

6.4 In order to allow prospective tenderers reasonable time in which to take the Addendum into account in preparing their tenders, the Employer may, at his discretion, extend the deadline for the submission of tenders.

PREPARATION OF TENDERS

7. Language of Tender

8.1 The tender and all correspondence and documents relating to the tender exchanged between the tenderer and the Employer shall be written in the English language. Supporting documents and printed literature furnished by the tenderer with the tender may be in another language provided they are accompanied by an appropriate translation of pertinent passages in the above stated language. For the purpose of interpretation of the tender, the English language shall prevail.

8. Documents Comprising the Tender

9.1 The tender to be prepared by the tenderer shall comprise: the Form of Tender and Appendix thereto, a Tender Surety, the Priced Bills of Quantities and Schedules, the information on eligibility and qualification, and any other materials required to be completed and submitted in accordance with the Instructions to Tenderers embodied in these tender documents. The Forms, Bills of Quantities and Schedules provided in the tender documents shall be used without exception (subject to extensions of the schedules in the same format and to the provisions of clause 13.2 regarding the alternative forms of Tender Surety].

9. Tender Prices

9.1 All the insertions made by the tenderer shall be made in INK and the tenderer shall clearly form the figures. The relevant space in the Form of Tender and Bills of Quantities shall be completed accordingly without interlineations or erasures except those necessary to correct errors made by the tenderer in which case the erasures and interlineations shall be initialed by the person or persons signing the tender.

9.2 A price or rate shall be inserted by the tenderer for every item in the Bills of Quantities whether the quantities are stated or not items against which no rate or price is entered by the tenderer will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bills of Quantities.

The prices and unit rates in the Bills of Quantities are to be the full [all-inclusive] value of the work described under the items, including all costs and expenses which may be necessary and all general risks, liabilities and obligations set forth or implied in the documents on which the tender is based. All duties and taxes and other levies payable by the Contractor under the Contract or for any other cause as of the date 28 days prior to the deadline for the submission of tenders, shall be included in the rates and prices and the total tender prices submitted by the Tenderer.

Each price or unit rate inserted in the Bills of Quantities should be a realistic estimate for completing the activity or activities described under that particular item and the tenderer is advised against inserting a price or rate against any item contrary to this instruction.

Every rate entered in the Bills of Quantities, whether or not such rate be associated with a quantity, shall form part of the Contract. The Employer shall have the right to call for any item of work contained in the Bills of Quantities, and such items of work to be paid for at the rate entered by the tenderer and it is the intention of the Employer to take full advantage of unbalanced low rates.

9.3 Unless otherwise specified the tenderer must enter the amounts representing 10% of the sub- total of the summary of the Bills of Quantities for Contingencies and Variation of Prices [V.O.P.] payments in the summary sheet and add them to the sub-total to arrive at the tender amount.

9.4 The tenderer shall furnish with his tender written confirmation from his suppliers or manufacturers of unit rates for the supply of items listed in the Conditions of Contract clause 47 where appropriate.

9.5 The rates and prices quoted by the tenderer are subject to adjustment during the performance of the Contract only in accordance with the provisions of the Conditions of Contract. The tenderer shall complete the schedule of basic rates and shall submit with his tender such other supporting information as required under clause 47 of the Conditions of Contract Part II.

10. Currencies of Tender and Payment

11.1 Tenders shall be priced in Kenya Shillings and the tender sum shall be in Kenya Shillings.

11.2 Tenderers are required to indicate in the Statement of Foreign Currency Requirements, which forms part of the tender, the foreign currency required by them. Such currency should generally be the currency of the country of the tenderer's main office. However, if a substantial portion of the tenderer's expenditure under the Contract is expected to be in countries other than his country of origin, then he may state a corresponding portion of the contract price in the currency of those other countries. However, the foreign currency element is to be limited to two (2) different currencies and a maximum of 30% (thirty percent) of the Contract Price.

11.3 The rate of rates of exchange used for pricing the tender shall be selling rate or rates of the Central Bank ruling on the date thirty (30) days before the final date for the submission of tenders.

11.4 Tenderers must enclose with their tenders, a brief justification of the foreign currency requirements stated in their tenders.

11. Tender Validity

11.1 The tender shall remain valid and open for acceptance for a period of one hundred and twenty (120) days from the specified date of tender opening or from the extended date of tender opening (in accordance with clause 7.4 here above) whichever is the later.

11.2 In exceptional circumstances prior to expiry of the original tender validity period, the Employer may request the tenderer for a specified extension of the period of validity. The request and the responses thereto shall be made in writing or by cable, telex or facsimile. A tenderer may refuse the request without forfeiting his Tender Surety. A tenderer agreeing to the request will not be required nor permitted to modify his tender, but will be required to extend the validity of his Tender Surety correspondingly.

12. Tender Surety

12.1 The tenderer shall furnish as part of his tender, a Tender Surety in the amount stated in the Appendix to Instructions to Tenderers.

12.2 The unconditional Tender Surety shall be in Kenya Shillings and be in form of a certified cheque, a bank draft, an irrevocable letter of credit or a guarantee from a reputable Bank approved by the Employer located in the Republic of Kenya.

The format of the Surety shall be in accordance with the sample form of Tender Surety included in these tender documents; other formats may be permitted subject to the prior approval of the Employer. The Tender Surety shall be valid for twenty eight (28) days beyond the tender validity period.

12.3 Any tender not accompanied by an acceptable Tender Surety will be rejected by the Employer as non-responsive.

12.4 The Tender Sureties of unsuccessful tenderers will be returned as promptly as possible but not later than twenty eight (28) days after concluding the Contract execution and after a Performance Security has been furnished by the successful tenderer. The Tender Surety of the successful tenderer will be returned upon the tenderer executing the Contract and furnishing the required Performance Security.

12.5 The Tender Surety may be forfeited:

(a) if a tenderer withdraws his tender during the period of tender validity: or

(b) in the case of a successful tenderer, if he fails

(i) to sign the Agreement, or
(ii) to furnish the necessary Performance Security

(c) if a tenderer does not accept the correction of his tender price pursuant to clause 23.

13. No Alternative Offers

13.1 The tenderer shall submit an offer which complies fully with the requirements of the tender documents.

Only one tender may be submitted by each tenderer either by himself or as partner in a joint venture.

13.2 The tenderer shall not attach any conditions of his own to his tender. The tender price must be based on the tender documents. The tenderer is not required to present alternative construction options and he shall use without exception, the Bills of Quantities as provided, with the amendments as notified in tender notices, if any, for the calculation of his tender price.

Any tenderer who fails to comply with this clause will be disqualified.

14. Pre-Tender Meeting

14.1 The tenderer's designated representative is invited to attend a pre-tender meeting, which if convened, will take place at the venue and time stated in the Invitation to Tender. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

14.2 The tenderer is requested as far as possible to submit any questions in writing or by cable, to reach the Employer not later than seven days before the meeting. It may not be practicable at the meeting to answer questions received late, but questions and responses will be transmitted in accordance with the following:

(a) Minutes of the meeting, including the text of the questions raised and the responses given together with any responses prepared after the meeting, will be transmitted without delay to all purchasers of the tender documents. Any modification of the tender documents listed in -–Clause 9 which may become necessary as a result of the pre- tender meeting shall be made by the Employer exclusively through the issue of a tender notice pursuant to Clause 7 and not through the minutes of the pre-tender meeting.

(b) Non-attendance at the pre-tender meeting will not be cause for disqualification of a bidder.

15. Format and Signing of Tenders

15.1 The tenderer shall prepare his tender as outlined in clause 9 above and mark appropriately one set "ORIGINAL" and the other "COPY".

15.2 The copy of the tender and Bills of Quantities shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the tenderer. Proof of authorization shall be furnished in the form of the written power of attorney which shall accompany the tender. All pages of the tender where amendments have been made shall be initialed by the person or persons signing the tender.

15.3 The complete tender shall be without alterations, interlineations or erasures, except as necessary to correct errors made by the tenderer, in which case such corrections shall be initialed by the person of persons signing the tender.

SUBMISSION OF TENDERS

16. Sealing and Marking of Tenders

16.1 The tenderer shall seal the original and copy of the tender in separated envelopes, duly marking the envelopes as "ORIGINAL" and "COPY". The envelopes shall then be sealed in an outer envelope.

17.2 The inner and outer envelopes shall be addressed to the Employer at the address stated in the Appendix to Instructions to Tenderers and bear the name and identification of the Contract stated in the said Appendix with a warning not to open before the date and time for opening of tenders stated in the said Appendix.

17.3 The inner envelopes shall each indicated the name and address of the tenderer to enable the tender to be returned unopened in case it is declared "late", while the outer envelope shall bear no mark indicating the identity of the tenderer.

17.4 If the outer envelope is not sealed and marked as instructed above, the Employer will assume no responsibility for the misplacement or premature opening of the tender. A tender opened prematurely for this cause will be rejected by the Employer and returned to the tenderer.

18 Deadline for Submission of Tenders

18.1 Tenders must be received by the Employer at the address specified in clause 17.2 and on the date and time specified in the Letter of Invitation, subject to the provisions of clause 7.4, 18.2 and 18.3.

Tenders delivered by hand must be placed in the "tender box" provided in the office of the Employer.

Proof of posting will not be accepted as proof of delivery and any tender delivered after the above stipulated time, from whatever cause arising will not be considered.

18.2 The Employer may, at his discretion, extend the deadline for the submission of tenders through the issue of an Addendum in accordance with clause 7, in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline shall thereafter be subject to the new deadline as extended.

18.3 Any tender received by the Employer after the prescribed deadline for submission of tender will be returned unopened to the tenderer.

19 Modification and Withdrawal of Tenders

19.1 The tenderer may modify or withdraw his tender after tender submission, provided that written notice of the modification or withdrawal is received by the Employer prior to prescribed deadline for submission of tenders.

The tenderer's modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provisions for the submission of tenders, with the inner and outer envelopes additionally marked "MODIFICATION" or "WITHDRAWAL" as appropriate.

19.2 No tender may be modified subsequent to the deadline for submission of tenders.

19.3 No tender may be withdrawn in the interval between the deadline for submission of tenders and the period of tender validity specified on the tender form. Withdrawal of a tender during this interval will result in the forfeiture of the Tender Surety.

19.4 Subsequent to the expiration of the period of tender validity prescribed by the Employer, and the tenderer having not been notified by the Employer of the award of the Contract or the tenderer does not intend to conform with the request of the Employer to extend the prior of tender validity, the tenderer may withdraw his tender without risk of forfeiture of the Tender Surety.

TENDER OPENING AND EVALUATION

20 Tender Opening

20.1 The Employer will open the tenders in the presence of the tenderers' representatives who choose to attend at the time and location indicated in the Letter of Invitation to Tender. The tenderers' representatives who are present shall sign a register evidencing their attendance.

20.2 Tenders for which an acceptable notice of withdrawal has been submitted, pursuant to clause 19, will not be opened. The Employer will examine the tenders to determine whether they are complete, whether the requisite Tender Sureties have been furnished, whether the documents have been properly signed and whether the tenders are generally in order.

20.3 At the tender opening, the Employer will announce the tenderer's names, total tender price, tender price modifications and tender withdrawals, if any, the presence of the requisite Tender Surety and such other details as the Employer, at his discretion, may consider appropriate. No tender shall be rejected at the tender opening except for late tenders.

20.4 The Employer shall prepare minutes of the tender opening including the information disclosed to those present.

20.5 Tenders not opened and read out a tender opening shall not be considered further for evaluation, irrespective of the circumstances.

21 Process to be Confidential

21.1 After the public opening of tenders, information relating to the examination, clarification, evaluation and comparisons of tenders and recommendations concerning the award of Contract shall not be disclosed to tenderers or other persons not officially concerned with such process until the award of Contract is announced.

21.2 Any effort by a tenderer to influence the Employer in the process of examination, evaluation and comparison of tenders and decisions concerning award of Contract may result in the rejection of the tenderer's tender.

22 Clarification of Tenders

22.1 To assist in the examination, evaluation and comparison of tenders, the Employer may ask tenderers individually for clarification of their tenders, including breakdown of unit prices. The request for clarification and the response shall be in writing or by cable, facsimile or telex, but no change in the price or substance of the tender shall be sought, offered or permitted except as required to confirm the correction of arithmetical errors discovered by the employer during the evaluation of the tenders in accordance with clause 24.

22.2 No Tenderer shall contact the Employer on any matter relating to his tender from the time of the tender opening to the time the Contract is awarded. If the tenderer wishes to bring additional information to the notice of the Employer, he shall do so in writing.

23 Determination of Responsiveness

23.1 Prior to the detailed evaluation of tenders, the Employer will determine whether each tender is substantially responsive to the requirements of the tender documents.

23.2 For the purpose of this clause, a substantially responsive tender is one which conforms to all the terms, conditions and specifications of the tender documents without material deviation or reservation and has a valid bank guarantee. A material deviation or reservation is one which affects in any substantial way the scope, quality, completion timing or administration of the Works to be undertaken by the tenderer under the Contract, or which limits in any substantial way, inconsistent with the tender documents, the Employer's rights or the tenderers obligations under the Contract and the rectification of which would affect unfairly the competitive position of other tenderers who have presented substantially responsive tenders.

23.3 Each price or unit rate inserted in the Bills of Quantities shall be a realistic estimate of the cost of completing the works described under the particular item including allowance for overheads, profits and the like. Should a tender be seriously unbalanced in relation to the Employer's estimate of the works to be performed under any item or groups of items, the tender shall be deemed not responsive.

23.4 A tender determined to be not substantially responsive will be rejected by the Employer and may not subsequently be made responsive by the tenderer by correction of the non-conforming deviation or reservation.

24 Correction of Errors

Tenders determined to be substantially responsive shall be checked by the Employer for any arithmetic errors in the computations and summations. Errors will be corrected by the Employer as follows:

(a) Where there is a discrepancy between the amount in figures and the amount in words, the amount in words will govern.

(b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will prevail, unless in the opinion of the Employer, there is an obvious typographical error, in which case adjustment will be made to the entry containing that error.

(c) The amount stated in the tender will be adjusted in accordance with the above procedure for the correction of errors and, with concurrence of the tenderer, shall be considered as binding upon the tenderer. If the tenderer does not accept the corrected amount, the tender may be rejected and the Tender Security may be forfeited in accordance with clause 13.

25 Conversion to Single Currency

25.1 For compensation of tenders, the tender price shall first be broken down into the respective amounts payable in various currencies by using the selling rate or rates of the Central Bank of Kenya ruling on the date twenty eight (28) days before the final date for the submission of tenders.

25.2 The Employer will convert the amounts in various currencies in which the tender is payable (excluding provisional sums but including Dayworks where priced competitively) to Kenya Shillings at the selling rates stated in clause 25.1.

26 Evaluation and Comparison of Tenders

26.1 The Employer will evaluate only tenders determined to be substantially responsive to the requirements of the tender documents in accordance with clause 23.

26.2 In evaluating tenders, the Employer will determine for each tender the evaluated tender price by adjusting the tender price as follows:

(a) Making any correction for errors pursuant to clause 24.

(b) Excluding Provisional Sums and provision, if any, for Contingencies in the Bills of Quantities, but including Day works where priced competitively.

26.3 The Employer reserves the right to accept any variation, deviation or alternative offer. Variations, deviations, alternative offers and other factors which are in excess of the requirements of the tender documents or otherwise result in the accrual of unsolicited benefits to the Employer, shall not be taken into account in tender evaluation.

26.4 Price adjustment provisions in the Conditions of Contract applied over the period of execution of the Contract shall not be taken into account in tender evaluation.

26.5 If the lowest evaluated tender is seriously unbalanced or front loaded in relation to the Employer's estimate of the items of work to be performed under the Contract, the Employer may require the tenderer to produce detailed price analyses for any or all items of the Bills of Quantities, to demonstrate the relationship between those prices, proposed construction methods and schedules. After evaluation of the price analyses, the Employer may require that the amount of the Performance Security set forth in clause 29 be increased at the expense of the successful tenderer to a level sufficient to protect the Employer against financial loss in the event of subsequent default of the successful tenderer under the Contract.

26.6 Firms incorporated in Kenya where indigenous Kenyans own 51% or more of the share capital shall be allowed a 10% preferential bias provided that they do not sub-contract work valued at more than 50% of the Contract Price excluding Provisional Sums to a non-indigenous sub-contractor.

AWARD OF CONTRACT

27 Award

27.1 Subject to clause 27.2, the Employer will award the Contract to the tenderer whose tender is determined to be substantially responsive to the tender documents and who has offered the lowest evaluated tender price subject to possessing the capability and resources to effectively carry out the Contract Works.

27.2 The Employer reserves the right to accept or reject any tender, and to annual the tendering process and reject all tenders, at any time prior to award of Contract, without thereby incurring any liability to the affected tenderers or any obligation to inform the affected tenderers of the grounds for the Employer's action.

28 Notification of Award

28.1 Prior to the expiration of the period of tender validity prescribed by the Employer, the Employer will notify the successful tenderer by cable, telefax or telex and confirmed in writing by registered letter that his tender has been accepted. This letter (hereinafter and in all Contract documents called "Letter of Acceptance") shall name the sum(hereinafter and in all Contract documents called "the Contract Price") which the Employer will pay to the Contractor in consideration of the execution and completion of the Works as prescribed by the Contract.

28.2 Notification of award will constitute the formation of the Contract.

28.3 Upon the furnishing of a Performance Security by the successful tenderer, the unsuccessful tenderers will promptly be notified that their tenders have been unsuccessful.

28.4 Within twenty eight [28] days of receipt of the form of Contract Agreement from the Employer, the successful tenderer shall sign the form and return it to the Employer together with the required Performance Security.

29 Performance Guarantee

29.1 Within twenty eight [28] days of receipt of the notification of award from the Employer, the successful tenderer shall furnish the Employer with a Performance Security in an amount stated in the Appendix to Instructions to Tenderers.

29.2 The Performance Security to be provided by the successful tenderer shall be an unconditional Bank Guarantee issued at the tenderer's option by an established and a reputable Bank approved by the Employer and located in the Republic of Kenya and shall be divided into two elements namely, a performance security payable in foreign currencies (based upon the exchange rates determined in accordance with clause 35.4 of the Conditions of Contract) and a performance security payable in Kenya Shillings. The value of the two securities shall be in the same proportions of foreign and local currencies as requested in the form of foreign currency requirements.

29.3 Failure of the successful tenderer to lodge the required Performance Security shall constitute a breach of Contract and sufficient grounds for the annulment of the award and forfeiture of the Tender Security and any other remedy under the Contract the Employer may award the Contract to the next ranked tenderer.

30 Advance Payment

An advance payment, if approved by the Employer, shall be made under the Contract, if requested by the Contractor, in accordance with clause 23.7 of the Conditions of Contract. The Advance Payment Guarantee shall be denominated in the proportion and currencies named in the form of foreign currency requirements. For each currency, a separate guarantee shall be issued. The guarantee shall be issued by a bank located in the Republic of Kenya, or a foreign bank through a correspondent bank located in the Republic of Kenya, in either case subject to the approval of the Employer.

APPENDIX TO INSTRUCTIONS TO TENDERERS

1. CLAUSE 2.1

Change to read "This invitation is as per the tender invitation notice".

2. OMIT

Clauses 5.1 (a), (d), (f), (h), (i), (j), 10.4, 10.5, 11.2, 11.4,15, 25, 26.6, 30

4. ADD TO CLAUSE 13.1

Amount of tender surety shall be **Kshs. 500,000/=** either from a reputable Bank or an Insurance Firm recommended by Public Procurement Regulatory Authority (PPRA)

5. ADD TO CLAUSE 29.1

Amount of performance security shall be five per cent (5%)

6. ADD TO CLAUSE 29.2

Performance security shall not be divided in two elements and shall be payable in Kenya Shillings Only.

7. ADD CLAUSE 13.2

Tender surety shall be valid for **one hundred and fifty (150) days** from the date of tender opening.

8. ADD TO CLAUSE 24

(i) In the event of a discrepancy between the tender amount as stated in the form of Tender and the corrected tender figure in the Main summary of the Bills of Quantities, the amount as stated in the Form of Tender shall prevail

(ii) The Error correction factor shall be computed by expressing the difference between the amount and the corrected tender sum as a percentage of the corrected sub-contract works (i.e. corrected tender sum less P.C; and Provisional Sums)

(iii) The Error correction factor shall be applied to all sub-contract works (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuation of variations.

9. MODIFY CLAUSE 10.5

Clause 47 is not part of the Conditions of Contract Part II.

10. MODIFY CLAUSE 16.2

Proof of authorization shall be furnished in the form of a written power of attorney which shall accompany the tender if the signatory to the tender is not a director of the company.

11. CLAUSE 28.4 AND 29.1

Replace ''twenty eight (28) days'' with ''twenty one (21) days''

12. MODIFY CLAUSE 16 & 17

Bidders to submit two set of documents (THE ORIGINAL AND A COPY) filled, signed, sealed in separate envelopes and submitted.

13. ADD TO CLAUSE 26.

The evaluation criteria in **Appendix pages A18 – A24 shall** form part of the evaluation.
The successful bidder shall be expected to provide a performance security of 10% of the contract value.

TENDER EVALUATION CRITERIA

After tender opening, the tenders will be evaluated in **4 stages**, namely:

1. Preliminary examination;
2. Technical evaluation;
3. Financial Evaluation; and
4. Due diligence.

STAGE 1: PRELIMINARY /MANDATORY REQUIREMENTS

No.	Requirement
1.	Company Certificate of incorporation/registration;
2.	Current Certificate of Registration with National Construction Authority (NCA) in Electrical Installations works –category **NCA3 and above**
3.	Current Certificate of Registration with National Construction Authority (NCA) in Generator Installations works –category **NCA3 and above**
4.	Current Certificate of Registration with National Construction Authority (NCA) CCTV Surveillance system Installations works –category **NCA3 and above**
5.	Current Certificate of Registration with National Construction Authority (NCA) Structured cabling system Installations works –category **NCA3 and above**
6.	Current NCA contractor's annual practicing license
7.	Current Class of Licenses with **BOTH** the Energy Regulatory Commission ERC A1 and Communication Authority of Kenya CAK
8.	The Bid has been submitted in the format required by the procuring entity (the bid should be submitted complete with all the sections as issued by the procuring entity);
9.	Provision of a tender Security of Kshs. **500,000.00** that is in the required format, amount and that the tender is valid for the period required;
10.	Duly filled Form of Tender
11.	Valid Tax Compliance Certificate;
12.	Duly filled Confidential Business Questionnaire
13.	Duly signed Statement of Compliance
14.	Provide Form CR12 from the Registrar of Companies
15.	Proof of authorization shall be furnished in the form of a written power of attorney which shall accompany the tender if the signatory to the tender is not a director of the company (provide name and attach proof of citizenship of the signatory to the Tender).
16.	Manufacturer's Authorization Letter for the Generator sets, UPS, AVS and CCTV cameras, network switches, NVR equipment being offered by the bidder
17.	Indicate the principal place of business. (Attach a current lease agreement from landlord or trade license from the respective county)
18.	Provide **1 ORIGINAL** copy of the tender document clearly **marked ORIGINAL** and **1** other copy marked **COPY** and all placed in one envelope
19.	Duly signed Sworn Anti-corruption affidavit
20.	Bidders to provide evidence of at least three similar contracts completed in the last five years with a value of **Kshs forty Million and above**. Attach copies of contracts/LSO, respective completion certificates and recommendation letters.
21.	Audited reports of financial statement for the last three (3) years.
22.	Signed site visit form
23.	Ensure serialization of all pages of the bid submitted
24.	Submit a statement in the letterhead of the bidder indicating that the company is not insolvent, in receivership, bankrupt or in the process of being wound up
25.	Submit a statement in the bidder's letter head indicating that the person or his or her sub-contractor, if any is not debarred from participating in procurement proceedings.
26.	Submit a statement in the bidder's letter head indicating that the person participating in procurement proceedings has not been convicted of corrupt or fraudulent practices

STAGE 2: TECHNICAL EVALUATION

The tender document shall be examined based on clause 2.2 of the Instructions to Tenderers which states as follows:

In accordance with clause 2.2 of Instruction to Tenderers, the tenderers will be required to provide evidence for eligibility of the award of the tender by satisfying the employer of their eligibility under sub clause 2.1 of Instructions to Tenderers and their capability and adequacy of resources to effectively carry out the subject contract.

In order to comply with provisions of clause 2.2 of Instruction to Tenderers, the tenderers shall be required to submit the items provided in the table below and will be evaluated against each requirement ;

Technical evaluation criteria

NO.	PARAMETERS	MAXIMUM SCORES	SCORE
i	Evaluation based on compliance with the Technical specifications (Duly filled Bill of Quantities)	5	
	To supply equipments/items which comply with the technical specifications set out in the bid document. In this regard, the bidders shall be required to submit relevant technical brochures/catalogues with the tender document, highlighting the Catalogue Numbers of the proposed items. Such brochures/catalogues should indicate comprehensive relevant data of the proposed equipment/items which should include but not limited to the following: (i) Standards of manufacture; (ii) Performance ratings/characteristics; (iii)Material of manufacture; (iv)Electrical power ratings; and (v) Any other necessary requirements (Specify). The bids will then be analyzed, using the information in the technical brochures, to determine compliance with key technical specifications for the works/items as indicated in the tender document. Bidders not complying with **any** of the key technical specifications shall be awarded **0 marks** while those meeting all the key technical specifications shall be awarded **20 marks**	20	
ii	Experience as main contractor in 3 projects of a similar nature and size for the past five (5) years, and details of work under way or contractually committed; and names and addresses of 3 companies who may be contacted for further information on these contracts. Works cited should be at least 70 percent complete. Attach completion certificates, recommendation letters from previous clients	15	

NO.	PARAMETERS	MAXIMUM	SCORE
iii	Qualifications and experience of key site management and technical personnel proposed for the Contract and must individually provide an undertaking that they shall be available for the Contract. Attach signed **Curriculum Vitae {CV}** of at least five (5) technically qualified staff and attach organizational structure of the firm. The staff must include and not limited to Architect, Quantity surveyor, Mechanical Engineer, Electrical Engineer, Structural Engineer, Contract/Project manager **MUST** have at least seven years' experience in works of an equivalent nature and volume, including no less than five years as Manager. All other technical personnel **MUST** have at least five years' experience in works of an equivalent nature and volume.	10	
iv	Major construction equipment proposed to carry out the works and an undertaking that they will be available for the Contract the equipment should include and not limited to concrete mixers, hoist / cranes, lorries and trucks, pickups, excavator, earth moving equipment, concrete pump, generator. Bidders to attach the applicable ownership documents and or evidence of leasing the equipment.	10	
v	Evidence of adequacy of working capital for this Contract or access to line(s) of credit facilities, from major relevant material suppliers, manufacturers or dealers all to a minimum facility (ies) of Kshs 20,000,000.00.	20	
	Financial Resources:	20	
	Financial capability of the firm based on information provided in the last **Three (3) years** audited accounts • Current assets : Current liabilities (3 marks) • Working capital (3 marks) • Positive profit trends for the last two years (3 marks) • The 50,000,000.00 for each of the last 3 years.		
	TOTAL	**100%**	

NOTE: The pass mark to proceed to the financial evaluation stage shall be 80 % (>= 80%). Evaluation shall be done based on the evaluation criteria provided.

STAGE 3 - FINANCIAL EVALUATION

Upon completion of the technical evaluation a detailed financial evaluation shall follow.

The evaluation shall be in **three stages**

a) Determination of Arithmetic errors
b) Comparison of Rates; and
c) Consistency of the Rates.

A) Determination of Arithmetic Errors

Arithmetic Errors will be corrected by the Procuring Entity as follows:

i) In the event of a discrepancy between the tender amount as stated in the form of Tender and the corrected tender figure in the Main summary of the Bills of Quantities, the amount as stated in the Form of Tender shall

prevail. Pursuant to Section 82 of the Public Procurement and Asset Disposal Act 2015, the tender sum as submitted and read out during the tender opening shall be absolute and final and shall not be the subject of correction, adjustment or amendment in any way by any person or entity;

If, in the opinion of the Tender Evaluation Committee, the arithmetic error is substantial and is to the disadvantage of the bidder under consideration, then the bidder under consideration shall be notified in writing for concurrence of such an error. If such a bidder does not concur with the error, then the bidder shall be considered financially non-responsive and disqualified from further analysis.

ii) Error correction factor shall be computed by expressing the difference between the amount and the corrected tender sum as a percentage of the corrected contract works (i.e. corrected tender sum less P.C; and Provisional Sums);

iii) The Error correction factor shall be applied to all contract works (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuation of variations.

B) Comparison of rates

Items that are underpriced or overpriced may indicate potential for non-delivery and front loading
respectively. The committee shall promptly write to the tenderer asking for detailed breakdown of costs for any of the quoted items, relationship between those prices, proposed construction/installation methods and schedules.

The evaluation committee shall evaluate the responses and make an appropriate recommendation to the procuring entity giving necessary evidence. Such recommendations may include but not limited to:

a) Recommend no adverse action to the tenderer after a convincing response;

b) Employer requiring that the amount of the performance bond be raised at the expense of the successful tenderer to a level sufficient to protect the employer against potential financial losses;

c) Recommend non-award based on the response provided and the available demonstratable evidence that the scope, quality, completion timing, administration of works to be undertaken by the tenderer, would adversely be affected or the rights of the employer or the tenderers obligations would be limited in a substantial way.

C) **Consistency of the Rates**

The evaluation committee will compare the consistency of rates for similar items and note all inconsistencies
of the rates for similar items.

STAGE 4 – DUE DILIGENCE

The Evaluation Committee may verify all or part of the information provided.

SECTION B

CONDITIONS OF CONTRACT

CONDITIONS OF CONTRACT

1.0 Definitions

In this contract, except where context otherwise requires, the following terms shall be interpreted as indicated;

"Bills of quantities" means the priced and completed bill of quantities forming part of the tender.

"Compensation Events" are those defined in clause 24 hereunder

"Completion date" means the date of completion of the works as certified by the Project Manager, in accordance with Clause 31.

"The Contract" Means the agreement entered into between the Employer and the Contactor as recorded in the Agreement Form and signed by the parties including all attachments and appendices thereto and all documents incorporated by reference therein to execute, complete, and maintain the Works,

"The Contractor" refers to the person or corporate body whose tender to carry out the Works has been accepted by the Employer.

"The Contractor's Tender" is the completed tendering document submitted by the Contactor to the Employer.

"The Contract Price" is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

"Days" are calendar days; **"months"** are calendar months.

"Defects" is any piece of work not completed in accordance with the Contract.

"The Defects Liability Certificate" is the certificate issued by project Manager upon correction of defects by the Contractor.

"The Defects Liability Period" is the period named in the Contract Data and calculated from the Completion Date.

"Drawings" include calculations and other information provided or approved by the Project Manager for the execution of the Contract.

"Dayworks" are Work inputs subject to payment on a time basis for labour and the associated materials and plant.

"Employer" or the **"procuring entity"** as defined in the Public Procurement Regulations (i.e. Central or Local Government administration, Universities, Public Institutions and Corporations, etc is the party who employs the Contractor to carry out the Works.

"Equipment" is the Contractor's machinery and vehicles brought temporarily to the Site for the execution of the Works.

"The intended completion date" is the date on which it is intended that the Contractor shall complete the works. The intended Completion Date may be revised only by the Project manager by issuing an extension of time or acceleration in the Works.

"Materials" are all supplies, including consumables, used by the Contractor for incorporation in order.

"Plant" is any integral part of the Works that shall have a mechanical, electrical, chemical or biological function.

"Project Manager" is the person named in the Appendix to Conditions of Contract (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract and shall be an "Architect" or a "Quantity Surveyor registered under the Architects and Quantity Surveyors Act Cap 525 or an "Engineer" registered under Engineers Registration Act Cap 530.

"Site" means the place or places where the permanent Works are to be carried out including workshops where the same is being prepared.

"Site Investigation Reports" are those reports that may be included in the tendering documents which are factual and interpretative about the surface and subsurface conditions at the Site.

"Specifications" means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.

"Start Date" is the date when the Contractor shall commence execution of the Works.

"A Sub-contractor" is a person or corporate body who has a Contract with the Contractor to carry out a part of the Work in the Contract, which includes Work on the Site.

"Temporary works" are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

"Employer's Representative" is the person appointed by the Employer and notified to the Contractor for the purpose of supervision of the Works.

"A Variation" is an instruction given by the Employer's Representative which varies the Works.

"The Works" are what the Contract requires the Contractor to construct, install, and turnover to the Employer.

2.0 Interpretation

2.1 In interpreting the Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning in English Language unless specifically defined. The Project Manager will provide instructions clarifying queries about these Conditions of Contract.

2.2 If sectional completion is specified in the Appendix to Conditions of Contract, reference in the Conditions of Contract to the Works, the Completion Date and the Intended Completion Date apply to any section of the Works (other than references to the Intended Completion Date for the whole of the Works).

2.3 The following documents shall constitute the Contract documents and shall be interpreted in the following order of priority;

(1) Agreement,
(2) Letter of acceptance,
(3) Contractor's Tender,
(4) Appendix to Conditions of Contract,
(5) Conditions of Contract,
(6) Specifications,
(7) Drawings,
(8) Bills of Quantities,
(9) Any other documents listed in the Appendix to Conditions of Contract as forming part of the contract.

2.4 Immediately after the execution of the contract, the Project Manager shall furnish both the Employer and the Contractor with two copies each of all the Contract documents. Further, as and when necessary the Project manager shall furnish the Contractor {always with a copy to the Employer) with three ({3} copies of such further drawings or details or descriptive schedules as are reasonably necessary either to explain or amplify the Contract drawings or to enable the Contractor to carry out and complete the Works in accordance with these Conditions.

3. Language and Law

3.1 Language of Contract and the law governing the Contract shall be English language and the Laws of Kenya respective unless otherwise stated.

4. Project Manager's Decisions

4.1 Except where otherwise specifically stated, the Project Manager will decide contractual matters between the Employer and the Contract in the role representing the Employer.

5. Delegation

5.1 The Project manager may delegate any of his duties and responsibilities to others after notifying the Contractor.

6. Communications

6.1 Communication between parties shall be effective only when in writing. A notice shall be effective only when it is delivered.

7. Subcontracting

7.1 The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities etc. as listed in the Appendix to Conditions of Contract and also with the Employer, as per the directions of the Project Manager. The Contractor shall also provide facilities and services for them. The employer may modify the said List of Other Contractors etc., and shall notify the Contractor of any such modification.

9. Personnel

9.1 The Contractor shall employ the key personnel named in the Qualification Information, to carry out the functions stated in the said information or other personnel approved by the Project Manager. The Project Manager will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are substantially equal to or better than those of the personnel listed in the Qualification Information. If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within Seven days and has no further connection with the Work in the Contract.

10. Works

10.1 The Contractor shall construct and install the works in accordance with the Specifications and Drawings. The Works may commence on the Start Date and shall be carried out in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Intended Completion Date.

11. Safety and Temporary Works

11.1 The Contractor shall be responsible for the design of temporary works. However before erecting the same, he shall submit his designs including specifications and drawings to the Project Manager and to any other relevant third parties for their approval. No erection of temporary works shall be done until such approvals are obtained.

11.2 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary works and all drawings prepared by the Contractor for the execution of the temporary or permanent works, shall be subject to prior approval by the Project Manager before they can be used.

11.3 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary works and all drawings prepared by the Contractor for the execution of the temporary or permanent works, shall be subject to prior approval by the Project Manager before they can be used.

11.4 The Contractor shall be responsible for the safety of all activities on the Site.

12. Discoveries

12.1 Anything of historical or other interest or of significant value unexpectedly discovered on Site shall be the property of the Employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project manager's instructions for dealing with them.

13. Work Program

13.1 Within the time stated in the appendix to Conditions of Contract, the Contractor shall submit to the Project Manager for approval a program showing the general methods, arrangements, order, and timing for all the activities in the Works. An update of the program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.

13.2 The Contractor shall submit to the Project Manager for approval an updated program at intervals no longer than the period stated in the Appendix to Conditions of Contract. If the Contractor does not submit an updated program within this period, the Project Manager may withhold the amount stated in the said Appendix from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue program has been submitted. The Project Manager's approval of the program shall not alter the Contractor's obligations. The Contractor may revise the program and submit it to the Project Manager again at any time. A revised program shall show the effect of Variations and Compensation Events.

14. Possession of Site

14.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Appendix to Conditions of Contract, the Employer will be deemed to have delayed the start of the relevant activities, and this will be Compensation Event.

15. Access to Site

15.1 The Contractor shall allow the Project manager and any other person authorized by the Project Manager, access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

16. Instructions

16.1 The Contractor shall carry out all instructions of the Project Manager which are in accordance with the Contract.

17. Extension of Acceleration of Completion Date

17.1 The Project manager shall extend the Intended Completion Date if a Compensation Event occurs or a variation is issued which makes it impossible for completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost. The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager in writing for a decision upon the effect of a Compensation Event or variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay caused by such failure shall not be considered in assessing the new (extended) Completion Date.

17.2 No bonus for early completion of the Works shall be paid to the Contractor by the Employer

18. Management Meetings

18.1 A Contractor management meeting shall be held monthly and attended by the Project Manager and the Contractor. Its business shall be to review the plans for the remaining Work and to deal with matters raised in accordance with the early warning procedure. The Project manager shall record the minutes of management meetings and provide copies of the same to those attending the meeting and the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

19. Early Warning

19.1 The Contractor shall warn the Project at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the Work increase the Contract Price or delay the execution of the Works. The Project Manager may required the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.

19.2 The Contractor shall cooperate with the Project Manager in making and considering proposals on how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the Work and in carrying out any resulting instruction of the Project Manager.

20. Defects

20.1 The Project Manager shall inspect the Contractor's work and notify the Contractor of any defects that are found. Such inspection shall not affect the Contractor's responsibilities.The Project Manager may instruct the Contractor to search for a defect and to uncover and test any work that the Project manager considers may have defects. Should the defect be found, the cost of uncovering and making good shall be borne by the Contractor. However, if there is no defect found, the cost of uncovering and making good shall be treated as a variation and added to the Contract Price.

20.2 The Project Manager shall give notice to the Contractor of any defects before the end of the Defect Liability Period, which begins at completion, and is defined in the Appendix to Conditions of contract. The Defects Liability Period shall be extended for as long as defects remain to be corrected.

20.3 Every time notice of a defect is given, the Contractor shall correct the notified defect within the length of time specified by the Project Manager's notice. If the Contractor has not corrected a defect within the time specified in the Project Manager's notice, the Project Manager will assess the cost of having the defect corrected by other parties and such cost shall be treated as a variation and be deducted from the Contract Price.

21. Bills of Quantities

21.1 The Bills of Quantities shall contain items for the construction, installation, testing and commissioning of the work to be done by the Contractor. The Contractor will be paid for the quantity of the work done at the rate in the Bills of Quantities for each item.

21.2 If the final quantity of the work done differs from the quantity in the Bills of Quantities for the particular item by more than 25 percent and provided the change exceeds 1 percent of the Initial Contractor price, the Project Manager shall adjust the rate to allow for the change.

21.3 If requested by the Project Manager, the Contractor shall provide the Project manager with a detailed cost breakdown of any rate in the Bills of Quantities.

22. Variations

22.1 All variations shall be included in updated programs produced by the Contractor.

22.2 The Contractor shall provide the Project Manager with a quotation for carrying out the variations when requested to do so. The Project Manager shall assess the quotation, which shall be given within seven days of the request or within any longer period as may be stated by the Project Manager and before the Variation is ordered.

22.3 If the work in the variation corresponds with an item description in the Bills of Quantities and if in the opinion of the Project Manager, the quantity of work is not above the limit stated in Clause 21.2 or the timing of its execution does not cause the cost per unit of quantity to change, the rate in the Bills of Quantities shall be used to calculate the value of the variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the variation doe not correspond with items in the Bills of Quantities, the quotation by the contractor shall be in the form of new rates for the relevant items of work.

22.4 If the Contractor's quotation is unreasonable, the Project manager may order the variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the variation on the Contractor's cost

22.5 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the works, no quotation shall be given and the variation shall be treated as a Compensation Event.

22.6 The Contractor shall not be entitled to additional payment for cost that could have been avoided by giving early warning.

22.7 When the Program is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast.

23. Payment Certificates, Currency of Payments and Advance Payments

23.1 The Contractor shall submit to the Project Manager monthly applications for payment giving sufficient details of the Work done and materials on Site and the amounts which the Contractor considers himself to be entitles to. The Project Manager shall check the monthly application and certify the amount to be paid to the Contractor within 14 days. The value of work executed and payable shall be determined by the Project Manager.

23.2 The value of work executed shall comprise the value of the quantities of the items in the Bills of Quantities completed, materials delivered on site, variations and compensation events. Such materials shall become the property of the Employer once the Employer has paid the Contractor for their value. Thereafter, they shall not be removed from site without the Project Manager's instructions except for use upon the works.

23.3 Payments shall be adjusted for deductions for retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 30 days of the date of issue of each certificate. If the Employer makes a late payment, the Contractor shall be paid simple interest on the late payment in the next payment. Interest shall be calculated on the basis of number of days delayed at a rate three percentage points above the Central Bank of Kenya's average rate for base lending prevailing as of the first day the payment becomes overdue.

23.4 If an amount certified is increased in a later certificate of a result of an award by an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

23.5 Items of the works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

23.6 The Contract Price shall be stated in Kenya Shillings. All payments to the contractor shall be made in Kenya Shillings and foreign currency in the proportion indicated in the tender, or agreed prior to the execution of the Contract Agreement and indicated therein. The rate of exchange for the calculation of the amount of foreign currency payment shall be the rate of exchange indicated in the Appendix to Conditions of Contract. If the contractor indicated foreign currencies for payment other than the currencies of the countries of origin of related goods and services. The Employer reserves the right to pay the equivalent at the time pf payment in the currencies of the countries of such goods and services.

The Employer and the Project manager shall be notified promptly by the Contractor of an changes in the expected foreign currency requirements of the Contractor during the execution of the works as indicated in the Schedule of Foreign Currency Requirements and the foreign and local currency portions of the balance of the Contract Price shall then be amended by agreement between Employer and the Contractor in order to reflect appropriately such changes.

23.7 In the event that an advance payment is granted, the following shall apply:-

a) On signature of the Contract, the Contractor shall at his request, and without furnishing proof of expenditure, be entitled to an advance of 10% (ten percent) of the original amount of the contract. The advance shall not be subject to retention money.

b) No advance payment may be made before the Contractor has submitted proof of the establishment of deposit or a directly liable guarantee satisfactory to the Employer in the amount of the advance payment. The guarantee shall be in the same currency as the advance.

c) Reimbursement of the lump sum advance shall be made by deductions from the Interim payments and where applicable from the balance owing to the contractor. Reimbursement shall begin when the amount of the sums due under the Contract reaches 20% of the original amount of the contract. It shall have been completed by the time 80% of this amount is reached.

The amount to be repaid by way of successive deductions shall be calculated by means of the formula:

$$\mathbf{R} = \frac{\mathbf{A(X^1 - X^{11})}}{80 - 20}$$

Where:

R = the amount to be reimbursed

A = the amount of the advance which has been granted

X^1 = the amount of proposed cumulative payments as a percentage of the original amount of the Contract. This will exceed 20% but not exceed 80%.

X^{11} = the amount of the previous cumulative payments as a percentage of the original amount of the Contract. This figure will be below 80% but not less than 20%.

d) With each reimbursement the counterpart of the directly liable guarantee may be reduced accordingly.

24. Compensation Events

24.1 The following issues shall constitute Compensation Events.

a) The Employer does not give access to a part of the site by the Site Possession Date stated in the Appendix to Conditions of Contract.

b) The Employer modifies the List of Other Contractors, etc., in a way that affects the Work of the Contractor under the Contract.

c) The Project Manager orders a delay or does not issue drawings, specifications or instructions required for execution of the works on time.

d) The Project Manager instructs the contractor to uncover or to carry out additional tests upon the work, which is then found to have no defects.

e) The Project Manager unreasonably does not approve a subcontract to be let.

f) Ground conditions are substantially more3 adverse than could reasonably have been assume ed before issuance of the Letter of Acceptance from the information issued to tenderers (including the site investigation reports), from information available publicly and from a visual inspection of the site.

g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer or additional works required for safety or other reasons.

h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.

i) The effects on the Contractor of any of the Employer's risks.

j) The Project Manager unreasonably delays issuing a Certificate of Completion.

k) Other compensation events described in the Contract or determined by the Project manager shall apply

24.2 If a compensation event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

24.3 As soon as information demonstrating the effect of each compensation event upon the Contractor's forecast cost has been provided by the Contract, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly.

24.4 If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager will assume that the Contractor will react competently and promptly to the event.

24.5 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having co-operated with the Project Manager.

24.6 Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the Appendix to Conditions of Contract.

24.7 The Contractor shall give written notice to the Project Manager of his intention to make a claim within thirty days after the event giving rise to the claim has first arisen. The claim shall be submitted within thirty days thereafter.Provided always that should the event giving rise to the claim of continuing effect, the Contractor shall submit an interim claim within the said thirty days and a final claim within thirty days of the end of the event giving rise to the claim.

25. Price Adjustment

25.1 The Project Manager shall adjust the Contract Price if taxes, duties and other levies are changed between the date 30 days before the submission of tenders for the Contract and the date of Completion. The adjustment shall be the change in the amount of tax payable by the Contractor.

25.2 The Contract Price shall be deemed to be based on exchange rates current at the date of tender submission in calculating the cost to the Contractor of materials to be specifically imported (by express provision in the Contract Bills of Quantities or Specifications) for permanent incorporation in the Works.

25.3 Unless otherwise stated in the Contract, if any time during the period of the Contract exchange rates shall be varied and this shall affect the cost to the Contractor of such materials, then the Project Manager shall assess the net difference in the cost of such materials. Any amount from time to time so assessed shall be added to or deducted from the Contract Price, as case may be.

25.4 Unless otherwise stated in the Contract, the Contract Price shall be deemed to have been calculated in the manner set out below and in sub-clauses 25.4 and 25.5 and shall be subject to adjustment in the events specified thereunder;

i) The price contained in the Contract Bills of Quantities shall be deemed to be based upon the rates of wages and other emoluments and expenses as determined by the Joint Building Council of Kenya (J.B.C.) and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the schedule used by the Contractor in his pricing shall be attached in the Appendix to Conditions of Contract.

ii) Upon J.B.C. determining that any of the said rates of wages or other emoluments and expenses are increased or decreased, then the Contract Price shall be increased or decreased by the amount assessed by the Project Manager based upon the difference, expressed as a percentage, between the rate set out in the schedule of basic rated issued 30 days before the date for submission or tenders and the rate published by the J.B.C. and applied to the quantum of labour incorporated within the amount of work remaining to be executed at the date of publication of such increase or decrease.

iii) No adjustment shall be made in respect of changes in the rates of wages and other emoluments and expenses which occur after the date of Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.

25.5 The price contained in the Contract Bills of Quantities shall be deemed to be based upon the basic prices of materials to be permanently incorporated in the works as determined by the J.B.C. and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the schedule used by the Contractor in his pricing shall be attached in the Appendix to Conditions of Contract.

25.6 Upon the J.B.C. determining that any of the said basic prices are increased or decreased then the Contract Price shall be increased or decreased by the amount to be assessed by the Project Manager based upon the difference between the price set out in the schedule of basic rates issued 30 days before the date for submission of tenders and the rate published by the J.B.C. and applied to the quantum of the relevant materials which have not been taken into account in arriving at the amount of any interim certificate under clause 23 of these Conditions issued before the date of publication of such increase or decrease.

25.7 No adjustment shall be made in respect of changes in basic prices of materials which occur after the date for Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.

25.8 The provisions of sub-clause 25.1 to 25.2 herein shall not apply in respect of any materials included in the schedule of basic rate.

26. Retention

26.1 The Employer shall retain from the payment due to the Contractor the proportion stated in the Appendix to Conditions of Contract until Completion of the whole of the works. On Completion of the whole of the works, half the total amount retained shall be repaid to the Contractor and the remaining half when the Defects Liability Period has passed and the Project manager has certified that all defects notified to the Contractor before the end of this period have been corrected.

27. Liquidated damages

27.1 The Contractor shall pay liquidated damages to the Employer at the rate stated in the Appendix to Conditions of Contract for each day that the actual Completion Date is later than the Intended Completion Date. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not alter the Contractor's liabilities.

27.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rate specified in Clause 23.30.

28. Securities

28.1 The Performance Security shall be provided to the Employer not later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a reputable bank acceptable to the Employer, and denominated in Kenya shillings. The Performance Security shall be valid until a date 30 days beyond the date of issue of the Certificate of Completion.

29. Day works

29.1 If applicable, the Day works rates in the Contractor's tender shall be used for small additional amounts of work only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.

29.2 All work to be paid for as Day works shall be recorded by the Contractor on Forms approved by the Project Manager. Each completed form shall be verified and signed by the Project manager within two days of the work being done.

29.3 The Contractor shall be paid for Day works subject to obtaining signed Day works forms.

30. Liability and Insurance

30.1 From the Start Date until the Defects Correction Certificate has been issued, the following are the Employer's risks:

a) The risk of personal injury, death or loss of or damage to property (excluding the works, plant, materials and equipment), which are due to;

i) use or occupation of the site by the works or for the purpose of the works, which is the unavoidable result of the works, or
ii) negligence, breach of statutory duty or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.

b) The risk of damage to the works, plant, materials, and equipment to the extent that it is due to a fault of the Employer or in Employer's design, or due to war or radioactive contamination directly affecting the place where the works are being executed.

30.2 From the Completion Date until the Defects Correction Certificate has been issued, the risk of loss of or damage to the works, plant, and materials is the Employer's risk except loss or damage due to;

a) a defect which existed on or before the Completion Date.

b) An event occurring before the Completion Date, which was not itself, the Employer's risk.

c) The activities of the Contractor on the Site after the Completion Date.

30.3 From the Start Date until the Defects Correction Certificate has been issued, the risks of personal injury, death and loss of or damage to property (including, without limitation, the works, plant, materials, and equipment) which are not Employer's risk are contractor's risks.

30.4 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts stated in the Appendix to Conditions of Contract for the following events;

a) loss of or damage to the works, plant and materials;
b) loss of or damage to Equipment;
c) loss of or damage to property (except the works, plant materials, and equipment) in connection with the Contract, and
d) personal injury or death.

30.5 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation required to rectify the loss or damage incurred.

30.6 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

30.7 Alterations to the terms of insurance shall not be made without the approval of the Project Manager. Both parties shall comply with any conditions of insurance policies.

31. Completion and Taking over

31.1 Upon deciding that the works are complete, the Contractor shall issue a written request to the Project Manager to issue a Certificate of Completion of the works. The Employer shall take over the site and the works within seven (7) days of the Project manager's issuing a Certificate of Completion.

32. Final Account

32.1 The Contractor shall issue the Project Manager with a detailed account of the total amount that the Contractor considers payable to him by the Employer under Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 30 days of receiving the Contractor's account if it is correct and complete.

32.2 If it is not, the Project Manager shall issue within 30 days a schedule that states the scope of the corrections or additions that are necessary. If the final account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a Payment Certificate.

32.3 The Employer shall pay the Contractor the amount due in the Final certificate within 60 days.

33. Termination

33.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. These fundamental breaches of Contract shall include, but shall not be limited to, the following;

a) The Contractor stops work for 30 days when no stoppage of work is shown on the current program and the stoppage has not been authorized by the Project Manager.

b) The Project Manager instructs the Contractor to delay the progress of the works, and the instruction is not withdrawn within 30 days.

c) The Contractor is declared bankrupt or goes into liquidation other than for a reconstruction or amalgamation.

d) A payment certified by the Project Manager is not paid by the Employer to the Contractor within 30 days (for Interim Certificate) or 60 days (for Final Certificate) of issue.

e) the Project Manager gives notice that failure to correct a particular defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager.

f) the Contractor does not maintain a security, which is required.

33.2 When either party to the contract gives notice of Contract to the Project Manager for a cause other than those listed under Clause 33.1 above, the Project Manager shall decide whether the breach is fundamental or not.

33.3 Notwithstanding the above, the Employer may terminate the Contract for convenience.

33.4 If the Contractor is terminated, the contractor shall stop work immediately, make the site safe and secure, and leave the site as soon as reasonably possible.

33.5 The Project Manager shall immediately thereafter arrange for a meeting for the purpose of taking record of the works executed and materials, goods, equipment and temporary buildings on site.

34. Payment Upon Termination

34.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and materials ordered and delivered to site up to the issue of the certificate. Additional liquidated damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable by the contractor.

34.2 If the contract is terminated for the Employer's convenience or because of a fundamental breach of contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, materials ordered, the reasonable cost of removal of equipment, repatriation of the Contractor's personnel employed solely on the works, and the Contractor's costs of protecting and securing the works.

34.3 The Employer may employ and pay other persons to carry out and complete the works and to rectify and defects and may enter upon the works and use all materials on the site, plant, equipment and temporary works.

34.4 The contractor shall, during the execution or after the completion o the works under this clause remove from the site as and when required, within such reasonable time as the Project Manager may in writing specify, any temporary building, plant, machinery, appliances, goods or materials belonging to or hired by him, and in default the Employer may (without being responsible for any loss or damage) remove and sell any such property of the Contractor, hold the proceeds less all costs incurred to the credit of the Contractor.

34.5 Until after completion of the works under this clause the Employer shall not be bound by any other provision of this Contract to make any payment to the Contractor, but upon such completion as aforesaid and the verification within a reasonable time of the accounts therefore the Project Manager shall certify the amount of expenses properly incurred by the Employer and, if such amount added to the money paid to the Contractor before such determination exceeds the total amount which would have been payable on due completion in accordance with this Contract the difference shall be a debt payable to the Employer by the Contract; and if the said amount added to the said money be less than the said total amount, the difference shall be a debt payable by the Employer to the Contractor.

35. Release from Performance

35.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it.

36. Corrupt gifts and Payment of Commission

36.1 The Contractor shall not;

a) Offer or give or agree to give to any person in the service of the Employer any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other Contract for the Employer or for showing or forbearing to show favour or disfavour to any person in relation to this or any other contract for the Employer.

b) Enter into this or any other contract with the Employer in connection with which commission has been paid or agreed to be paid by him or on his behalf or to his knowledge, unless before the Contract is made particulars of any such commission and of the terms and conditions of any agreement for the payment thereof have been disclosed in writing to the Employer.

36.2 Any breach of this Condition by the Contractor or by anyone employed by his or acting on his behalf (whether with or without the knowledge of the Contractor) shall be an offence under the provisions of the Public Procurement Regulations issued under the Exchequer and Audit Act Cap 412 of the Laws of Kenya.

37. Settlement of Disputes

37.1 In case any dispute or difference shall arise between the Employer or the Project Manager on his behalf and the Contractor, either during the progress or after the completion or termination of the works, such dispute shall be notified in writing by either party to the other with a request to submit it to arbitration and to concur in the appointment of an Arbitrator within thirty days of the notice. The dispute shall be referred to the arbitration and final decision of a person to be agreed between the parties. Failing agreement to concur in the appointment of an Arbitrator, the Arbitrator shall be appointed by the Chairman or Vice Chairman of any of the following professional institutions;

(i) Architectural Association of Kenya

(ii) Institute of Quantity Surveyors of Kenya

(iii) Association of Consulting Engineers of Kenya

(iv) Chartered Institute of Arbitrators (Kenya Branch)

(v) Institute of Engineers of Kenya

On the request of the applying party, the institution written to first by the aggrieved party shall take precedence over all other institutions.

37.2 The arbitration may be on the construction of this Contract or on any matter or thing of whatsoever nature arising hereunder or in connection therewith, including any matter or thing left by this Contract to the discretion of the Project Manager, or the withholding by the Project Manager of any certificate to which the Contractor may claim to be entitled to or the measurement and valuation referred to in clause 23.0 of these conditions, or the rights and liabilities of the parties subsequent to the termination of Contract.

37.3 Provided that no arbitration proceedings shall be commenced on any dispute or difference where notice of a dispute or difference has not been given by the applying party within ninety days of the occurrence or discovery of the matter or issue giving rise to the dispute.

37.4 Notwithstanding the issue of a notice as stated above, the arbitration of such a dispute or difference shall not commence unless an attempt has in the first instance been made by the parties to settle such dispute or difference amicably with or without the assistance of third parties. Proof of such attempt shall be required.

37.5 Notwithstanding anything stated herein the following matters may be referred to arbitration before the practical completion of the works or abandonment of the works or termination of the Contract by either part:

a. The appointment of a replacement Project Manager upon the said person ceasing to act.

b. Whether or not the issue of an instruction by the Project Manager is empowered by these Conditions

c. Whether or not a certificate has been improperly withheld or is not in accordance with these Conditions.

d. Any dispute or difference arising in respect of war risks or war damage.

37.6 All other matter shall only be referred to arbitration after the completion or alleged completion of the works or termination or alleged termination of the Contract, unless the Employer and the Contractor agree otherwise in writing.

37.7 The Arbitrator shall, without prejudice to the generality of his powers, have powers to direct such measurements, computations, tests or valuations as may in his opinion be decision, requirement or notice and to determine all matters in dispute which shall be submitted to him in the same manner as if no such certificate, opinion, decision requirement or notice had been given.

37.8 The award of such Arbitrator shall be final and binding upon the parties.

APPENDIX TO CONDITIONS OF CONTRACT

CONDITIONS OF CONTRACT CLAUSE 1
The Employer is: **Government of the Republic of Kenya,**

Represented by **The Director General,**
Kenya Civil Aviation Authority.
Address: **P.O. Box 30163-00100, Nairobi**

CONDITIONS OF CONTRACT CLAUSE 1

The Project Manager is **Chief Engineer (Electrical)**
M.T.I.PW.H &UD
State Department of Public Works
Address: **P.O. Box 41191 – 00100, Nairobi**

Telephone: **2247277**

The name (and identification number) of the Contract is: **Proposed Refurbishment of Electrical Power Supply Distribution the Kenya Civil Aviation Authority Stations – JKIA Tower, JKIA Radar, Stony-Athi, Ngong Hills and Mua Hills Radar stations.**

TENDER No. KCAA/009/2019-2020

The Contract Works consist of **Proposed Supply, Installation, Testing & Commissioning of Electrical, Generator sets, UPS, AVS and IP CCTV Surveillance System Installation Works**

CONDITIONS OF CONTRACT CLAUSE 1
The Site is located **at the Kenya Civil Aviation Authority Stations – JKIA Tower, JKIA Radar, Stony-Athi, Ngong Hills and Mua Hills Radar stations.**

CONDITIONS OF CONTRACT CLAUSE 13
The contractor shall submit a revised program for the works within **7 days** of delivery of the letter of acceptance.

CONDITIONS OF CONTRACT CLAUSE 1
The Defects Liability Period is **12 months from practical completion date**

CONDITIONS OF CONTRACT CLAUSE 32
Period of final measurement: **6 months after practical completion**

CONDITIONS OF CONTRACT CLAUSE 27
Liquidated and Ascertained damages: **At the rate of Kshs. 25, 000.00 per week or part thereof**

CONDITIONS OF CONTRACT CLAUSE 23

Percentage of certified value retained: **10%**

Limit of certified value retained : **5%**

Period between program updates is **14 days**

The completion period for the contract works is **16 (Sixteen) weeks**

OMIT CLAUSE 23.7

SECTION C

CONTRACT PRELIMINARIES

AND

GENERAL CONDITIONS

CONTRACT PRELIMINARIES AND GENERAL CONDITIONS

SECTION C

CONTRACT PRELIMINARIES AND GENERAL CONDITIONS

1.01 Examination of Tender Documents

The tenderer is required to check the number of pages of this document and should he find any missing or indistinct, he must inform the Engineer at once and have the same rectified.

All tenderers shall be deemed to have carefully examined the following:

a) Work detailed in the Specification and in the Contract Drawings.

b) The Republic of Kenya Document "General Conditions of Contract for Electrical and Mechanical Works".

c) Other documents to which reference is made.

He shall also be deemed to have included for any expenditure which may be incurred in conforming with the above items (a), (b), (c) and observe this expense as being attached to the contract placed for the whole or any part of the work.

The tenderer shall ensure that all ambiguities, doubts or obscure points of detail, are clarified with the Engineer before submission of his tender, as no claims for alleged deficiencies in the information given shall be considered after this date.

1.02 Discrepancies

The contractor shall include all work either shown on the Contract Drawings or detailed in the specification. No claim or extra cost shall be considered for works which has been shown on the drawings or in the specification alone.

Should the drawing and the specification appear to conflict, the contractor shall query the points at the time of tendering and satisfy himself that he has included for the work intended, as no claim for extra payment on this account shall be considered after the contract is awarded.

1.03 Conditions of Contract Agreement

The contractor shall be required to enter into a contract with the Employer.

The Conditions of the Contract between the Contractor and the Employer as hereinafter defined shall be the latest edition of the Agreement and Schedule of Conditions of Kenya Association of Building and Civil Engineering Contractors as particularly modified and amended hereinafter.

For the purpose of this contract the Agreement and Schedule of Conditions and any such modifications and amendments shall read and construed together. In any event of discrepancy the modifications and amendments shall prevail.

1.04 **Payment**

Payment will be made through certificates to the Contractor. All payments will be less retention as specified in the Main Contract. No payment will become due until materials are delivered to site.

1.05 **Definition of Terms**

Throughout these contract documents units of measurements, terms and expressions are abbreviated and wherever used hereinafter and in all other documents they shall be interpreted as follows:

i) **Employer:** The term **"Employer"** shall mean **The Director General, Kenya Civil Aviation Authority.**

ii) **Architect:** The term **"Architect"** shall mean **The Chief Architect, Ministry Of Transport, Infrastructure, Housing and Urban Development - State Department of Public Works**

iii) **Quantity Surveyor:** The term **"Quantity Surveyor"** shall mean **The Chief Quantity Surveyor, M.T.I.PW.H&UD - State Department of Public Works**

iv) **Civil/Structural Engineers:** The term **"Civil/Structural Engineers "** shall mean **The Chief Engineer(Structural), M.T.I.PW.H&UD- State Department of Public Works**

v) **Electrical Engineer:** The term **"Electrical Engineer"** shall mean **Chief Engineer (Electrical), M.T.I.PW.H&UD - State Department of Public Works**

v) **Mechanical Engineer:** The term **"Mechanical Engineer"** shall mean **Chief Engineer (Mechanical), M.T.I.PW.H&UD - State Department of Public Works**

vi) **Contractor:** The term **"Contractor"** shall mean the firm or company appointed to carry out Generator set, UPS, AVS, CCTV Surveillance System and Electrical Installation Works and shall include his or their heir, executors, assigns, administrators, successors, and duly appointed representatives.

vii) **Contract Works:** The term **"contract Works"** shall mean all or any portion of the work, materials and articles, whether 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 site or not.

viii) **Contract Drawings:** The term **"Contract Drawings"** shall mean those drawings required or referred to herein and forming part of the Bills of Quantities.

ix) **Working Drawings:** The term **"Working Drawings"** shall mean those drawings required to be prepared by the contractor as hereinafter described.

x) **Record Drawings:** The term **"Record Drawings"** shall mean those drawings required to be prepared by the contractor showing "as installed" and other records for the contract Works.

xi) **Abbreviations:**

CM shall mean **Cubic Metre**
SM shall mean **Square Metre**
LM shall mean **Linear Metre**
LS shall mean **Lump Sum**
mm shall mean **Millimetres**
No. shall mean **Number**
Kg. shall mean **Kilogramme**
KEBS shall mean **Kenya Bureau of Standards**
BS shall mean. **Current standard British Standard Specification published by the British Standard Institution, 2 Park Street, London W1, England**

"Ditto" shall mean the whole of the preceding description in which it occurs. Where it occurs in description of succeeding item it shall mean the same as in the first description of the series in which it occurs except as qualified in the description concerned. Where it occurs in brackets it shall mean the whole of the preceding description which is contained within the appropriate brackets.

1.06 **Site Location**

The site of the Contract Works is situated at **the Kenya Civil Aviation Authority Stations – JKIA Tower, JKIA Radar, Stony-Athi, Ngong Hills and Mua Hills Radar stations.**

The tenderer is recommended to visit the site and shall be deemed to have satisfied himself with regard to access, possible conditions, the risk of injury or damage to property on/or adjacent to the site, and the conditions under which the contract Works shall have to be carried out and no claims for extras will be considered on account of lack of knowledge in this respect.

1.07 **Duration of Contract**

The Contractor shall be required to phase his work in accordance with the works programme (or its revision). The programme is to be agreed with the Project Manager.

1.08 **Scope of Contract Works**

The contractor shall supply, deliver, unload, hoist, fix, test, commission and hand-over in satisfactory working order the complete installations specified hereinafter and/or as shown on the Contract Drawings attached hereto, including the provision of labour, transport and plant for unloading material and storage, and handling into position and fixing, also the supply of ladders, scaffolding the other mechanical devices to plant, installation, painting, testing, setting to work, the removal from site from time to time of all superfluous material and rubbish caused by the works.

The contractor shall supply all accessories, whether of items or equipment supplied but to be fixed and commissioned under this contract.

1.09 **Extent of the contractor's Duties**

At the commencement of the works, the contractor shall investigate and report to the Engineer if all materials and equipment to be used in the work and not specified as supplied by the others are available locally. If these materials and equipment are not available locally, the contractor shall at this stage place orders for the materials in question and copy the orders to the Engineer. Failure to do so shall in no way relieve the contractor from supplying the specified materials and equipment in time.

Materials supplied by others for installation and/or connection by The contractor shall be carefully examined in the presence of the Supplier before installation and connection. Any defects noted shall immediately be reported to the Engineer.

The contractor shall be responsible for verifying all dimensions relative to his work by actual measurements taken on site.

The contractor shall mark accurately on one set of drawings and indicate all alterations and/or modifications carried out to the designed system during the construction period. This information must be made available on site for inspection by the Engineer.

1.10 **Execution of the Works**

The works shall be carried out strictly in accordance with:

a) All relevant Kenya Bureau of Standards Specifications.

b) All relevant British Standard Specifications and Codes of Practice (hereinafter referred to as B.S. and C.P. respectively).

c) This Specification.

d) The Contract Drawings.

e) The Bye-laws of the Local Authority.

f) The Engineer's Instructions.

The Contract Drawings and Specifications to be read and construed together.

1.11 **Validity of Tender**

The tender shall remain valid for acceptance within 120 days from the final date of submission of the tender, and this has to be confirmed by signing the Tender Bond. The tenderer shall be exempted from this Bond if the tender was previously withdrawn in writing to the Employer before the official opening.

1.12 **Firm – Price contract**

Unless specifically stated in the documents or the invitation to tender, this is a firm-price Contract and the contractor must allow in his tender for the increase in the cost of labour and/or materials during the duration of the contract. No claims will be allowed for increased costs arising from the fluctuations in duties and/or day to day currency fluctuations. The contractor will be deemed to have allowed in his tender for any increase in the cost of materials which may arise as a result of currency fluctuation during the contract period.

1.13 **Variation**

No alteration to the contract Works shall be carried out until receipt by the contractor of written instructions from the Project Manager.

Any variation from the contract price in respect of any extra work, alteration or omission requested or sanctioned by the Architect or Engineer shall be agreed and confirmed in writing at the same time such variations are decided and shall not affect the validity of the Contract. Schedule of Unit Rates shall be used to assess the value of such variations. No allowance shall be made for loss of profit on omitted works.

Where the Project Manager requires additional work to be performed, the contractor, if he considers it necessary, will give notice within seven (7) days to the Project Manager of the length of time he (the contractor) requires over and above that allotted for completion of the contract.

If the contractor fails to give such notice he will be deemed responsible for the claims arising from the delay occasioned by reason of such extension of time.

1.14 Prime Cost and Provisional Sums

A specialist Contractor may be nominated by the Project Manager to supply and/or install any equipment covered by the Prime Cost or Provisional Sums contained within the Contract documents.

The work covered by Prime Cost and Provisional Sums may or may not be carried out at the discretion of the Project Manager.
The whole or any part of these sums utilised by the contractor shall be deducted from the value of the contract price when calculating the final account.

1.15 Bond

The tenderer must submit with his tender the name of one Surety who must be an established Bank only who will be willing to be bound to the Employer for an amount equal to 7½ % of the contract amount as Clause 31 of the Main Contract.

1.16 Government Legislation and Regulations

The contractor's attention is called to the provision of the Factory Act 1972 and subsequent amendments and revisions, and allowance must be made in his tender for compliance therewith, in so far as they are applicable.

The contractor must also make himself acquainted with current legislation and any Government regulations regarding the movement, housing, security and control of labour, labour camps, passes for transport, etc.

The contractor shall allow for providing holidays and transport for work people, and for complying with Legislation, Regulations and Union Agreements.

1.17 Import Duty and Value Added Tax

The contractor will be required to pay full Import Duty and Value Added Tax on all items of equipment, fittings and plant, whether imported or locally manufactured. The tenderer shall make full allowance in his tender for all such taxes.

1.18 **Insurance Company Fees**

Attention is drawn to the tenderers to allow for all necessary fees, where known, that may be payable in respect of any fees imposed by Insurance Companies or statutory authorities for testing or inspection.

No allowance shall be made to the contractor with respect to fees should these have been omitted by the tenderer due to his negligence in this respect.

1.19 **Provision of Services by the Contractor**

Contractor shall make the following facilities available for his use:

a) Attendance and the carrying out of all work affecting the structure of the building which may be necessary, including all chasing, cutting away and making good brickwork, all plugging for fixing, fittings, machinery, fan ducting, etc., and all drilling and tapping of steel work. Any purpose made fixing brackets shall not constitute Builder's Work and shall be provided and installed by the contractor unless stated hereinafter otherwise.

b) The provision of temporary water, lighting and power: All these services utilised shall be paid for by the Contractor

c) Fixing of anchorage and pipe supports in the shuttering, anchorage with fully dimensioned drawings detailing the exact locations.

d) i) Provision of scaffolding, cranes, etc. but only in so far as it is required for the Contract Works

ii) Any specialist scaffolding, cranes, etc. to be used by any Contractor for his own exclusive use shall be paid for by the Contractor.

1.20 **Suppliers**

The contractor shall submit names of any supplier for the materials to be incorporated, to the Engineer for approval. The information regarding the names of the suppliers may be submitted at different times, as may be convenient, but no sources of supply will be changed without prior approval. Each supplier must be willing to admit the Engineer or his representative to his premises during working hours for the purpose of examining or obtaining samples of the materials in question.

1.21 **Samples and Materials Generally**

The contractor shall, when required, provide for approval at no extra cost, samples of all materials to be incorporated in the works. Such samples, when approved, shall be retained by the Engineer and shall form the standard for all such materials incorporated.

1.22 **Administrative Procedure and Contractual Responsibility**

The Contractor is entirely responsible to the Employer for the whole of the works including any Contract Works and shall deal direct with the Employer or Engineer.

1.23 **Bills of Quantities**

The Bills of Quantities have been prepared in accordance with the standard method of measurement of Building Works for East Africa, first Edition, Metric, 1970. All the Quantities are based on the Contract Drawings and are provisional and they shall not be held to gauge or to limit the amount or description of the work to be executed by the contractor but the value thereof shall be deducted from the Contract Sum and the value of the work ordered by the Engineer and executed thereunder shall be measured and valued by the Engineer in accordance with the conditions of the contract.

All work liable to adjustment under this contract shall be left uncovered for a reasonable time to allow measurements needed for such adjustment to be taken by the Quantity Surveyor or Engineer. Immediately the work is ready for measuring the Contractor shall give notice to the Quantity Surveyor or Engineer to carry out measurements before covering up. If the contractor shall make default in these respects he shall, if the Project Manager so directs, uncover the work to enable the necessary measurements to be taken and afterwards reinstate at his own expense.

1.24 Contractor's Office in Kenya

The contractor shall maintain (after first establishing if necessary) in Kenya an office staffed with competent manager and such supporting technical and clerical staff as necessary to control and coordinate the execution and completion of the contract Works.

The Manager and his staff shall be empowered by the contractor to represent him at meetings and in discussions with the Employer, the Engineer and other parties who may be concerned and any liaison with the contractor's Head Office on matters relating to the design, execution and completion of the contract Works shall be effected through his office in Kenya.

It shall be the contractor's responsibility to procure work permits, entry permits, licenses, registration, etc., in respect of all expatriate staff.

The Contractor shall prepare a substantial proportion of his Working Drawings at his office in Kenya. No reasons for delays in the preparation or submission for approval or otherwise of such drawings or proposals will be accepted on the grounds that the contractor's Head Office is remote from his office in Nairobi or the site of the contract Works or otherwise.

1.25 Builder's Work

All chasing, cutting away and making good will be done by the Contractor. The contractor shall also mark out in and be responsible for accuracy of the size and position of all holes and chases required.

The contractor shall drill and plug holes in floors, walls, ceiling and roof for securing services and equipment requiring screw or bolt fixings.

The contractor shall also provide and install any purpose made fixing brackets.

1.26 Structural Provision for the Works

Preliminary major structural provision has been made for the contract works based on outline information ascertained during the preparation of the Specification.

The preliminary major structural provision made will be deemed as adequate unless the contractor stated otherwise when submitting his tender.

Any major structural provision or alteration to major structural provisions required by the Contractor shall be shown on Working Drawings to be submitted to the Engineer within 30 days of being appointed.

No requests for alterations to preliminary major structural provisions will be approved except where they are considered unavoidable by the Engineer. In no case will they be approved if building work is so far advanced as to cause additional costs or delays in the work of the contractor.

1.27 Position of Services, Plant, Equipment, Fittings and Apparatus

The Contract Drawings give a general indication of the intended layout. The position of the equipment and apparatus, and also the exact routes of the ducts, main and distribution pipework shall be confirmed before installation is commenced. The exact sitting of appliances, pipework, etc., may vary from that indicated.

The routes of services and positions of apparatus shall be determined by the approved dimensions detailed in the Working Drawings or on site by the Engineer in consultation with the contractor .

Services throughout the ducts shall be arranged to allow maximum access along the ducts and the services shall be readily accessible for maintenance. Any work which has to be re-done due to negligence in this respect shall be the contractor's responsibility.

The contractor shall be deemed to have allowed in his contract sum for locating terminal points of services (e.g. lighting, switches, socket outlets, lighting points, control switches, thermostats and other initiating devices, taps, stop cocks) in positions plus or minus 1.2m horizontally and vertically from the locations shown on Contract Drawings. Within these limits no variations in the Contract Sum will be made unless the work has already been executed in accordance with previously approved Working Drawings and with the approval of the Engineer.

1.28 Checking of Work

The Contractor shall satisfy himself to the correctness of the connections he makes to all items of equipment supplied under the contract agreement and equipment supplied under other contracts before it is put into operation. Details of operation, working pressures, temperatures, voltages, phases, power rating, etc., shall be confirmed to others and confirmation received before the system is first operated.

1.29 Setting to Work and Regulating System

The contractor shall carry out such tests of the contract Works as required by British Standard Specifications, or equal and approved codes as specified hereinafter and as customary.

No testing or commissioning shall be undertaken except in the presence of and to the satisfaction of the Engineer unless otherwise stated by him (Contractor's own preliminary and proving tests excepted).

It will be deemed that the contractor has included in the contract Sum for the costs of all fuel, power, water and the like, for testing and commissioning as required as part of the contract Works. He shall submit for approval to the Engineer a suitable programme for testing and commissioning. The Engineer and Employer shall be given ample warning in writing, as to the date on which testing and commissioning will take place.

The contractor shall commission the contract Works and provide attendance during the commissioning of all services, plant and apparatus connected under the contract Agreement or other Contract Agreements, related to the project.

Each system shall be properly balanced, graded and regulated to ensure that correct distribution is achieved and where existing installations are affected, the Contractor shall also regulate these systems to ensure that their performance is maintained.

The proving of any system of plant or equipment as to compliance with the Specification shall not be approved by the Engineer, except at his discretion, until tests have been carried out under operating conditions pertaining to the most onerous conditions specified except where the time taken to obtain such conditions is unreasonable or exceeds 12 months after practical completion of the contract Works.

1.30 **Identification of Plant Components**

The contractor shall supply and fix identification labels to all plant, starters, switches and items of control equipment including valves, with white traffolyte or equal labels engraved in red lettering denoting its name, function and section controlled. The labels shall be mounted on equipment and in the most convenient positions. Care shall be taken to ensure the labels can be read without difficulty. This requirement shall apply also to major components of items of control equipment.

Details of the lettering of the labels and the method of mounting or supporting shall be forwarded to the Engineer for approval prior to manufacture.

1.31 **Contract Drawings**

The Contract Drawings when read in conjunction with the text of the Specification, have been completed in such detail as was considered necessary to enable competitive tenders to be obtained for the execution and completion of the contract works.

The Contract Drawings are not intended to be Working Drawings and shall not be used unless exceptionally they are released for this purpose.

1.32 **Working Drawings**

The contractor shall prepare such Working Drawings as may be necessary. The Working Drawings shall be complete in such detail not only that the contract Works can be executed on site but also that the Engineer can approve the contractor's proposals, detailed designs and intentions in the execution of the contract Works.

If the contractor requires any further instructions, details, Contract Drawings or information drawings to enable him to prepare his Working Drawings or proposals, the Contractor shall accept at his own cost, the risk that any work, commenced or which he intends to commence at site may be rejected.

The Engineer, in giving his approval to the Working Drawings, will presume that any necessary action has been, or shall be taken by the contractor to ensure that the installations shown on the Working Drawings have been cleared with the Project Manager and any other Contractors whose installations and works might be affected.

If the contractor submits his Working Drawings to the Engineer without first liaising and obtaining clearance for his installations from the Project Manager and other Contractors whose installations and works might be affected, then he shall be liable to pay for any alterations or modification to his own, the Contractor's or other Contractor's installations and works, which are incurred, notwithstanding any technical or other approval received from the Engineer.

Working Drawings to be prepared by the contractor shall include but not be restricted to the following:

a) Any drawings required by the Contractor, or Engineer to enable structural provisions to be made including Builder's Working Drawings or Schedules and those for the detailing of holes, fixings, foundations, cables and paperwork ducting below or above ground or in or outside or below buildings.

b) General Arrangement Drawings of all plant, control boards, fittings and apparatus or any part thereof and of installation layout arrangement of such plant and apparatus.

c) Schematic Layout Drawings of services and of control equipment.

d) Layout Drawings of all embedded and non-embedded paperwork, ducts and electrical conduits.

e) Complete circuit drawings of the equipment, together with associated circuit description.

f) Such other drawings as are called for in the text of the Specification or Schedules or as the Engineer may reasonably require.

Three copies of all Working Drawings shall be submitted to the Engineer for approval. One copy of the Working Drawings submitted to the Engineer for approval shall be returned to the Contractor indicating approval or amendment therein.

Six copies of the approved Working Drawings shall be given to the employer by the contractor for information and distribution to other Contractors carrying out work associated with or in close proximity to or which might be affected by the contract Works.

Approved Working Drawings shall not be departed from except as may be approved or directed by the Engineer.

Approval by the Engineer of Working Drawings shall neither relieve the contractor of any of his obligations under the contract nor relieve him from correcting any errors found subsequently in the Approved Working Drawings or other Working Drawings and in the contract Works on site or elsewhere associated therewith.

The contractor shall ensure that the Working Drawings are submitted to the Architect for approval at a time not unreasonably close to the date when such approval is required. Late submission of his Working Drawings will not relieve the contractor of his obligation to complete the contract Works within the agreed Contract Period and in a manner that would receive the approval of the Project Manager.

1.33 **Record Drawings (As Installed) and Instructions**

During the execution of the contract Works the contractor shall, in a manner approved by the Engineer record on Working or other Drawings at site all information necessary for preparing Record Drawings of the installed contract Works. Marked-up Working or other Drawings and other documents shall be made available to the Engineer as he may require for inspection and checking.

Record Drawings, may, subject to the approval of the Engineer, include approved Working Drawings adjusted as necessary and certified by the contractor as a correct record of the installation of the contract Works.

They shall include but not restricted to the following drawings or information:

a) Working Drawings amended as necessary but titled “Record Drawings” and certified as a true record of the “As Installed” Contract Works. Subject to the approval of the Engineer such Working Drawings as may be inappropriate may be omitted.

b) Fully dimensioned drawings of all plant and apparatus.

c) General arrangement drawings of equipment, other areas containing plant forming part of the Contract Works and the like, indicating the accurate size and location of the plant and apparatus suitability cross-referenced to the drawings mentioned in (b) above and hereinafter.

d) Routes, types, sizes and arrangement of all pipework and ductwork including dates of installation of underground pipework.

e) Relay adjustment charts and manuals.

f) Routes, types, sizes and arrangement of all electric cables, conduits, ducts and wiring including the dates of installation of buried works.

g) System schematic and trunking diagrams showing all salient information relating to control and instrumentation.

h) Grading Charts.

i) Valve schedules and locations suitability cross-referenced.

j) Wiring and piping diagrams of plant and apparatus.

k) Schematic diagrams of individual plant, apparatus and switch and control boards. These diagrams to include those peculiar to individual plant or apparatus and also those applicable to system operation as a whole.

l) Operating Instruction

Schematic and wiring diagrams shall not be manufacturer's multipurpose general issue drawings. They shall be prepared specially for the contract Works and shall contain no spurious or irrelevant information.

Marked-up drawings of the installation of the contract Works shall be kept to date and completed by the date of practical or section completion. Two copies of the Record Drawings of contract Works and two sets of the relay adjustment and grading charts and schematic diagrams on stiff backing shall be provided not later than one month later.

The contractor shall supply for fixing in sub-stations, switch-rooms, boiler houses, plant rooms, pump houses, the office of the Maintenance Engineer and other places, suitable valve and instructions charts, schematic diagrams of instrumentation and of the electrical reticulation as may be requested by the Engineer providing that the charts, diagrams, etc., relate to installations forming part of the Contract Works. All such charts and diagrams shall be of suitable plastic material on a stiff backing and must be approved by the Engineer before final printing.

Notwithstanding the contractor's obligations referred to above, if the contractor fails to produce to the Engineer's approval, either:-

a) The Marked-up Drawings during the execution of the contract Works or

b) The Record Drawings, etc., within one month of the Section or Practical Completion

The Engineer shall have these drawings produced by others. The cost of obtaining the necessary information and preparing such drawings, etc., will be recovered from the contractor.

1.34 **Maintenance Manual**

Upon Practical Completion of the contract Works, the contractor shall furnish the Engineer four copies of a Maintenance Manual relating to the installation forming part of all of the contract Works.

The manual shall be loose-leaf type, International A4 size with stiff covers and cloth bound. It may be in several volumes and shall be sub-divided into sections, each section covering one Engineering service system. It shall have a ready means of reference and a detailed index.

There shall be a separate volume dealing with Air Conditioning and Mechanical Ventilation installation where such installations are included in the Contract Works.

The manual shall contain full operating and maintenance instructions for each item of equipment, plant and apparatus set out in a form dealing systematically with each system. It shall include as may be applicable to the contract Works the following and any other items listed in the text of the Specifications:

a) System Description.

b) Plant

c) Valve Operation

d) Switch Operation

e) Procedure of Fault Finding

f) Emergency Procedures

g) Lubrication Requirements

h) Maintenance and Servicing Periods and Procedures

i) Colour Coding Legend for all Services

j) Schematic and Writing Diagrams of Plant and Apparatus

k) Record Drawings, true to scale, folded to International A4 size

l) Lists of Primary and Secondary Spares.

The manual is to be specially prepared for the contract Works and manufacturer's standard descriptive literature and plant operating instruction cards will not be accepted for inclusion unless exceptionally approved by the Engineer. The contractor shall, however, affix such cards, if suitable, adjacent to plant and apparatus. One spare set of all such cards shall be furnished to the Engineer.

1.35 **Hand-over**

The contract Works shall be considered complete and the Maintenance and Defects Liability Period shall commence only when the contract Works and supporting services have been tested, commissioned and operated to the satisfaction of the Engineer and officially approved and accepted by the Employer, provided always that the handing over of the contract Works shall be coincident with the handing over of the sub- Contract Works.

The procedure to be followed will be as follows:

a) On the completion of the contract Works to the satisfaction of the Engineer and the Employer, the contractor shall request the Engineer, at site to arrange for handing over.

b) The Engineer shall arrange a Hand-over Meeting or a series thereof, at site.

c) The contractor shall arrange with the Engineer and Employer for a complete demonstration of each and every service to be carried out and for instruction to be given to the relevant operation staff and other representatives of the Employer.

d) In the presence of the Employer and the Engineer, Hand-over will take place, subject to Agreement of the Hand-over Certificates and associated check lists.

1.36 **Painting**

It will be deemed that the contractor allowed for all protective and finish painting in the contract Sum for the contract Works, including colour coding of service pipework to the approval of the Engineer. Any special requirements are described in the text of the Specifications.

1.37 **Spares**

The contractor shall supply and deliver such spares suitably protected and boxed to the Engineer's approval as are called for in the Specifications or in the Price Schedules.

1.38 **Testing and Inspection – Manufactured Plant**

The Engineer reserves the right to inspect and test or witness of all manufactured plant equipment and materials.

The right of the Engineer relating to the inspection, examination and testing of plant during manufacture shall be applicable to Insurance companies and inspection authorities so nominated by the Engineer.

The contractor shall give two week's notice to the Engineer of his intention to carry out any inspection or tests and the Engineer or his representative shall be entitled to witness such tests and inspections.

Six copies of all test certificates and performance curves shall be submitted as soon as possible after the completion of such tests, to the Engineer for his approval.

Plant or equipment which is shipped before the relevant test certificate has been approved by the Engineer shall be shipped at the contractor's own risk and should the test certificate not be approved new tests may be ordered by the Engineer at the contractor's expense.

The foregoing provisions relate to tests at manufacturer's works and as appropriate to those carried out at site.

1.39 **Testing and Inspection -Installation**

Allow for testing each section of the contract Works installation as described hereinafter to the satisfaction of the Engineer.

1.40 **Labour Camps**

The contractor shall provide the necessary temporary workshop and mess-room in position to be approved by the Architect.

The work people employed by the contractor shall occupy or be about only that part of the site necessary for the performance of the work and the contractor shall instruct his employees accordingly.

If practicable, W.C. accommodation shall be allocated for the sole use of the contractor's workmen and the contractor will be required to keep the same clean and disinfected, to make good any damage thereto and leave in good condition.

1.41 **Storage of Materials**

Space for storage and provision of any lock-up sheds or stores required will be provided by the contractor

Nominated 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 Project manager.

1.42 **Initial Maintenance**

The contractor shall make routine maintenance once a month during the liability for the Defects Period and shall carry out all necessary adjustments and repairs, cleaning and oiling of moving parts. A monthly report of the inspection and any works done upon the installation shall be supplied to the Engineer.

The contractor shall also provide a 24 -hour break-down service to attend to faults on or malfunctioning of the installation between the routine visits of inspection.

The contractor shall allow in the contract Sum of the initial maintenance, inspection and break-down service and shall provide for all tools, instruments, plant and scaffolding and the transportation thereof, as required for the correct and full execution of these obligations and the provision, use or installation of all materials as oils, greases, sandpaper, etc., or parts which are periodically renewed such as brake linings etc., or parts which are faulty for any reason whatsoever excepting always Acts of God such as storm, tempest, flood, earthquake and civil revolt, acts of war and vandalism.

1.43 **Maintenance and Servicing After Completion of the Initial Maintenance**

The contractor shall, if required, enter into a maintenance and service agreement with the employer for the installation for a period of up to five years from the day following the last day of the liability for Defects Period which offers the same facilities as specified in Clause 1.41 (Initial Maintenance).

The terms of any such agreement shall not be less beneficial to the employer than the terms of Agreements for either similar installation.

The contractor shall submit with his tender for the works, where called upon a firm quotation for the maintenance and service of the installation as specified herein, which shall be based upon the present day costs and may be varied only to take into account increases in material and labour unit rate costs between the time of tendering and the signing of the formal maintenance

and service agreement and which shall remain valid and open for acceptance by the Employer to and including the last day of the fifth complete calendar month following the end of the liability for Defects Period.

1.44 **Trade Names**

Where trade names of manufacturer's catalogue numbers are mentioned in the Specification or the Bills of Quantities, the reference is intended as a guide to the type of article or quality of material required. Alternate brands of equal and approved quality will be acceptable.

1.45 **Water and Electricity for the Works**

These will be made available by the Contractor who shall be liable for the cost of any water or electric current used and for any installation provided for their own use.

1.46 **Protection**

The contractor shall adequately cover up and protect his own work to prevent injury and also to cover up and protect from damage all parts of the building or premises where work is performed by him under the Contract.

1.47 **Defects After Completion**

The defects liability period will be 12 months from the date of completion of the Contract as certified by the Engineer.

1.48 **Damages for Delay**

Liquidated and Ascertained damages as stated in the Contract Agreement will be claimed against the Contract for any unauthorised delay in completion. The contractor shall be held liable for the whole or a portion of these damages should he cause delay in completion.

1.49 **Clear Away on Completion**

The contractor shall, upon completion of the works, at his own expense, remove and clear away all plant, equipment, rubbish and unused materials, and shall leave the whole of the works in a clean and tidy state, to the satisfaction of the Engineer. On completion, the whole of the works shall be delivered up clean, complete and perfect in every respect to the satisfaction of the Engineer.

1.50 **Final Account**

On completion of the works the contractor shall agree with the Engineer the value of any variations outstanding and as soon as possible thereafter submit to the Engineer his final statement of account showing the total sum claimed sub-divided as follows:

Statement A - detailing the tender amounts less the Prime Cost and Provisional Sums, included therein.

Statement B - detailing all the variation orders issued on the contract.

Statement C - Summarising statement A and B giving the net grand total due to the Contractor for the execution of the Contract.

1.51 **Fair Wages**

The contractor shall in respect of all persons employed anywhere by him in the execution of the contract, in every factory, workshop or place occupied or used by him for execution of the Contract, observe and fulfil the following conditions:

a) The contractor shall pay rates of the wages and observe hours and conditions of labour not less favourable than those established for the trade or industry in the district where work is carried out.

b) In the absence of any rates of wages, hours or conditions of labour so established the contractor shall pay rates and observe hours and conditions of labour are not less favourable than the general level of wages, hours and conditions observed by other employers whose general circumstances in the trade or industry in which the Contractor is engaged are similar.

1.52 **Supervision**

During the progress of the works, the contractor shall provide and keep constantly available for consultation on site an experienced English - speaking Supervisor and shall provide reasonable office facilities, attendance, etc., for the Supervisor.

In addition, during the whole of the time the works are under construction, the contractor shall maintain on site one experienced foreman or charge-hand and an adequate number of fitters, etc., for the work covered by the Specification. The number of this staff shall not be reduced without the prior written approval of the Project manager or Engineer.

Any instructions given to the Supervisor on site shall be deemed to have been given to the contractor.

One copy of this Specification and one copy of each of the Contract Drawings (latest issue) must be retained on site at all times, and available for reference by the Engineer or contractor.

1.53 **Test Certificates**

The contractor shall provide the Engineer with three copies of all test reports or certificates that are or may be required by this Specification.

1.54 **Labour**

The contractor shall provide skilled and unskilled labour as may be necessary for completion of the contract.

1.55 **Discount to the Employer**

No discount to the Employer will be included in the tender for this installation.

1.56 **Guarantee**

The whole of the work will be guaranteed for a period of 12 months from the date of the Engineer's certification of completion and under such guarantee the contractor shall remedy at his expense all defects in materials and apparatus due to faulty design, construction or workmanship which may develop in that period.

1.57 Direct Contracts

Notwithstanding the foregoing conditions, the Government reserves the right to place a "Direct Contract" for any goods or services required in the works which are covered by a P.C Sum in the Bills of Quantities and to pay for the same direct. In any such instance, profit relative to the P.C Sum in the priced Bills of Quantities will be adjusted as deserved for P.C Sum allowed.

1.58 Attendance Upon the Tradesmen etc

The Contractor shall allow for the attendance of trade upon trade and shall afford any tradesmen or other persons employed for the execution of any work not included in this contract every facility for carrying out their work and also for the use of ordinary scaffolding. The contractor however, shall not be required to erect any special scaffolding for them.

1.59 Trade Unions

The contractor shall recognize the freedom of his work people to be members of trade unions.

1.60 Local and other Authorities notices and fees

The contractor shall comply with and give all notices required by any Regulations, Act or by Law of any Local Authority or of any Public Service, Company or Authority who have any jurisdiction with regard to the works or with those systems the same are or will be connected and he shall pay and indemnify the Government against any fees or charges legally demandable under any regulation or by-law in respect of the works; provided that the said fees and charges if not expressly included in the contract sum or stated by way of provisional sum shall be added to the contract sum.

The contractor before making any variation from the contract drawings or specification necessitated by such compliance shall give the Project Manager written notice specifying and giving the reason for such variation and applying for instructions in reference thereto.
If the contractor within seven days of having applied for the same does not receive such instructions, he shall proceed with the works in conforming to the provision regulation or by-law in question and any variation thereby necessitated shall be deemed to be a variation in accordance to the conditions of contract.

1.61 Assignment or subletting

The contractor shall not without the written consent of the Project Manager assign this contract or sublet any portion of the works, provided that such consent shall
not be unreasonably withheld to the prejudice of the contractor.

1.62 Partial Completion

If the Government shall take over any part or parts works, apparatus, equipment etc. then within seven days from the date on which the Government shall have taken possession of the relevant part, the Project Manager shall issue a Certificate stating his estimate of the approximate total value of the works which shall be the total value of that part and practical completion of the relevant part shall be deemed to have occurred, and the Defects Liability Period in respect of the relevant part be deemed to have commenced on the date Government shall have taken possession thereof.

The contractor shall make good any defects or other faults in the relevant part that had been deemed complete.
The contractor shall reduce the value of insurance by the full value of the relevant part

The contractor shall be paid for the part of works taken possession by the Government

1.63 Temporary Works

Where temporal works shall be deemed necessary, such as Temporary lighting, the contractor shall take precaution to prevent damage to such works.

The contractor shall include for the cost of and make necessary arrangements with the Project Manager for such temporary works. For temporary lighting, electricity shall be metered and paid for by the contractor.

1.64 Patent Rights

The contractor shall fully indemnify the Government of Kenya; against any action, claim or proceeding relating to infringement of any patent or design rights, and pay any royalties which may be payable in respect of any article or any part thereof, which shall have been supplied by the contractor to the Project Manager. In like manner the Government of Kenya shall fully indemnify the contractor against any such action, claim or proceedings for infringement under the works, the design thereof of which shall have been supplied by the Project Manager to the contractor, but this indemnify shall apply to the works only, and any permission or request to manufacture to the order of the Project Manager shall not relieve the contractor from liability should he manufacture for supply to other buyers.

1.65 Mobilization and Demobilization

The contractor shall mobilize labour plant and equipment to site according to his programme and schedule of work He shall ensure optimum presence and utilization of labour, plant and equipment. He should not pay and maintain unnecessary labour force or maintain and service idle plant and equipment. Where necessary he shall demobilize and mobilize the labour, plant and equipment, as he deems fit to ensure optimum progress of the works and this shall be considered to be a continuous process as works progress. He shall make provision for this item in his tender. No claim will be entertained where the contractor has not made any provision for mobilization and demobilization of labour, plant and equipment in the preliminary bills of quantities or elsewhere in this tender.

1.66 Extended Preliminaries

Where it shall be necessary to extend the contract period by the Project manager the contractor shall still ensure availability on site, optimum labour, materials, plant and equipment. The contractor shall make provision for extended preliminaries, should the contract period be extended and this shall be in a form of a percentage of the proportion of the Contract works remaining as at that time of extension. Where called upon in the Appendix to these Preliminaries the Contractor shall insert his percentage per month for extended preliminaries that shall form basis for compensation.
Lack of inserting the percentage shall mean that the contractor has provided for this requirement elsewhere in the Bills of Quantities.

1.67 Supervision by Engineer and Site Meetings

A competent Project Engineer appointed by the Engineer as his representative shall supervise the Contract works. The Project Engineer shall be responsible for issuing all the site instructions in any variations to the works and these shall be delivered through the Contractor with the authority of the Project Manager. Any instructions given verbal shall be confirmed in writing.

The project engineer and (or) the Engineer shall attend management meetings arranged by the Project Manager and for which the Contractor or his representative shall also attend. For the purpose of supervising the project, provisional sums are provided to cover for transport and allowances. The Contractor shall in his tender allow for the provision of management meetings and site inspections, as instructed by the Engineer, and also profit an attendance on these funds. The funds shall be expended according to Project Manager's instructions to the contractor.

1.68 Amendment to Scope of Contract Works

No amendment to scope of Contract works is expected and in case of amendment or modification to scope of work, these shall be communicated to all tenderers in sufficient time before the deadline of the tender submission. However during the contract period and as the works progress the Project Manager may vary the works as per conditions of contract by issuing site instructions.

No claims shall be entertained on account of variation to scope of works either to increase the works (pre-financing) or reduction of works (loss of profit-see clause 1.69)

1.69 **Contractors Obligation and Employers Obligation**

The Contractor will finance all activities as part of his obligation to this contract. The employer shall pay interim payment for materials and work completed on site as his obligation in this contract, as the works progresses. No claims will be entertained for pre-financing of the project by the Contractor, or for loss of profit (expectation loss) in case of premature termination, reduction or increase of works as the Contractor shall be deemed to have taken adequate measures in programming his works and expenditure and taken necessary financial precaution while executing the works. No interest shall be payable to the Contractor, except as relates to late payment as in the conditions of contract clause 23.3. The contractor shall where called upon, insert his price to compensate for any of the occurrence stated here (premature termination, reduction or increase of works),as a percentage of the contract sum in the Appendix to this section.

1.70 APPENDIX TO CONTRACT PRELIMINARIES AND GENERAL CONDITIONS

1. ADD TO CLAUSE 1.40

Their is no labour camp.

2. MODIFY CLAUSE 1.66

Percentage of extended preliminaries shall be inserted in Schedule No.1 page H//5 section H. However, this amount of the extended preliminaries **SHALL NOT** exceed the Liquidated and Ascertained Damages indicated on page **B-21** of Section B of this tender document

3. ADD TO CLAUSE 1.17

Prices quoted shall include **VAT,** and all other taxes applicable at the time of tender.

4. OMIT CLAUSE 1.12

5. MODIFY CLAUSE 1.15

Replace 7 1/2% with 5%

SECTION D GENERAL

SPECIFICATIONS OF

MATERIALS AND WORKS

PART A - GENERAL SPECIFICATIONS FOR ELECTRICAL INSTALLATION WORKS

2.1 General

2.2 Standard of Materials

2.3 Workmanship

2.4 Procurement of Materials

2.5 Shop Drawings

2.6 Record Drawings

2.7 Regulations and Standards

2.8 Setting out Works

2.9 Position of Electrical Plant and Apparatus

2.10 M.C.B Distribution Panels and Consumer Units

2.11 Fused Switchgear and Isolators

2.12 Conduits and Conduit Runs

2.13 Conduit Boxes and Accessories

2.14 Labels

2.15 Earthing

2.16 Cables and Flexible Cords

2.17 Armoured PVC Insulated and Sheathed Cables

2.18 Cable Supports; Markers and Tiles

2.19 PVC Insulated Cables

2.20 Heat Resisting Cables

2.21 Flexible Cords

2.22 Cable Ends and phase Colours

2.23 Cable Insulation Colours

2.24 Sub-circuit Wiring

2.25 Space Factor

2.26 Insulation

2.27 Lighting Switches

2.28 Sockets and Switched sockets

2.29 Fused Spur Boxes

2.30 Cooker Outlets

2.31 Connectors

2.32 Lampholders

2.33 Lamps

2.34 lighting Fittings Street lighting Lanterns

2.35 Position of Points and Switches

2.36 Street/Security Lighting Columns

2.37 Timing Control Switch

2.38 Wiring System for Street Lighting

2.39 Metal control Pillar

2.40 Current Operated Earth leakage circuit breaker

2.41 MV Switchboard

2.42 Steel Conduits and Steel Trunking

2.43 Testing on Site

2.1 SHOP DRAWINGS

Before manufacture or Fabrication is commenced the sub-contractor shall submit Two copies of detailed drawings of all control pillars, meter cubicles, medium voltage switchboards including their components showing all pertinent information including sizes, capacities, construction details, etc, as may be required to determine the suitability of the equipment for the approval of the Engineer. Approval of the detailed drawings shall not relieve the sub-contractor of the full responsibility of errors or the necessity of checking the drawings himself or of furnishing the materials and equipment and performing the work required by the plans and specifications.

2.2 RECORD DRAWINGS

These diagrams and drawings shall show the completed installation including sizes, runs and arrangements of the installation. The drawings shall be to scale not less than 1:50 and shall include plan views and section.

The drawings shall include all the details which may be useful in the operation, maintenance or subsequent modifications or extensions to the installation.

Three sets of diagrams and drawings shall be provided, all to the approval of the Engineer.

One coloured set of line diagrams relating to operating and maintenance instructions shall be framed and, mounted in a suitable location.

2.3 REGULATIONS AND STANDARDS

All work executed by the Sub-contractor shall comply with the current edition of the "Regulations" for the Electrical Equipment of Buildings, issued by the Institution of Electrical Engineers, and with the Regulations of the Local Electricity Authority.

Where the two sets of regulations appear to conflict, they shall be clarified with the Engineers. All materials used shall comply with relevant Kenya Bureau of Standards Specification.

2.4 SETTING OUT WORK

The sub-contractor at his own expenses; is to set out works and take all measurements and dimensions required for the erection of his materials on site; making any modifications in details as may be found necessary during the progress of the works, submitting any such modifications or alterations in detail to the Engineer before proceeding and must allow in his Tender for all such modifications and for the provision of any such sketches or drawings related thereto.

2.5 POSITIONS OF ELECTRICAL PLANT AND APPARATUS

The routes of cables and approximate positions of switchboards etc, as shown on the drawings shall be assumed to be correct for purpose of Tendering, but exact positions of all electrical Equipment and routes of cables must be agreed on site with the Engineer before any work is carried out.

2.6 MCB DISTRIBUTION PANELS AND CONSUMER UNITS

All cases of MCB Panels and consumer units shall be constructed in heavy gauge sheet with hinged covers.

Removable undrilled gland plates shall be provided on the top and bottom of the cases. Miniature circuit breakers shall be enclosed in moulded plastic with the tripping mechanism and arc chambers separated and sealed from the cable terminals.

The operating dolly shall be tripfree with a positive movement in both make and break position. Clear indication of the position of the handle shall be incorporated.

The tripping mechanism shall be on inverse characteristic to prevent tripping in temporary overloads and shall not be affected by normal variation in ambient temperature.

A locking plate shall be provided for each size of breaker; A complete list of circuit details on typed cartridge paper glued to stiff cardboards and covered with a sheet of perspex, and held in position with four suitable fixings, shall be fitted to the inner face of the lids of each distribution panel. The appropriate MCB ratings shall be stated on the circuit chart against each circuit in use: Ivorine labels shall be secured to the insulation barriers in such a manner as to indicate the number of the circuits shown on the circuit chart.
Insulated barriers shall be fitted between phases, and neutrals in all boards, and to shroud live parts.

Neutral cables shall be connected to the neutral bar in the same sequence as the phase cables are connected to the MCB's. This shall also apply to earth bars when installed.

2.7 FUSED SWITCHGEAR AND ISOLATORS

All fused switchgear and isolators whether mounted on machinery, walls or industrial panels shall conform to the requirements of KS 04 – 226 PART: 1: 1985.

All contacts are to be fully shrouded and are to have a breaking capacity on manual operations as required by KS 04 – 182 : 1980.

Fuse links for fused switches are to be of high rupturing capacity cartridge type, conforming to KS 04 – 183 : 1978.

Isolators shall be load breaking/fault making isolators.

Fused switches and isolators are to have separate metal enclosures. Mechanical interlocks are to be provided between the door and main switch operating mechanism so arranged that the door may not be opened with the switch in the 'ON' position. Similarly; it shall not be possible to close the switch with the door open except that provision to defeat the mechanical interlock and close the switch with the door in the open position for test purposes. The 'ON' and 'OFF' positions of all switches and isolators shall be clearly indicated by a mechanical flag indicator or similar device. In T.P & N fused switch units, bolted neutral links are to be fitted.

2.8 CONDUITS AND CONDUIT RUNS

Conduit systems are to be installed so as to allow the loop-in system of wiring:

All conduits shall be black rigid super high impact heavy gauge class 'A' PVC in accordance with KS 04 – 179: 1988 and IEE Regulations. No conduit less than 20mm in diameter shall be used anywhere in this installation.

Conduit shall be installed buried in plaster work and floor screed except when run on wooden or metal surface when they will be installed surface supported with saddles every 600mm. Conduit run in chases shall be firmly held in position by means of substantial pipe hooks driven into wooden plugs.

The Sub-contractors attention is drawn to the necessity of keeping all conduits entirely separate from other piping services such as water and no circuit connections will be permitted between conduits and such pipes.
All conduits systems shall be arranged wherever possible to be self-draining to switch boxes and conduit outlet points for fittings:

The systems, when installed and before wiring shall be kept plugged with well fitting plugs and when short conduit pieces are used as plugs, they shall be doubled over and tied firmly together with steel wire; Before wiring all conduit systems shall be carried out until the particular section of the conduit installation is complete in every respect.

The sets and bends in conduit runs are to be formed on site using appropriate size bending springs and all radii of bends must not be less than 2.5 times the outside diameter of the conduit. No solid or inspection bends, tees or elbows will be used.

Conduit connections shall either be by a demountable (screwed up) assembly or adhesive fixed and water tight by solution. The tube and fittings must be clean and free of all grease before applying the adhesive. When connections are made between the conduit and switch boxes, circular or non-screwed boxes, care shall be taken that no rough edges of conduit stick out into the boxes.

Runs between draw in boxes are not to have more than two right angle bends or their equivalent. The sub-contractor may be required to demonstrate to the Engineers that wiring in any particular run is easily withdrawable and the sub-contractor may, at no extra cost to the contract; be required to install additional draw-in boxes required. If conduit is installed in straight runs in excess of 6000mm, expansion couplings as manufactured by Egatube shall be used at intervals of 6000mm.

Where conduit runs are to be concealed in pillars and beams, the approval of the Structural Engineer, shall be obtained. The sub-contractor shall be responsible for marking the accurate position of all holes, chases etc, on site, or if the Engineer so directs, shall provide the Main Contractor with dimensional drawings to enable him t o mark out and form all holes and chases. Should the sub-contractor fail to inform the main contractor of any inaccuracies in this respect they shall be rectified at the sub-contractors expense.

It will be the Sub-contractors responsibility to ascertain from site, the details of reinforced concrete or structural steelwork and check from the builder's drawings the positions of walls, structural concrete and finishes. No reinforced concrete or steelwork may be drilled without first obtaining the written permission of the Structural Engineer.

The drawings provided with these specifications indicate the appropriate positions only of points and switches, and it shall be the Sub-Contractors responsibility to mark out and centre on site the accurate positions where necessary in consultation with the Architect and the Engineer. The sub-contractor alone shall be responsible for the accuracy of the final position.

2.13 CONDUIT BOXES AND ACCESSORIES

All conduit outlets and junction boxes are to be either malleable iron and of standard circular pattern of the appropriate type to suit saddles being used or super high impact PVC manufactured to KS 04 – 179 : 1983.
Small circular pattern boxes are to be used with conduits up to and including 25mm outside diameter. Rectangular pattern adaptable boxes are to be used for conduits of 32mm outside diameter and larger. For drawing in of cables in exposed runs of conduit, standard pattern through boxes are to be used:

Boxes are to be not less than 50mm deep and of such dimensions as will enable the largest appropriate number of cables for the conduit sizes to be drawn in without excessive bending.

Outlet boxes for lighting fittings are to be of the loop-in type where conduit installation is concealed and the sub- contractor shall allow one such box per fitting, except where fluorescent fittings are specified when two such boxes per fitting shall be fitted flush with ceiling and if necessary fitted with break joint rings. Pattresses shall be fitted where required to outlets on surface conduit runs.

Adaptable boxes are to of PVC or mild steel (of not less than 12swg) and black enamelled or galvanised finish according to location. They shall be of square or oblong shape location. They shall be of square or oblong shape complete with lids secured by four 2 BA brass roundhead screws; No adaptable box shall be less than 75mm x 75mm x 50mm or larger than 300mm x 300mm x 75mm and shall be adequate in depth in relation to the size of conduit entering it. Conduits shall only enter boxes by means of conduit bushes.

2.14 LABELS

Labels fitted to switches and fuseboards;-

(i) Shall be Ivorine engraved black on white.

(ii) Shall be secured by R.H brass screws of same manufacturing throughout.

(iii) Shall be indicated on switches:-
- a) Reference number of switch
- b) Special current rating
- c) Item of equipment controlled

(iv) Shall indicate on MCB panels
- a) Reference number
- b) Type of board, i.e;, lighting, sockets, etc,.
- c) Size of cable supplying panel
- d) where to isolate feeder cable

(v) Shall be generally not less than 75mm x 50mm.

2.15 EARTHING

The earthing of the installation shall comply with the following requirements;-

(i) It shall be carried out in accordance with the appropriate sections of the current edition of the Regulations, for the Electrical Equipment of Buildings issued by Institute of Electrical Engineers of Great Britain.

(ii) At all main distribution panels and main service positions a 25mm x 3mm minimum cross sectional area Copper tape shall be provided and all equipment including the lead sheath and armouring of cables, distribution boards and metal frames shall be bonded thereto.

(iii) The earth tape in Sub-clause (ii) shall be connected by means of a copper tape or cable of suitable cross sectional area to an earth electrode which shall be a copper earth rod (see later sub-clause).

(iv) All tapes to be soft high conductivity copper, untinned except where otherwise specified and where run underground on or through walls, floors, etc., it shall be served with corrosion resisting tape or coated with corrosion compound and braided

(v) Where the earth electrode is located outside the building a removable test link shall be provided inside the building as near as possible to the point of entry to the tape, for isolating the earth electrode for testing purposes.

(vi) Earthing of sub-main equipment shall be deemed to be satisfactory where the sub-main cables are M.I.C.S. or conduit with separate earth wire, and installation is carried out in accordance with the figures stated in the current edition of the I.E.E Regulations.

(vii) Where an earth rod is specified (see Sub-clause (iii) it shall be proprietary manufacture, solid hand drawn copper of 15mm diameter driven into the ground to a minimum depth of 3.6m . It shall be made up to 1.2m sections with internal screw and socket joints and fitted with hardened steel tip and driving cap.

(viii) Earth plates will not be permitted

(ix) Where an earth rod is used the earth resistance shall be tested in the manner described in the current edition of the IEE Regulations, by the Sub-Contractor in the presence of the Engineer and the Sub-Contractor shall be responsible for the supply of all test equipment.

(x) Where copper tape is fixed to the building structure it structure it shall be by means of purpose made non-ferrous saddles which space the conductor away from the structure a minimum distance of 20mm. Fixings, shall be made using purpose made plugs; No fixings requiring holes to be drilled through the tape will be accepted.

(xi) Joints in copper tape shall be tinned before assembly riveted with a minimum of two copper rivets and seated solid.

(xii) Where holes are drilled in the earth tape for connection to items of equipment the effective cross sectional area must not be less than required to comply with the IEE regulations.

(xiii) Bolts, nuts and washers for any fixing to the earth tape must be of non-ferrous material.

(xiv) Attention is drawn to the need for the earthing metal parts of lighting fittings and for bonding ball joint suspension in lighting fittings.

2.16 CABLES AND FLEXIBLE CORDS

All cables used in this Sub-Contract shall be manufactured in accordance with the current appropriate Kenya standard Specification which are as follows:-

P.V.C. Insulated Cables and Flexible Cords	-	Ks 04-192:1988
PVC Insulated Armoured Cables	-	Ks 04-194:1990
Armouring of Electric cables	-	Ks 04-290:1987

The successful Sub-Contractor will, at the Engineers discretion be required to submit samples of cables for the Engineers approval; the Engineer reserves the right to call for the cables of an alternative manufacture without any extra cost being incurred.

P.V.C. insulated cables shall be 500/1000 volt grade. No cables smaller than 1.5mm² shall be used unless otherwise specified. The installation and the finish of cables shall be as detailed in later clauses. The colour of cables shall conform with the details stated in the "Cable Braid and insulation Colours" Clause.

2.17 ARMOURED P.V.C. INSULATED AND SHEATHED CABLES:

Shall be 600/1000 volt grade manufactured to Ks 04-194:1988 and Ks 04-187/188 with copper stranded conductors.

The wire armour of the cable shall be used wholly as an earth continuity conductor and the resistance of the wire armour shall have a resistance not more than twice of the largest current carrying conductor of the cable.

P.V.C./S.W.A./P.V.C. cables shall be terminated using "Telecom" "B" type or approved equal or approved equal glands and a P.V.C. tapered sleeve shall be provided to shroud each gland.

Where cables rise from floor level to switchgear etc., they shall be protected by P.V.C. conduit, to a height of 600mm from finished floor level, whether the cable is run on the surface or recessed into the wall.

2.18 CABLE SUPPORTS, MARKERS AND TILES

All PVC/SWA/PVC cables run inside the building shall be fixed in rising ducts or on ceilings by means of die cost cables hooks or clamps, or appropriate size to suit cables, fixed by studs and back nuts to their channel sections.

Alternatively, fixing shall be by BICC claw type cleating system with die-cast cleats and galvanised mild steel back straps or similar approved equal method. For one or two cables run together the cleats shall be fixed a special channel section supports or backstraps described above which shall in turn be secured to walls or ceilings of ducts by rawbolts.

In excessively damp or corrosive atmospheric conditions special finishes may be required and the Sub-contractor shall apply to the Engineer for further instructions before ordering cleats and channels for such areas.

The above type of hooks and clamps and channels or cleats and blackstraps shall also be used for securing cables in vertical ducts.

Cables supports shall be fixed at 600mm maximum intervals, the supports being supplied and erected under this Sub-contract. Saddles shall not be used for supporting cables nor any other type of fixing other than one of the two methods described above or other system which has received prior approval of the Engineer;

Cables are to be kept clear of all pipe work and the Sub-contractor shall work in close liaison with other services Sub-contractors.

The Sub-Contractor shall include for the provision of fixing of approved type coloured slip on cables end markers to indicate permanently the correct phase and neutral colours on all ends.

Provision shall be made for supplying and fixing approved non-corrosive metal cable markers to be attached to the outside of all PVC/SWA/PVC cables at 15mm intervals indicating cable size and distinction.

Where PVC/SWA/PVC cables are outside the building they shall be laid underground 750mm deep with protecting concrete interlocking cover tiles laid over which shall be provided and laid under this Sub-contract.

All necessary excavations and reinstatement of ground including sanding or trenches will be carried out by the Sub-Contractor, unless otherwise stated.

2.19 PVC INSULATED CABLES

Shall be of non-braided type as CMA reference 6491 x 600/1000/1000 volt grade cables, or equal approved.

PVC cables shall conform to the details of the “Cables and Flexible cords” and “Cable Braid and Insulation Colours” clauses.

2.20 HEAT RESISTING CABLES

Final connections to cookers, water heaters, etc., shall be made using butyl rubber insulated cable as CMA reference 610 butyl (Single core 600/1000 Volt).

This type of cable shall be used in all instances where a temperature exceeding 100°F, but not exceeding 150°F is likely to be experienced. Final connections to all lighting fittings (and other equipment where a temperature in excess of 150°c likely to be experienced) shall be made using silicon rubber insulated cable or equal and approved.

2.21 FLEXIBLE CORDS

Shall be in accordance with the “Cable and Flexible Cords” clause. No cord shall be less than 24/0.2mm in size unless otherwise specified.

Circular white twin TRS flex shall be used for plain pendant fittings up to 100 watts. For all other types of lighting fittings the flexible cable shall be silicone rubber insulated.

No polythene insulated flexible cable shall be used in any lighting fitting or other appliance (see "Heat Resisting Cables" Clause 30).

2.22 CABLE ENDS AND PHASE COLOURS

All cable ends connected up in switchgear, MCB panels etc;, shall have the insulation carefully cut back and the ends sealed with Hellerman rubber slip on cable end markers.

The markers shall be of appropriate phase colour for switch and all other live feeds to the details of the "Cable Insulation Colours" clause. Black cable with black end markers shall only be used for neutral cables.

2.23 CABLE INSULATION COLOURS Unless otherwise stated in later clauses the insulation colours shall be in accordance with the following table.

Where other systems are installed the cable colours shall be in accordance with the details stated in the appropriate clause.

SYSTEM	INSULATION COLOUR	CABLE END MARKER
Main and Sub-Main		
a) Phase	Red	Red
b) Neutral	Black	Black
1) Sub-Circuits Single Phase		
a) Phase	Red	Red
b) Neutral	Black	Black

2.24 SUB-CIRCUIT WIRING

For all lighting and sockets wiring shall be carried out in the "looping in" system and there shall be no joints whatsoever. No lighting circuits shall comprise more than 20 points when protected by 10A MCB. Cables with different cross-section area of copper shall not be used in combination.

Lighting circuits P. V.C. cable 1.5mm² for all lighting circuits indicated on the drawing.
Power circuits P.V.C cable (minimum sizes).

(i) 2.5mm² for one, two or three 5Amp sockets wired in parallel.

(ii) 2.5mm² for one 15Amp socket.

(iii) 2.5mm² for maximum of ten switched 13 Amp sockets wired from 30 Amp MCB.

The wiring sizes for lighting circuits and sockets are shown on the drawings. In such cases, the sizes shown on the drawings shall prevail over the sizes specified.

Wiring sizes for other appliances shall be shown on the drawing or specified in later clauses of this specification.

2.25 SPACE FACTOR

The maximum number of cables that may be accommodated in a given size of conduit or trunking or duct is not to exceed the number in Tables B.5 and B.6 or as stated in Regulation B.91, B.117 and B.118 of the I.E.E Regulations whichever is appropriate.

2.26 INSULATION

The insulation resistance to earth and between poles of the whole wiring system, fittings and lumps, shall not be less than the requirements of the latest edition of the I.E.E Regulations. Complete tests shall be made on all circuits by the Sub-contractor before the installations are handed over.

A report of all tests shall be furnished by the Sub-Contractor to the Engineer. The Engineer will then check test with his own instruments if necessary.

2.27 LIGHTING SWITCHES

These shall be mounted flush with the walls, shall be contained in steel or alloy boxes and shall be of the gangs ratings and type shown in the drawings. They shall be as manufactured by M.K. Electrical Ltd., or other equal and approved to KS 04 – 247: 1988

2.28 SOCKETS AND SWITCHED SOCKETS

These shall be flush pattern in steel/pvc box and shall be of the gangs and type specified in the drawings.

They shall be 13- Amp, 3-pin, shuttered, switched and as manufactured by "M.K. Electrical Co. Ltd.", or other approved equal to KS 04 – 246: 1987

2.29 FUSED SPUR BOXES

These shall be flush, D.P switched as in steel/pvc box and of type and make specified in the drawings complete with pilot light and as manufactured by "M. K. Electrical Company Ltd", or other approved equal. KS 04 – 247: 1988

2.30 COOKER OUTLETS

These shall be flush mounted with 13-A switched socket outlet and neon indicator Lamps.
The cooker control units shall be as manufactured by "M.K. Electrical Company Ltd", or other approved equal KS 04 – 247: 1988

2.31 CONNECTORS

Shall be specified in the drawings and appropriate rating. These shall be fitted at all conduit box lighting point outlets for jointing of looped P.V.C cables with flexible cables of specified quality.

2.32 LAMPHOLDERS

Shall be of extra heavy H.O skirted and shall be provided for every specified lighting fitting and shall be B.C;, E.S;, or G.E.S as required. All E.S. and G.E.S. holders shall be heavy brass type (except for plain pendants where the reinforced bakelite type shall be used). The screwed cap of the E.S and G.E.S. holders shall be connected to the neutral.

Where lampholders are supported by flexible cable, the holders shall have "cord grip" arrangements and in the case of metal shades earthing screws shall be provided on each of the holders.

The Sub-Contractor must order the appropriate type of holder when ordering lighting fittings, to ensure that the correct types of holders are provided irrespective of the type normally supplied by the manufacturers.

2.33 LAMPS

All lamps shall be suitable for normal stated supply voltage and the number and sizes of lamps detailed on the drawings shall be supplied and fixed. The Sub-Contractor must verify the actual supply voltage with the supply authority before ordering the lamps.

Tungsten filament lamps shall be manufactured in accordance with KS 04 – 112:1978 for general service lamps and KS 04 – 307:1985 for lamps other than general services. Tubular fluorescent lamps shall comply with KS 04 – 464:1982

Pearl lamps shall be used in all fittings unless otherwise specified.

2.34 LIGHTING FITTINGS AND STREET LIGHTING LANTERNS

This Sub-Contract shall include for the provision, handling charges, taking the delivery, safe storage, wiring (including internal wiring) assembling and erecting of all lighting fittings shown on the drawings.

All fittings and pendants shall be fixed to the conduit boxes with brass R/H screws. These to be in line with metal finish of fittings. The lighting fittings are detailed for the purpose of establishing a high standard of finish and under no circumstances will substitute fittings be permitted.
In case of rectangular shaped ceiling fittings, the extreme ends of the fittings shall be secured to suitable support in addition to the central conduit box fittings. Supports shall be provided and fixed by the Sub-Contractor.

The whole of the metal work of each lighting fittings shall be effectively bonded to earth. In the case of ball and/or knuckle joints short lengths of flexible cable shall be provided, bonded to the metal work on either side of the joints. If the above provisions are not made by the manufacturers -, the Sub-contractor shall include cost of additional work necessary in his tender. See “Flexible Cords” clause for details of internal wiring of lighting fittings. Minimum size of internal wiring shall be 20/0.20mm (23/0067). Each lighting fitting shall be provided with number type and size of lamps as detailed on the drawings. It is to be noted that some fittings are suspended as shown on the drawings.

Where two or more points are shown adjacent to each other on the drawings, e.g socket outlet and telephone outlet, they shall be lined up vertically or horizontally on the centre lines of the units concerned.

Normally, the units shall be lined up on vertical centre lines, but where it is necessary to mount units at low level they shall be lined up horizontally.

2.35 POSITIONS OF POINTS AND SWITCHES

Although the approximate positions of all points are shown on the drawings, enquiry shall be made as to the exact positions of all M.C.B panels, lighting points, socket outlets etc, before work is actually commenced. The Sub-contractor must approach the Architect with regard to the final layout of all lights on the ceiling and walls.

The Sub-contractor must consult with the Engineer in liaison with the Clerk of Works, or the General Foreman on site regarding the positions of all points before fixing any conduit etc. The Sub-Contractor shall be responsible for all alterations made necessary by the non-compliance with the clause.

2.36 STREET/SECURITY OUTDOOR LIGHTING COLUMNS:

The column shall be at a minimum of 225mm in the ground on 75mm thick concrete foundations and the pole upto 150mm shall be surrounded with concrete. The top bracket and plain section of the columns shall be common to and interchangeable with all brackets with maximum mismatching tolerance of 3mm between any pole and bracket. After manufacture and before erection the columns shall be treated with an approved mordant solution which shall be washed off and the whole allowed to dry. Thereafter, the columns shall be painted with one undercoat and two coats of gloss paint to an approved colour. All columns shall be complete with fused cut-outs.

2.37 TIMING CONTROL SWITCH

These shall be installed where shown on the drawings. Photocell timing control circuits which will operate 'on' with a specified level of darkness and 'off' with a given level of light. The initial adjustment will be done with approval of the Electrical Engineer.

2.38 WIRING SYSTEM FOR STREETLIGHTING

Cables shall be as indicated on the drawings, and shall be laid in a cable trench 450mm deep along the road sides and 600mm deep across the roads and 900mm away from the road kerb or 1500mm away from the edges of the road. 'Loop-in' and 'Loop-out' arrangement shall be used at every pole. Wiring to the lanterns on each pole shall be with 1.5mm² PVC twin insulated and sheathed cable with earth wire shall be laid at least 600mm below the finished road level on a compact bed of murram at least 50mm thick and covered with a concrete surrounded 150mm thick.

2.39 METAL CONTROL PILLAR

These shall be metal clad and fabricated as per contract drawings and specification. The Sub-Contractor shall supply, install, test and commission control pillars including supplying, fixing connecting switchgears as detailed on the appropriate drawings.

2.40 CURRENT OPERATED EARTH LEAKAGE CIRCUIT BREAKER

Current operated earth leakage circuit breaker shall conform to B.S.S. 4293:68 rated at 240 volts D.P. 50 cycles A.C. Mains.

The breaker shall be provided with test switch and fitted in weather proof enclosure for surface mounting. The rated load current and earth fault operating current shall be as specified in the drawings. These shall be as manufactured by Crabtree, Siemens or other equal and approved.

2.41 M.V. SWITCHBOARD AND SWITCHGEAR

The switchboard shall be manufactured in accordance with KS04-226 which co-ordinates the requirements for electrical power switchgear and associated apparatus. It is not intended that this K.S. should cover the requirements for specified apparatus for which separate Kenyan Standard exist. All equipment and material used in the switchboard shall be in accordance with the appropriate Kenya Standard.

The switchboard shall comprise the equipment shown on the drawings together with all current transformers, auxiliary fuses, labels, small wiring and interconnections necessary for the satisfactory operation of the switchboard

Switchboard shall be of the flush fronted, enclosed, metal clad type with full front or rear access as called for in the particular specifications, suitable for indoor use, sectionalized as necessary to facilitate transport and erection. The maximum height of the switchboard is to be approximately 2.0 meters. A suitable connection chamber containing all field terminals shall be provided at the top or bottom of the switchboard as appropriate.

Before manufacture, the Sub-Contractor shall submit to the consulting Engineer for approval of detailed drawings showing the layout, construction and connection of the switchboard.

All bus-bars and bus-bar connections shall consist of high conductivity copper and be provided in accordance with KS 04-226: 1985. The bus-bars shall be clearly marked with the appropriate phase and neutral colours which should be red, yellow, blue for the phases and black for neutral. The bus-bars shall be so arranged in the switchboard that the extensions to the left and right may be made in the future with ease should the need arise.

Small wiring, which will be neatly arranged and cleated, shall be executed in accordance with B.S. 158 and the insulation of the wiring shall be colored according to the phase or neutral connection.

Switches and fuse switches, shall be in strict accordance with KS04-183:1978 Class 2 switches. Means of locking the switch in the "OFF" position shall be provided.

All fuse switches shall comply with KS04-183:1978, PARTS 2 and 3 a fault rating at least equal to the fault rating of the switchboard in which they are installed. Cartridge fuse links to KS 04-183:1978 category A.C. 46, class Q1 and fusing factor not exceeding 1.5 shall be supplied with each fused switch.

Mounting arrangements shall be such that individual complete fuse switches may be disconnected and withdrawn when necessary without extensive dismantling work. When switches are arranged in their formation all necessary horizontal and vertical barriers shall be provided to ensure segregation from adjacent units. Means of locking the switch in the "OFF" position shall be provided.

2.42 STEEL CONDUITS AND STEEL TRUNKING

Conduits shall be of heavy gauge class "B" welded to Standard specification KS 04-180:1985. In no case will conduit smaller than 20mm diameter be used on the works. Conduits installed within buildings shall be black enameled finish except where specified otherwise. Where installed externally or in damp conditions they shall be galvanised. Conduit fittings, accessories or equipment used in conjunction with galvanised conduits shall also be galvanised or otherwise as approved by the service engineer.

Metal trunking shall be fabricated from mild steel of not less than 18 swg. All sections of trunking shall be rigidly fixed together and attached to the framework or fabric or the building at intervals of not less than 1.2m. Joint trunking shall not overhang fixing points by more than 0.5m.

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

All trunking fittings (i.e. Bends, tees, etc) shall leave the main through completely clear of obstructions and continuously open except through walls and floors at which points suitable fire resisting barriers shall be provided as may be necessary. The inner edge of bends and tees shall be chamfered where cables larger than 35mm² are employed.

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

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

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

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

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

Where a 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 circumstances be such that a space factor of 45% is exceeded.

Conduit and trunking shall be mechanically and electrically continuous. Conduit 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 any other insulating substance shall be removed from the screw threads; where conduits terminate in fuse-gear, distribution boards, adaptable boxes, non-spouted switchboxes, etc., they shall, unless otherwise stated, be connected thereto by means of smooth bore male brass bushes, compression washers and sockets. All exposed threads and abrasions shall be painted using an oil paint for black enamelled tubing and galvanising paint for 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 bed 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 15mm. No tees, elbows, sleeves, either of inspection or solid type, will be permitted.

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

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

All boxes shall conform to KS 04 – 668: 1986, to be of malleable iron, and black enamelled or galvanised according to the type of conduit specified. All accessory boxes shall have threaded brass inserts.

Box lids where required shall be heavy gauge metal, secured by means of zinc plated or cadmium plated steel screws.

All adaptable boxes and lids of the same size shall be interchangeable.
Boxes used on surface work are to be tapped or drilled to line up with the conduit fixed in distance type saddles allowing clearance between the conduit and wall without the need for setting the conduit.
Where used in conjunction with mineral insulated copper sheathed cable, galvanised boxes shall be used and painted after erection.

Draw-in boxes in the floors are generally to be avoided but where they are essential they must be grouped in positions approved by the services engineer and covered and by the suitable floor traps, with non-ferrous trays and covers.

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

The Sub-contractor must take full responsibility for the filling in of all covers, but the filling in material will be supplied and the filling carried out by the main building contractor.

Where buried in the ground outside the building the whole of the buried conduit is to be painted with two coats of approved bitumastic composition before covering up.

Where run on the surface, unpainted fittings and joints shall be painted with two coats of oil bound enamel applied to rust and grease free metalwork.

2.43 TESTING ON SITE

The Sub-contractor shall conduct during and at the completion of the installation and, if required, again at the expiration of the maintenance period, tests in accordance with the relevant section of the current edition of the Regulations for the electrical equipment of buildings issued by the I.E.E of Great Britain, the Government Electrical Specification and the Electric Supply Company's By-Laws.

(a) Tests shall be carried out to prove that all single pole switches are installed in the 'live' conductor.

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

(c) Phase tests shall be carried out on completion of the installation to ensure that correct phase sequence is maintained throughout the installation. Triplicate copies of the results of the above tests shall be provided within 14 days of the witnessed tests and the Sub-contractor will be required to issue to the service engineer the requisite certificate upon completion as required by the regulations referred to above.

(d) Any faults, defects or omissions or faulty workmanship, incorrectly positioned or installed parts of the installation made apparently by such inspections or tests shall be rectified by the Sub-contractor at his own expense.

(e) The Sub-contractor shall provide accurate instruments and apparatus and all labour required to carry out the above tests. The instruments and apparatus shall be made available to the services engineer to enable him to carry out such tests as he may require.

The Sub-contractor shall generally attend on other contractors employed on the project and carry out such electrical tests as may be necessary.

The Sub-contractor shall test to the services engineer's approval and as specified elsewhere in this specification or in standards and regulations already referred to, all equipment, plant and apparatus forming part of the works and before connecting to any power or other supply and setting to work.

Where such equipment, etc., forms part of or is connected to a system whether primarily or of an electrical nature or otherwise (e.g. air conditioning system) the Sub-contractor shall attend on and assist in balancing, regulating testing and commissioning, or if primarily an electrical or other system forming part of works, shall balance, regulate, test and commission the system to the service engineer's approval.

APPENDIX TO GENERAL SPECIFICATIONS OF MATERIALS AND WORKS

The Contractor shall comply with the following: -

1. Government Electrical Specifications No. 1 and No. 2.

2. All requirements of Kenya Power Company Limited

3. All requirements of Communications Authority of Kenya (CAK).

PART B - GENERAL SPECIFICATIONS FOR DIESEL ENGINE GENERATORS

DESCRIPTION

1. Extent of the Contract works
2. Regulation and Standards
3. Conformity with the Specification
4. Information required with Tenders
5. Site Conditions
6. Tropicalisation of Components
7. Surface Finish
8. Record of Drawings
9. Maintenance Manual
10. Factory Tests
11. Installation
12. Spare Parts
13. Tools
14. Maintenance Period
15. Maintenance Contract
16. Transport and Storage

1. Extent of Contract Works

The work covered by this specification includes the supply, delivery, installation, setting to work, commissioning to the satisfaction of the engineer and maintenance for a period of twelve months, of a Diesel Engine Generating set complete with all necessary ancillary equipment and as indicated.

2. Regulations and Standards

The equipment shall comply with all relevant statutory instruments and regulations current at the date of tender and in particular the following:

1. I.E.E Wiring Regulations
2. Regulation under the Electric Power Act
3. Factories Act
4. Any special regulations issued by the local Electricity or Water Undertakings
5. Kenya Bureau of Standards (K.B.S)

The equipment and all components shall comply with all relevant KBS standards and codes of practice or other equal and approved standards specifications and codes. Where the equipment or part of it complies with other internationally recognized standards which are less stringent than British standards or Codes of practice, then the difference is to be stated in writing and must accompany the tender submission.

3. Conformity with the specification.

The equipment to be supplied shall conform in all respects to the specifications. Unless another standard is specifically mentioned in the specification, all materials and practices employed in the works must, where such standards exist be in accordance with the current KBS standards or code of practices or in accordance with such other authorized standard appropriate to the country of manufacture as in the opinion of the Engineer ensures equivalent or higher quality. .

Alternative which deviate in any respect from the specifications may only be submitted in addition to the main offer required by the Specification. Such alternative must be fully detailed and the price indicated may be considered for adoption after the comparison of quotation submitted in accordance with the Specifications.

4. Information required with Tenders

Each tender shall be accompanied by 2 sets of technical manual showing general arrangement and typical details of the equipment offered.

All tender documents and any communications thereof shall be in English language.

5. Site Conditions

The contractor is deemed to have visited the site and if unable to locate it to apply to the Engineer for directions to enable him to do so. The contractor is deemed to have acquainted himself therewith as to its nature, position, means of access, etc and no claim in the connection will be allowed. No claim will be allowed for traveling or other expenses which may be incurred by the contractor in visiting the site or preparing a tender for the contract works.

6 Tropicalisation of Components

All components shall fully be tropicalised and protected against moth growth.

7 Surface finish

All ferrous metal work shall be either painted or processed to give a rust proof coating. Ferrous metal work to be painted shall first to be either shot blasted or thoroughly wire brushed to remove all scale and oxide and immediately given one brushed coat or two sprayed coats of primer.

After not less than four hours, one brushed or two sprayed undercoats followed by one brushed or two sprayed finishing coats of heat and oil resisting quality paint shall be applied.

Successive coats of paint shall be slightly differing shades. Interior surfaces of electrical equipment enclosures shall be finished white and all external surfaces shall be finished grey (Bs 2660, colour 9-097)

Engine crank cases shall not be painted internally unless the paint is resistant to the lubricating oil.

8. Recording Drawings

The Contractor shall provide to the engineer four sets of the following drawings:

a) Where indicated a building drawing showing details of cable entries, pipe entries and ducts required, and the exhaust system.

b) A general arrangement drawing showing the principal dimensions and weight of the set.

c) A general arrangement of the diesel engine.

d) A general arrangement of the alternator and exciter showing terminal markings, polarity and phase rotation

e) A general arrangement of the electrical control panel(s).

f) A schematic and wiring diagram of the electrical control panel (s)

9. Maintenance Manual

Upon practical completion of the Contract works the Contractor shall furnish to the Engineer four copies of Manuals. The manuals shall be printed on good quality paper International A4 size and shall have stiff covers of durable materials.

The Manual shall contain full operating and maintenance instructions for each item of equipment, plant and apparatus set out in a form dealing systematically with each system. It shall include, as may be applicable to the contract works, the following and any other items listed in the text of the specification hereinafter:

a) System Description
b) Plant
c) Valve Operation
d) Switch Operation
e) Procedure of Fault Finding
f) Emergency Procedures
g) Lubrication Requirement
h) Maintenance and Servicing periods and Procedures
i) Colour coding legend for all services
j) Schematic and wiring Diagrams of plant, Apparatus and Switchgear
k) Record Drawings, true too scale, reduced to international A4 size
l) Lists of primary and secondary spares

The Manual is to be specially prepared for the contract works and Manufacture's standard descriptive literature and plant operating instruction cards will not be accepted for inclusion unless exceptionally approved by the engineer. The contractor shall, however, affix such cards, if suitable, adjacent to plant and apparatus. One spare set of all such cards shall be furnished to the electrical Engineer.
The maker's name, the rating of the set, the contract number, the location of the site and the year of installation shall appear on the front covers.

10. Factory Tests

The set shall be tested as a unit up to its rated capacity at the manufacturer's workshop (or elsewhere by agreement) for output and performance generally in accordance with the requirements of BS 649 and as 2613. The Engineer shall be given adequate notice in writing of the date and time of the work tests and he, or his representative shall if he so desires, be present at such tests and given all reasonable facilities for his own inspections during the course of the tests.
Whether or not the Engineer or his representative attends the tests, he shall be furnished, by the Contractor, with copies of all relevant tests certificates.

11. Installation

Installation of all plant and equipment shall be carried out by the contractor under adequate supervision from skilled staff provided by the plant and equipments manufacturer or his appointed agent.

Plant or equipment which are shipped before the relevant test certificate has been approved by the Engineer shall be shipped at the contractor's own risk and should the test certificate not be approved, new tests may be ordered by the Engineer at the contractor's expense.

12. Spare parts

The contractor shall submit with his tender a separate priced list of recommended spare parts including any optional extras which he recommends should be purchased for the set and its control equipment and are not supplied as standard with the unit. The initial spares required at handover shall be deemed to have been included in the tender pricing.

13. Tools

A complete set of tools and general and special testing equipment shall be provided, including grease and oil guns, necessary for the normal maintenance of the set and it controls.
The tools shall be of the best quality, the spanners being of chrome vanadium steel, and shall be contained in a suitable robust steel tool box with lid fitted with a lock and two keys. All tools and testing equipment may be used by the Contractor in the execution of the contract works but will not be accepted as part of the Contract works by the Engineer unless they are handed over in clean and undamaged condition, in perfect working order and effectively in new condition.

14. Maintenance period

The Contractor shall maintain the complete set and associated control equipment forming the unit for a period of twelve calendar months from the date that the unit is put into commission and regular use.

During this maintenance period, the contractor shall at his own expense.

a) Make good any defects in the unit and replace any parts that fail or show signs of weakness or undue wear in consequences of faulty design, workmanship or materials.

b) Visit the site with all diligence and attend to any such defect that arises within 48 hours of receiving notification of the defect.

c) Carry out regular examination and services of the unit at the intervals laid down by the manufacturer, or every three months, whichever is the sooner, the service examination to include all necessary adjustments, greasing, oiling, cleaning, changing of lubricating oils (where necessary) to keep the unit in sound and efficient working order.

d) Instruct the maintenance personnel in the proper operation, care and maintenance of the set and its equipment.

If during the maintenance period the unit is or is likely to be out of use for a period greater than 48 hours, due to the unit or part thereof developing a defect attributable to faulty design, workmanship or materials, or due to neglect of maintenance by the Contractor, the Contractor shall at his own expense immediately provide and install on free loan a suitable temporary unit for use until the required repair or replacement has been satisfactorily undertaken and the original set (or its replacement) put to proper working order.

At the end of the twelve months period of maintenance the Contractor shall (in addition to normal servicing work) carry out a compressive examination and test of the set and its auxiliaries, to ensure that the unit is in proper working order and in satisfactory condition for handing over to the Engineer whose representative shall be present at such examination and test.

15. Maintenance Contract.

The Contractor may be called upon to enter into maintenance contract with the Employer for the servicing the Generating sets after the expiry of the initial maintenance period. The Contractor shall indicate his willingness to carry out this service at the time of tendering and shall ensure that component personnel are available locally to be called at short notice to attend to Generator faults.

16. Transport and Storage

All plant equipment shall, during transportation, be suitably packed, crated and protected to minimize the possibility of damage, and 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 storage or installation.

PART C - GENERAL SPECIFICATIONS FOR IP CCTV SURVEILLANCE SYSTEM

2.1 General

2.2 Standard of Materials

2.3 Workmanship

2.4 Procurement of Materials

2.5 Shop Drawings

2.6 Record Drawings

2.7 Regulations and Standards

2.8 Setting out Works

2.9 Testing on Site

2.1 GENERAL

This specification is to be read in conjunction with any other information herein issued with it. Bills of quantities and schedule of unit rates shall be the basis of all additions and omissions during the progress of the works.

2.2 STANDARD OF MATERIALS

Where the material and equipment are specifically described and named in the Specification followed by approved equal, they are so named or described for the purpose of establishing a standard to which the contractor shall adhere.

Should the contractor install any material not specified herein before receiving approval from the proper authorities, the Engineer shall direct the contractor to remove the material in question immediately. The fact that this material has been installed shall have no bearing or influence on the decision by the Engineer.

All materials condemned by the Engineer as not approved for use, are to be removed from the premises and suitable materials delivered and installed in their place at the expense of the Contractor. All materials required for the works shall be from branded manufacturers, and shall be new and the best of the respective kind and shall be of a uniform pattern.

2.3 WORKMANSHIP

The workmanship and method of installation shall conform to the best standard practice. All work shall be performed by a skilled tradesman and to the satisfaction of the Engineer. Helpers shall have qualified supervision.

Any work that does not in the opinion of the Engineer conform to the best standard practice will be removed and reinstated at the contractor's expense.

Permits, Certificates or Licences must be held by all tradesmen for the type of work; in which they are involved where such permits, certificates or licences exist under Government legislation.

2.4 PROCUREMENT OF MATERIALS

The contractor is advised that no assistance can be given in the procurement or allotment of any materials or products to be used in and necessary for the construction and completion of the work.

Contractors are warned that they must make their own arrangements for the supply of materials and/or products specified or required.

2.5 RECORD DRAWINGS

These diagrams and drawings shall show the completed installation including sizes, runs and arrangements of the installation. The drawings shall be to scale not less than 1:50 and shall include plan views and section.

The drawings shall include all the details which may be useful in the operation, maintenance or subsequent modifications or extensions to the installation.

Three sets of diagrams and drawings shall be provided, all to the approval of the Engineer.

One coloured set of line diagrams relating to operating and maintenance instructions shall be framed and, mounted in a suitable location.

2.6 REGULATIONS AND STANDARDS

All work executed by the contractor shall comply with the current edition of the "Regulations" for the Electrical Equipment of Buildings, issued by the Institution of Electrical Engineers, Electric Power Act, Kenya Bureau of Standards (KBS), Institution of Electrical Engineers (I.E.E) Wiring Regulations, Current recommendation of CCITT and CCIR, and with the Regulations of the Local Electricity Authority and the Communications Commission of Kenya (CCK)

Where the sets of regulations appear to conflict, they shall be clarified with the Engineer.

2.7 SETTING OUT WORK

The contractor, at his own expenses, is to set out works and take all measurements and dimensions required for the erection of his materials on site; making any modifications in details as may be found necessary during the progress of the works, submitting any such modifications or alterations in detail to the Engineer before proceeding and must allow in his tender for all such modifications and for the provision of any such sketches or drawings related thereto.

2.9 TESTING ON SITE

The contractor shall conduct during and at the completion of the installation and, if required, again at the expiration of the maintenance period, tests in accordance with the relevant section of the current edition of the Regulations for the electrical equipment of buildings issued by the I.E.E of Great Britain, the Government Electrical Specifications No. 1 and No.2, Electric Supply Company's By-Laws, Communications Commission of Kenya (CCK) requirements or any other supplementary Regulations as may be produced by the engineer.

Any faults, defects or omissions or faulty workmanship, incorrectly positioned or installed parts of the installation shall be rectified by the contractor at his own expense.

SECTION E

SCHEDULE OF CONTRACT DRAWINGS

SCHEDULE OF CONTRACT DRAWINGS

1.0 Tenderers may inspect the electrical drawings at the office of the Chief Engineer Electrical (BS), State Department of Public Works, Hill Plaza, along Ngong Road, Nairobi, during normal working hours.

The drawings shall however be availed, on award of the tender, to the nominated Contractor.

SECTION F

PARTICULAR AND TECHNICAL SPECIFICATIONS

OF

MATERIALS AND WORKS

PART 1

PARTICULAR SPECIFICATIONS OF MATERIALS AND WORKS

1.00 SITE LOCATION

The location of the proposed works is at **the Kenya Civil Aviation Authority Stations – JKIA Tower, JKIA Radar, Stony-Athi, Ngong Hills and Mua Hills Radar stations.**

i) CLIMATE CONDITIONS

The following climate conditions can apply at the site of the sub-contract works and all the plant, equipment, apparatus, materials and installations shall be suited for these conditions:

Mean maximum temperature	30.9 ^{o}C D.B.
Mean minimum temperature	26.6 ^{o}C D.B.
Range of relative humidity	73% - 84%
Salt content in the atmosphere	0.2%
Altitude	5 meters above sea level
Latitude	04^{o} 0'S, 39^{o} 36'E
Solar radiation, June	780 mean max. Langleys.

Extremely heavy rains fall at certain periods of the year and the sub-contractor shall be deemed to have taken account of this factor both in his process and in his planning of the execution of the contract works.

Equipment de-rating factors for the temperature and altitude shall be stated.

It is intended that ventilation and air filtration, if any shall be provided by others. It is not intended that the accommodation shall be air conditioned. Any requirements of this nature upon which the tender is conditional shall be clearly stated in the tender.

ii) EXTENT OF THE WORKS

The works to be carried out include the supply, delivery, installation, testing, commissioning and leaving in servicing condition as herein described in this specification. The works shall include, but not limited to the supply and installation of the following:

i) 120 and 170 kVA Standby Generator set Installation

ii) 7.5 kVA Uninterruptible power supply unit (UPS) installation

iii) 10 kVA Automatic voltage stabilizer (AVS) Installation

iv) IP CCTV system installation

v) Mechanical ventilation/extraction fans and associated builders works

vi) Electrical Installation Work, comprising:-

- Careful removal of the existing but dysfunctional electrical items/equipment, fittings & accessories and handing over to client for safe keeping.

- Decommissioning and removal of the obsolete/ malfunctioned/dilapidated/ vandalized power distribution panels/boards and associated switchgears.
- Testing the status of existing earthing/ grounding system using appropriate electrical test equipment and compile formal report. If required allow for the appropriate remedial works to reinstate to the recommended functonal status.
- Assessment, testing by appropriate electrical test equipment and compile formal report, troubleshooting and making good electrical faults in the existing installation system.
- Installation of electrical fittings and accessories
- Installation of power distribution cables and control switchgear
- Installation of power distribution boards and panels with associated switchgears
- Proper cable management & labelling of the existing but untidy cabling.
- Wiring for lighting & power points and installation of fittings /accessories

2.00 REGULATIONS AND STANDARD

The contractor shall, in execution and completion of the works in the detailed design for which he is responsible, comply with the provisions of the following as necessary and relevant;

a) Communication Authority of Kenya (CAK)
b) The Kenya Communications Act
c) The Electronic Power Act and the Rules made there under.
d) The Kenya Power and Lighting Company Limited's Bye-Laws.
e) The current edition of the "Regulations for the Electric Equipment of Buildings" issued by the Institution of Electrical Engineers.
f) The requirements of the Chief Inspector of Factories for the Kenya Government.
g) Kenya Bureau of Standards (KBS) Standard Specifications and Codes of Practice, or other equal and approved standard specifications and codes.
h) The Bye-Laws of the Local Authority.
i) Any other regulations applicable to Electric and Electronic Installations or Communications systems in Kenya.
j) The Employer's Safety Regulations.

The bidders will be required to submit written manufacture's authorization for the UPS, AVS, Generator sets and CCTV equipment/spares to be supplied as provided for (agents authorization form)

NOTE: Any bidder without manufacturer's authorization will automatically be disqualified

3.00 TESTS

Both on completion of his work on the installation of the equipment and at the end of the guarantee period, the Contractor shall carry out all the tests as required and in accordance with B.S 2655 part 7 in the presence of the Engineer and shall provide all the necessary instruments, labour and materials to do so at his cost.

Damage occurring, as a result of these tests will be made good by the Contractor to the Engineer's satisfaction at his expense.

4No. (Four) copies of the test certificates for each equipment should be forwarded to the Engineer within 4 days of completion of the last test.

4.00 INITIAL MAINTANANCE OF THE VARIOUS EQUIPMENT

The tenderer shall allow in his tender for the initial routine service maintenance of the new installation once a month during the 6/12 months defects liability period and shall carry out all necessary adjustments and repairs, cleaning, greasing and oiling of moving parts.

During the initial maintenance of the installation, the tenderer shall also allow in his tender for all tools, instruments, plant and the transportation thereof, as required for the correct and full execution of these obligations and the provision, use or installation of all materials or parts which are periodically renewed or parts which are faulty for any reason whatsoever excepting always Acts of God such as storm, tempest, flood, earthquake and civil revolt, acts of war and vandalism.

The contractor shall also provide a 24 -hour break-down service to attend to faults on or malfunctioning of the installation between the routine visits of the defects liability period.

A monthly report of any works done upon the installation shall be supplied to the Engineer.

5.00 WORKING DRAWINGS

The Contractor shall submit to the Project Manager working drawings for the proposed system for approval. The drawings will show the locations of and identifiers for all cable routing and terminations, telecommunication outlets/connectors.

6.00 ELECTRICAL REQUIREMENTS

The equipment to be supplied shall be capable of being operated from 415/240 VAC (± 20%), 47-63 Hz power supply.

PART 2

A) TECHNICAL SPECIFICATIONS FOR IP CCTV SURVEILLANCE SYSTEM

1.00 EXTENT OF WORKS FOR IP CCTV SURVEILLANCE SYSTEM

The security surveillance system should consider the following.

IP CCTV Camera. The cameras specified should be able to cover the distance with clear pictures. Consider whether there shall be need to support the fixed digital cameras with the Pan, Tilt and Zoom Cameras or not. Highly sensitive areas should be covered with more cameras able to take pictures of any person coming in both from the front and the rear. The resolution of the cameras should be able to give motion pictures that are clear.
LED Monitors. The color monitors must be of high resolution and preferably of plasma screen. The size of the monitor should be big enough to allow the operators make correct deductions both in real time operation and during playbacks.
***IP Network Video Recording*.** The recording multiplexer resolution has to be equally high for the monitor to display the with a high resolution.

The IP Surveillance system should be able to support the following
- IP based recording system with motion detection.
- Digital zooming into recorded images/ life view
- Multi-level password protection and logging facilities
- Image compression for remote web live and playback viewing incase of IP.
- Multi display monitors
- Automatic daily archiving to hard drive or optical drive.
- Fully adjustable digital video motion detection with exclusion /inclusion multi regions per camera.
- Efficient video collection, storage and retrieval.
- Advanced and instant search capability
- Digitally signed recordings, with audit trails of all operator actions and system event.
- Storage capacity of the Network Video Recorder. Space to provide at least three months continuous recording and back up for automatic archiving for one year and redundancy
- Infra red illuminators in poor lighting conditions
- Able to interface with other systems on the ground
- Support IP and PoE connectivity.

2.00 WORKING DRAWINGS

The Contractor shall submit to the Project Manager working drawings for the proposed system for approval. The drawings will show the locations for all IP cameras, cable routing and terminations, telecommunication outlets/ connectors, location of NVR, monitors and Edge switches.

3.00 MINIMUM REQUIREMENTS FOR THE PROPOSED IP CCTV SYSTEM

The cameras shall have the following minimum specifications but cameras with higher specifications shall be accepted:

a) IP Dome CCTV Camera

3 Mega Pixel Full HD IP Dome Camera with Infrared
Built in Infrared 30 meters minimum
imaging sensor with Wide Dynamic Range
Motorized Varifocal Auto Iris lens (3-11mm)
Minimum illumination 0.01lux (colour)
IP network capable
PoE capability
H.265+ video compression
3D Noise reduction
Accessible edge storage with internal MicroSD card slot
Local Storage
True day and night vision capability
I/O - 1 Alarm in / 1 Alarm out
2 Way Audio
Tampering detection, Face detection, Audio Detection, Motion detection & Privacy Masking and event triggered alarm processing
Vandal proof IK-10 rating housing
Weather proof IP66 rating
ONVIF Compliant

(State make and type, and enclose brochures/catalogues)

e) IP PTZ CCTV Camera

3 Mega Pixel Full HD IP Dome Camera with Infrared
Built in Infrared 100 meters minimum
imaging sensor with Wide Dynamic Range
Varifocal Auto Iris lens
Minimum Adjustable zoom 16
Minimum illumination 0.01lux (colour)
IP network capable
PoE capability
H.265+ video compression
20X Optical zoom
Accessible edge storage with internal Micro SD/SDHC/SDXC card slot
Endless 360 degree pan rotation
180 Degree continuous tilt with auto flip

256 preset positions
I/O - 1 Alarm in / 1 Alarm out
True day and night vision capability
Vandal proof IK-10 rating housing
Weather proof IP66 rating
ONVIF Compliant

(State make and type, and enclose brochures/catalogues)

d) IP Bullet camera – 5MP

5 Mega Pixel Full HD indoor IP Bullet Camera with Infrared
Built in Infrared 40 meters minimum
imaging sensor with Wide Dynamic Range
Motorized Varifocal Auto Iris lens (3-11mm)
Minimum illumination 0.01lux (colour)
IP network capable
PoE capability
H.265+ video compression
Accessible edge storage with internal MicroSD card slot
True day and night vision capability
I/O - 1 Alarm in / 1 Alarm out
2 Way Audio
Tampering detection, Face detection, Audio Detection, Motion detection & Privacy Masking and event triggered alarm processing
Vandal proof IK-10 rating housing
Weather proof IP66 rating
ONVIF Compliant

(State make and type, and enclose brochures/catalogues)

2.05 MOUNTING BRACKETS

The Brackets shall:

Be suitable for wall or ceiling mounting of a single camera.
Be at least 5.5"length
Have an auto lock facility.

2.06 CAMERA HOUSING

The camera housing shall:
Be IP66 rated with integral cable management.
Be Weatherproof and constructed from aluminium with epoxy coating.

2.07 COLOR VIDEO MONITORS

The monitor should be capable of providing high levels of picture quality 10MHz bars visible at low brightness and reliability stable synchronization, black level clamping, low sensitivity and high stability. The monitors shall be high performance color video monitors for monitoring scenes from the above cameras and viewing playback scenes from the video cassette recorders. The monitors shall be located at places to be shown on site by the project manager.
The monitor shall give stable and interference free pictures of scenes being viewed. It shall also conform to the following specifications:

Type	:	LED; 50,000hours panel life
System	:	NTSC/PAL
Screen size	:	48/40
Resolution	:	1,920 x 1,080, 4K
Display Colour	:	16.0 million
Brightness	:	350cd/m^2
Contrast Ratio	:	5,000:1
Video input signal	:	1.0 V pk-pk
Power consumption	:	Not more than 80W
Power input	:	240V 50HZ
Interface	:	VGA, DVI, HDMI, RGB, Audio, Video

(State make and type, and enclose catalogues)

2.08 NETWORK VIDEO RECORDER

The network video recorder shall have the following minimum requirements:

12 Channels
Recording speeds of at least 256Mbps for 12channel
Gigabit Ethernet connection
Multi screen Display: Full/4/9/16 way or as appropriate.
4 Hot swap HDDs (RAID 5) at 4TB each
external storage support capability
VGA/HDMI local monitor
Redundant hot swap power supply
Network management/viewer software
In built intelligent video analysis
H.265+ Compression
ONVIF compatibility
Web viewer supported
PoE enabled
Storage capacity : continuous storage for at least six (6) months and back up storage for at least one year
Smart Video Search Feature for streamlined Investigations
Recording resolution of 5MP minimum
IP address filtering, user access log, authentication and encryption
Auto Launch of Video on specified Alarms/Events
LED status indicator
CE,UL certification

(State make and type, and enclose catalogues)

2.09 CCTV MANAGEMENT SOFTWARE

CCTV management software with the following minimum specifications:-

Event Recording Scheme
Operate Motion-Dector-Recording
NTSC-PAL video recording.
Be capable of recording real time images at full resolution and frames rate.
Features for connection for alarm system Automatic Recycling
Users' passwords.
Input, Output, Audio Alert Facilities
Remote Viewing Facilities, TCP/IP, INTERNET, ISDN, modem
Capability of streaming into the client's existing LAN / WAN infrastructure
Ability to quickly search through thousands of hours of recorded video information
Event-triggered video recording to reduce storage requirements
Masks out disturbing areas, or areas of no interest, within the specified region
Identifies & immediately alerts user to potential security breaches
Features should be able to be used at very low frame rates
Easy calibration for specific applications
Color-matching matches user-specified colour to the video image
Functions in outside environments with changing light conditions:
Auto-learning of background feature
Object saliency and object Consistency mechanisms to filter out phantom objects
"Out of Focus" condition is user-calibrated by level of focus
Automatic self-test of camera validity
Motion Trajectory Analyzer provides advanced analysis of the motion of objects
Seamless integration into Enterprise security knowledge management solution.
Analysis of stationary objects

(State make and type, and enclose catalogues)

2.11 CABLING

a) All cables must pass through conduits or trunking.
b) All cables and connectors shall be labeled.
c) No distortion due to kinks, sharp bends or excessive hauling tension shall be allowed.
d) Cables shall be run in a manner eliminating any possibility of strain on the cable itself or on the terminations.
e) Cables shall have no joints or splices.
f) Cables shall be kept at a minimum distance of 150mm from items liable to become hot or cold.
g) Bending radii shall be not less than eight times the overall cable diameter.
h) The manufacturers hauling tension shall not be exceeded.
i) All cable ties and fixings shall be tightened to support the cable loom without distortion of the cable sheath.
j) The STP 4 pair shall be of cat 6A grade and exceed ANSI/TIA/EIA-568-Aj and ISO/IEC 11001standards. Cat 6A structured cabling shall be used throughout the entire installation.

(State make and type, and enclose catalogues)

2.12 PATCH PANELS

a) Shall conform to ANSI/TIA/EIA-568A and rack mounted.
b) Shall be equipped with RJ45 contacts of Cat 6A sockets with capacity of 12, 24 or 48 ports.
c) Shall be earthed.
d) Except for patch cords used to connect NICs to the RJ45 sockets, all patch cords shall be labeled at each extremity with PVC support and intelligible marking. For other components the label shall be of stiff plastic PVC type.

(State make and type, and enclose catalogues)

2.13 NETWORK CONTROL EQUIPMENT AT THE NETWORK CORE

The active control equipment at the core should have the following features:

a) Backplane/switch fabric Bandwidth Capacity of 150 GBPS or more.
b) IEEE 802.3 compliant for power over Ethernet
c) IEEE 802.1 based security compliant
d) SNMP compliant for security
e) Layer 2/3/4 switch
f) Should support Gigabit Ethernet to the desktop
g) Should have at least 12-slots
h) The core switches should have two links to each edge switch configured in active/active configuration. The links should deliver 2GBPS throughput when all ports are active.
i) The core switch should have redundant power supply, redundant fan tray and redundant CPU/ supervisor engine installed
j) Fiber cable linking stacks on each edge switch to the core should be connected to 1000Base X(GBIC) port on the core switch using star topology
k) Should be installed with the latest version of system software at the time of delivery.
l) Should support Quality of service for various applications.
m) Active devices shall be rack mounted.
n) Active devices used at the LAN edge must be stackable and shall attach to the backbone cabling at 1000mbps.
o) Where more than one active device is required to satisfactorily serve the floor data outlet distribution requirements they shall be stacked using interface operating at the backbone speed.

(State make and type, and enclose catalogues)

2.14 LABELING

a) Horizontal and backbone cables shall be labeled at each end. The cable or its label shall be marked with its identifier.
b) A unique identifier shall be marked on each faceplate to identify it as connecting hardware.
c) Each port on the face plate shall be labeled with its identifier.
d) A unique identifier shall be marked on each piece of connecting hardware to identify it as a connecting hardware.
e) Each port on the connecting hardware shall be labeled with its identifier.
f) A unique identifier shall be marked on each **port** on the connecting faceplate to identify it as a connecting hardware.

2.15 NETWORK CABINET

a) The cabinet shall be metallic with front clear glass and of good finish and conveniently accessible by technical personnel for maintenance. The main cabinet shall be at least 12U and other cabinets housing edge switch should be at least 9U

b) Power to the cabinet shall be switched off from within the cabinets. Proper power socket cables to be supplied with the cabinet.

c) The cabinet for active devices shall conform to ANSI/TIA/EIA-568A specifications with forced cooling.

e) Support small factor pluggable (SFP) and industry leading density up to 240 of IEEE 8033 for 1000 Base-SX ports per system.

c) Cabinets shall have adequate room for additional components typically 3U free space.

(State make and type, and enclose catalogues)

2.16 ETHERNET FLOOR EDGE SWITCHES

Active control equipments at the LAN Edge should have the following features

a) Active control equipments at the LAN Edge should support 10/100/1000 MBPS on all ports (RJ45) and Gigabit to the desktop connectivity

b) The equipments should have at least two 1000BaseXGigabit uplink ports for terminating backbone Fiber.

c) The equipments should support layer 3 routing.

d) Should support IEEE 802.1, SSH, SNMP.

e) Switch Fabric forwarding Bandwidth of 64GBPS or more.

f) More than 12,000MAC addresses should be available on each switch .

g) The switches should have 12 ports of 10/100/1000 MBPS.

h) Each stack on the edge will have two links of Fiber to the core switch, totaling two fiber terminations from the core switch to the stack.

i) Should support Jumbo frames.

j) Total stack throughput bandwidth of 16 GBPS or more.

k) Active Edge switches should be quoted with a minimum of **One year of warranty** covering free replacement of parts and units.

l) The switches to be PoE plus

(State make and type, and enclose catalogues)

2.17 OPTICAL FIBRE CABLE

The fibre cable must be 8 core single mode fibre with the following specifications:-

a) Cable size: 8 cores.

b) Termination: SC Duplex connectors.

c) Graded Index: Nominal 62.5/125 micron

(State make and type, and enclose catalogues)

2.18 FIBER PATCH PANELS

All Backbone Fiber links should be terminated on Fiber Patch Panels. Connector interfaces should support ST, Sc simplex, Sc duplex, FC, LC or MT-RJ.

(State make and type, and enclose catalogues)

2.19 BACK BONE

Backbone cabling inclusive of switches and all necessary accessories shall be carried out in readiness for the termination of edge switches.

The Backbone cabling shall be flexible and allow for easy 'add ons' for future expansions. Hence enough capacity shall be allowed for future expansion. It shall be done using the star topology.

Network Management System

The Network Management System (NMS) enables Service Providers to Manage all Links in the Network from a Network Operations Center (NOC). With NMS, Service providers should monitor and configure up to 10,000 links.

Bidders must propose the manufacturers Network Management system for centralized configuration, maintenance and troubleshooting of active equipment. Third party standalone systems should not be offered as part of the solution.

Features and functionalities of the system should include the following:

a) Should be compatible with Microsoft windows/Linux operating systems
b) Graphical User Interface for central Management and network viewing
c) Network discovery and inventory management
d) VLAN, multicast, security and load-balancing/fail over configuration
e) Downloading and saving of log file from the device flash memory
f) Centralized upgrade/backup and archiving of active devices
g) Export of network topology to JPEG or other standard formats.

PART 3

B) TECHNICAL SPECIFICATIONS FOR UPS and AVS

1) 10 KVA Uninterruptible Power Supply (UPS)

The 10 kVA UPS shall operate as an active power control system, working in conjunction with the existing building electrical system to provide power conditioning, and on-line power protection for critical loads.

System Description

The UPS shall operate as an on-line system in the modes listed below.

i. Normal: The main inverter and the delta inverter shall operate in an on-line manner to continuously regulate the power to the critical load. The delta inverter and main inverter also shall derive power from the AC input source and supply DC power to float charge the battery.

ii. Battery: Upon failure of the AC input source, the critical load shall continue being supplied by the main inverter without any switching. The inverter shall obtain its power from the battery. There shall be no interruption in power to the critical load upon failure or restoration of the AC input source.

iii. Recharge: Upon restoration of the AC input source, the delta inverter and main inverter shall simultaneously recharge the battery and regulate the power to the critical load.

iv. Bypass: The static bypass switch shall be used for transferring the critical load to mains supply without interruption. Automatic re-transfer to normal operation shall also be accomplished with no interruption in power to the critical load. The static bypass switch shall be capable of manual operation.

v. External maintenance bypass: The external maintenance bypass switch shall be used for supplying the load directly from the mains supply, while the UPS is isolated for maintenance.

vi. Future expansion: The UPS shall be capable of field-up-grade to allow parallel operation with additional UPS modules for increased capacity or for redundant operation. The parallel systems shall be capable of operation on a common DC bus or with a separate DC bus for each system module and shall provide proportional load sharing between all available modules. To provide a true fault tolerant control system, any individual UPS module shall be capable of automatically assuming control of the entire system.

Standards

i. IEC 62040 part 1: Uninterruptible power systems (UPS) - Part 1: General and safety requirements for UPS.
ii. IEC 62040 part 2: Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements.
iii. IEC 62040-3: Method of specifying the performance and test requirements. UPS classification as VFI – SS – 111
iv. ISO 9001: Quality Standard Assurance System of the UPS manufacturer.

Environmental Conditions

The UPS system shall operate satisfactorily under the following ambient and environmental conditions:

i. Operating Temperature: -10 °C to 40 °C during normal operation.
ii. Storage Temperature: -20 °C to 60 °C.
iii. Relative humidity: 95 % maximum without condensation.
iv. UPS protection level: IP20.

Thermal Design

i. Airflow from the front side to back side of the UPS shall be unrestricted.
ii. The UPS shall not require additional forced cooling.
iii. The module includes built-in thermal protection.
iv. The UPS heat dissipate shall not be more than 4% of its maximum output load (in Watts).

Maintainability

i. Easy maintainability of the UPS system shall be regarded as important feature in the design and shall embody safety and simplicity.

ii. Maintenance may perform at any time without a need to shut down the UPS or isolate the batteries. During maintenance the UPS shall be able to provide the full protection to the system without any disruption to the critical loads.

iii. The power modules shall be easily accessible from the front by pulling out the modules while the system is still running. No special equipment or tools are required for the dismantling of modules. The modules shall be removable by sliding out of the respective slot.

iv. After the inspection and cleaning, the modules shall be easily reinserted into the system without having to carry out any manual phase synchronization. Each power module should not weigh more than 19 kg.

v. The principal shall be able to support the system for 5 years after the system has been declared obsolete by the principal.

vi. The principal shall demonstrate that the Mean-Time-To-Repair or replace the power modules shall be less than 15 minutes by either trained or untrained staff.

Quality and Reliability

i. The UPS shall be manufactured under recognized international standards of quality assurance such as ISO9001, CE (or equivalent) compliance.

ii. To ensure a high reliability for the continuous operation, the components used in the UPS shall be source from suppliers certified of ISO9001 standards.

iii. The UPS shall be required to pass full factory acceptance test.

Control, Indication and Alarm

The UPS system shall include the following control, indication and alarm system as a minimum requirement in addition to the control equipment as specified;

Local Control Panel 5" TFT color, touch LCD power flow diagram indications

i. AC line status and measurements.
ii. Bypass line status and measurements.
iii. Inverter line status and measurements.
iv. Output line status and measurements.
v. Battery and battery test status.
vi. Load on bypass.
vii. Load on inverter.
viii. Load level.
ix. Battery mode.
x. Double conversion mode.
xi. Communications status with modules and static switch.
xii. Synchronization status.
xiii. UPS ON

Power Module Indicators:

i. Module fault indicator.
ii. Input OK LED.
iii. Output OK LED.

Events log

i. The UPS shall be able to record up to 100 events

ii. For each event the log system shall capture system measurements, modules input, output and dc voltages, static switch's inverter, bypass and output voltages, status of each module, etc.

Uninterruptible Power Supply (10 KVA)

	ITEM DESCRIPTION	Minimum Requirement	Bidder's Specification
Mandatory Requirement			
1.	Topology	True Online Battery, Double Conversion VFI	
2.	Construction	Modular Design Hot swappable /Scalable modules with full expanded capacity of at least 10 KVA.	
AC SUPPLY INPUT			
3.	Nominal Voltage	220/240	
4.	Frequency	47-63Hz (autosensing or selectable)	
5.	Voltage Range	220-270V	
6.	Current	61 A per module – no inrush current at startup	
7.	Power walk-in	>60s	
8.	THDI	<3%	
9.	Power Factor	0.8	
OUTPUT			
10.	Rated Power	10KVA	
11.	Frequency Tracking Range	±0.5, ±1, ±2, ±3Hz (selectable)	
12.	Frequency	50/60 HZ +/- 0.1% HZ, Adjustable	
13.	Slew Rate	1Hz/Sec	
14.	Voltage	220/240/270V+N	
15.	Static Voltage Regulation	±1%	
16.	Regulation for Unbalanced load	±1% for 100% unbalanced load	
17.	Dynamic Response to 100% load step	±2%	
18.	Over-load	110% 10 Minute 125% 60 Sec, 1000% for one cycles	
19.	Waveform	Pure sine wave - Sinusoidal	
20.	THD	Less than 2% for linear load	
21.	Load CF (max)	6:1	
22.	AC-AC Efficiency	96%	
BATTERIES			
23.	DC-link voltage	±300 to ±405Vdc (405V floating, accuracy t › ±1%)	
24.	Back up Time	At least 15 (Fifteen) minutes on full load	

25.	Type	Lead Acid, Sealed, rechargeable Maintenance free VRLA, hot swappable Automatic periodic battery tests	
	Battery protection and safety	Must have both protective and safety isolation switch gear.	
	Battery charger type	PWM hi efficiency, one in each power module with protection against excessive discharge	
	Charging Cycle	Intelligent with boost charge and advanced management	
EXTERNAL CHANGE OVER SWITCH			
26.	External change over switch-	2 Pole Change Over Switch 35A with knock out on at least 2 sides and sufficient enclosure to manipulate cables. With 3 switch positions (ON, OFF, BYPASS positions) Internationally recognized, mature brand according to BS EN 60947-3.	
GENERAL			
27.	Maximum power dissipation	N*1041W (N*3552 BTU/hr) where N=# of modules	
28.	Ambient temperature	-10oC to +40oC (operating); -20oC to+60oC (storage)	
29.	Relative humidity	95% max non-condensing	
30.	Altitude	1500m without derating	
31.	Enclosure	IP20 (IP54 is optional)	
32.	Cooling	Multi-fan with speed control (forced)	
33.	Acoustic Noise (@ 1.5 m from front of unit) Noise (dBA) with full load	Not more than 60 DB	
34.	Display unit	LCD flat panel, touch-sensitive	
STANDARDS			
35.	EMC	EN50091-2 Class A; IEC 62040-2 Class A	
36.	Design	EN50091-3; IEC 62040-3	
37.	Safety	EN50091-1; IEC 62040-1-1	
38.	Low magnetic field radiation	EMF as per ICNIRP	
Communications & Management			
39.	Communications & Management	Smart communications interface Serial port communication support Network manageable Emergency power off (EPO) to be provided	
ENVIRONMENT			
40.	Operation Temperature	-10 to + 40 Degrees Celsius	
WARRANTY			
41.	Warranty	1 (One) year Warranty workmanship and defects liability period for the entire UPS installation.	

2) Automatic Voltage Stabilizer (7.5 KVA)

Specification	Minimum Requirement	Bidder's Specifications
Rating	7.5kVA (7.5kW at unity power factor), 1 Phase	
Input Voltage Range	220V to 250V, 47Hz to 53Hz, 3 Wire -1Ph	
Output Voltage	240V +/- 1%	
Duty Cycle	Continuous 24x7	
Waveform Distortion	Nil	
Response Time	Less than 10ms	
Suitability	Suitable for all power factor loads	
Cooling	Natural Oil Cooled	
Class of Insulation	A Class	
Breakdown Strength & IR	1500V AC for 2 minutes. Greater than 50 Mega Ohms at 500V DC	
Installation	Indoor type	
Degree of Protection	IP-30	
No Load Loss	Less than 0.4%	
Efficiency	Over 98%	
Applicable Standard	IS 9815	
Type & Suitability	Unbalanced Supply and Load. Suitable for 3 phase Unbalanced/ Balanced Supply & Unbalanced/Balanced Load.	
Input / Output Termination	On Copper Bus Bar	
Transformer Oil	New Insulating Transformer Oil ISI 335 marked	
Winding & Wiring Material	Copper EC grade (99.999% Pure)	
Standard Fittings	Two Nos. Earthing terminals. Cable end boxes for incoming and outgoing side for terminating cables. Oil level indicator, filling & drain valve, lifting lugs, wheels.	
Warranty	1 (One) year Warranty workmanship and defects liability period for the entire AVS installation.	

Specification	Minimum Requirement	Bidder's Specifications
Salient Features	"IC" based solid-state, relay less, front-loading plug in control cards for easy online serviceability. Output voltage adjustable ± 6% of set voltage from front panel. Meters on front panel for easy monitoring of input and output voltage along with limit indicators. Provision for Auto / Manual control from the front panel. Wide ambient temperature operation from –20° C to 50° C.	

PART 4 (A) -PARTICULAR SPECIFICATIONS FOR STANDBY GENERATING SYSTEM

DESCRIPTION

1. Location of Site
2. Climatic Condition
3. Operating Conditions
4. Functional objects
5. Scope of the Contract
6. Performance objectives
7. Generating Set Arrangements
8. Diesel Engine
   - General
   - Fuel Oil System
   - Lubricating Oil System
   - Starting of Engine
   - Cooling System
   - Governing System
   - Exhaust System
   - Engine Instruments
   - Pipe work, Valves and Fittings

9.0. The Generator (Alternator and Exciter)

9.1 General

9.2 Excitation

9.3 Electrical Control Panel

9.4 Lock-out

9.5 Fault Indication

9.6 Starting Battery and Charger

9.7 Wiring and Earthing

9.8 Contactors

9.9 Relays

9.10 Fuses

9.11 Rectifiers, capacitors and solid state components

9.12 Enclosures for Equipment

10.0 Lifting Gear and Handling

10.0 Commissioning

PARTICULAR SPECIFICATION FOR THE STANDBY GENERATING SYSTEM.

1 Location of site

The site for the proposed Contract Works is **the Kenya Civil Aviation Authority Stations – JKIA Radar & Tower stations**

2 Climatic Condition

The following climatic conditions apply at the site of the Contract Works and the equipment, materials and installations shall be suitable for these conditions:

Mean maximum temperature	30.9 ^{o}C D.B.
Mean minimum temperature	26.6 ^{o}C D.B.
Range of relative humidity	73% - 84%
Salt content in the atmosphere	0.2%
Altitude	5 meters above sea level
Latitude	04^{o} 0'S, 39^{o} 36'E
Solar radiation, June	780 mean max. Langleys.

3 Operating Conditions

The equipment and all components shall be suitable for the operation in ambient conditions of 5^{0} C to 40^{0}C and up to 100% relative humidity

i) in an unheated ventilated building
ii) in the open air as specified

Unless otherwise stated all ratings of equipment and components shall be interpreted as site rating and NOT sea level or other ratings.

4 Functional Objectives

The set shall be capable of operating continuously and satisfactorily in a medium dust laden atmosphere as defined in BS 1701 and in accordance with BS 649.

The generating set is required for standby duty and will be connected to the switchboard through a circuit. It shall have an automatic mains failure control, appropriately interlocked with the other incoming supply. Provisions shall be made in the control circuit of the generator for automatic and remote push button control, including the terminals and cable glands for all external cables, which will be supplied by others, where specified. It shall also be possible to start, operate and stop the set manually, independent of any automatic features

Within the operating conditions specified in part 3 above the set shall be capable of starting and accepting full load within the shortest possible time, and in any case, in not more than 10 seconds. Any special features included to achieve this shall be stated in Section F.

5. Scope of the Contract Works

The work covered by this Specification includes the design, manufacture, supply, delivery, installation, commissioning and testing to the satisfaction of the Engineer and maintenance for a period of twelve months of a new generating set complete with all necessary ancillary equipment.

The equipment to comprise 120KVA and 170KVA, 415 volts/3 phase /50Hz prime rated two diesel generator sets with all integral accessories, and all necessary equipment for the safe and efficient working of the set. The diesel generator set will be site rated at level of 2184 metres, Kenya Datum.

Diesel generator set to include:

a) Push button starting, starting battery and mains power supply trickle charger to be included.
b) 72 hour operational running capacity auxiliary fuel oil storage tank, loose transfer pump and duplex oil strainer.
c) An integral belly/ base fuel tank for daily service with an operational running capacity of 8 hours
d) All interconnecting pipe work, valves and fittings between the storage tank, base tank and the diesel engine.
e) An automatic generator control unit
f) A diesel generator control cubicle
g) Acoustic enclosure/ sound attenuated canopy
h) All local wiring
i) Maintenance tools and spare parts as specified.

6 Performance Objective

The output rating of the set in KVA, the voltage, the number of phases and the frequency shall be as specified in Bill No.2 Schedule 1 of the Bills of Quantities.

Within the operating conditions specified, the set equipped with its standard air intake filters, shall be capable of delivering its rated output continuously at rated voltage and 0.8 lagging power factor and of delivering 10% in excess of the continuous maximum rating for a period of one hour in any 12 hour period.

The steady state voltage shall be maintained within 2 ½ % of the rated voltage under control of the voltage regulator between the cold start ambient conditions and the maximum working temperature, from no load to 10% overload and from unity to 0.8 lagging power factor. After any change of load the voltage shall not vary by more than + 15% of the rated voltage and shall return to within +/- 3% within 3 seconds and to within 2 ½ % of rated voltage within 1 seconds. On starting the voltage overshoot shall not exceed 15% and shall return to within 3% in not more than 3 seconds.

The governing of the set shall be such that the steady load speed band shall not exceed 1% of rated speed. Sudden removal of the full load at rated frequency shall not cause the frequency to rise above 110% of the rated frequency and it shall return to within 105% of the rated frequency within 3 seconds. The resultant steady state frequency shall return to 104% within 15 seconds. If full load is then reimposed the frequency shall not fall below 94% of rated frequency and shall return to 99% within 3 seconds and to the rated frequency within 15 seconds. The cyclic irregularity of the set at full load shall not be worse than 1/150.
The deviated interference shall be suppressed to the limit specified in BS 800 and BS 833.

7. Generating Set Arrangement

Unless otherwise indicated the set and its auxiliaries shall be mounted on sufficiently substantial under base. All items which must be held in correct relative alignment shall be located by means of dowels.
The set shall be designed and supplied for operation bolted to the floor on robust anti-vibration and shock absorbing devices. They shall have adjusting screws for optimum setting and leveling and be so designed and installed that no appreciable engine vibration shall be transmitted to the floor or to any surrounding.
Bearings shall be suitable for operation over long periods without the need for replacement of the lubricant. Oil lubricated bearings shall be fitted with a visible oil level gauge.

8. Diesel Engine

8.1 General

The engine shall comply in design and performance with BS.649 "Diesel Engines for General purposes" or its approved equivalent. The engine shall be designed for satisfactory operation on fuel oil and lubricating oils complying with BS. 2869.

The engine shall be totally enclosed, with forced lubrication from an integral pump having on the suction side a course strainer and on the delivery side a dual' full flow' fine filter with a changeover cock incorporating pressure by-pass, so that the oil flow to the engine is maintained if the filter should choke. Alternatively a single filter of the self-cleaning type fitted with a by-pass relief valve and having the same filtration performance may be provided. Manual lubrication of any part of the engine will not be accepted. The capacity of the lubricating oil system shall be sufficient to enable the engine to run continuously for 12 hours at any load without replacement.

A filter with a by-pass relief valve shall be inserted in the fuel line immediately before the pump(s). The fuel filter element shall be incapable of passing particles larger than micrometers. The fuel system shall be so arranged that fuel resulting from filter, pump or pipe spillage shall be incapable of entering the engine sump.
Air filters complying with KS 06-294: 1986, Grade 'A' and Grade 'B' suitable for use in a dusty atmosphere shall be fitted on the engine air intake(s)

No significant critical speed of the complete shaft system, including the generator, shall be within 15% of the rated speed. A manually reset over speed trip shall be fitted to stop the engine if its speed exceeds the rated speed by 15%. A mechanical trip is preferred but an electrical over speed trip may be offered. Both types shall be equipped with a pair of contacts which close on operation of the trip. If the device is belt driven, at least two belts shall be provided and the drive shall be capable of carrying full load with one belt removed.

The set shall be arranged such that on shut-down the cooling water temperature shall not rise with residual heat so that the high water temperature lock-out operates. The engine may be naturally aspirated as pressure charged, or as indicated.

The starting shall be by means of electricity supplied from a starter battery. The starter motor shall be of axial type, de-energizing by a device operated from the engine. A means of manual starting shall also be provided. Suitable means shall be provided for running by hand the engine main shaft and the associated generator to facilitate inspection and overhaul.

If weekly test runs are insufficient to prevent the drying out of the bearings, means shall be provided to ensure that the bearing surfaces are adequately and automatically wetted with lubricating oil either periodically or immediately prior to every start.

The engine shall be capable of being started from any crank position. A thermostatically controlled 240-volt immersion heater may be fitted in the engine lubricating oil sump to facilitate starting. The heating surface loading of any lubricating oil heater(s) shall not exceed 0.015 watt per square millimeter to avoid carbonization of oil.

An efficient exhaust silencer with adequate draining facilities shall be supplied, and shall either be mounted on the set or installed in a generator room constructed as shown on the drawing indicated. The exhaust silencer system shall be so arranged that it may be readily relocated if required. Where any additional piping bends and fittings are specified, the manufacturer shall advise on any problems involved.

8.2 Fuel Oil System

An auxiliary fuel storage tank whose minimum capacity shall be sufficient to run the engine continuously on full load for 72 hours shall be installed in the position indicated in the contract drawing. It shall be supplied complete with supports.
The tank shall be fitted with a hand operated fuel with a flexible suction hose to permit filling from a drum on the floor.
A three way cock shall be fitted in the line from tank to the engine to enable the fuel to be supplied from a source other than the storage tank.

The position of the cock shall be clearly marked 'MANUAL, AUTOMATIC, OFF' as applicable.

A duplex oil filter shall be supplied between the storage tank and the diesel engine. The duplex filter shall be capable of being cleaned without dismantling, or in interruption of the fuel flow, and shall be easily maintainable. The tank shall be equipped with a graduated dipstick, a clearly visible contents' gauge (not of the site glass type) and with drain, vent, overflow and inlet and outlet connection.
The set shall also have an integral belly/base fuel tank for daily services with an operational running capacity of 8 hours.

8.3 Lubricating Oil System

An engine driven integral gear type lubricating oil pump shall be provided. The lubricating oil system shall include an oil cooler and fine mesh filters, together with devices to indicate lubricating oil pressure and to initiate a 240 volt A.C. Lubricating oil Low pressure Alarm, Lubricating Oil High Temperature Alarm and Cooling Water High Temperature Alarm.

As separate 240 volt A.C. Motor driven automatic lubricating oil priming pump shall be provided for intermittent operation when the diesel is lying idle.

8.4 Starting of Engine

The diesel generator set shall have facilities for local and remote push button starting, with a Local/ Remote/ Automatic selector switch at the local panel.
On mains failure the engine shall be capable of being automatically started from battery located near the generator set.

The battery shall be complete with drip tray and trickle charger.
All necessary relays, contacts, switches and miscellaneous items for the starting sequence shall be supplied and installed in the local control panel.

The system shall be designed to give maximum reliability in starting.
The Contractor shall state in detail his proposals to ensure reliable starting and prevention of deterioration of the diesel engine, generator and exciter during idle periods.

All manually operated valves and controls on whose setting the correct operation of the automatic starting equipment depends shall be provided with locking devices.

8.5 Cooling System

The engine may be air or water cooled unless a preference is indicated.

8.5.1 Air Cooling of Engine

Cooling air for the engine and lubricating oil shall be provided by fan(s) mechanically driven from the engine. The cooling system shall be adequate for the total requirements of the engine when running on continuous full load and on 10% overload for one hour in accordance with BS 649 and under the conditions of Section 3.

The engine shall be so designed that the cooling air discharges into or is drawn through a reasonably airtight ducted assembly enclosing the lubricating oil cooler, the cylinder barrels and the cylinder heads of the engine.
This assembly shall terminate in a flanged outlet to which trunking may be readily attached when necessary, to enable hot air from the cooling system to be discharged outside the building.

Belt driven fans shall have at least two belts and the drive shall be capable of transmitting the full load with one belt removed. The cooling air temperature shall be controlled so as to maintain a safe working temperature of the cylinder hand(s) and the engine shall shut down if the maximum is exceeded.

8.5.2 Water Cooling of Engine

A radiator of the air blast type shall be provided. It shall either have separate sections for water and for lubricating oil or be arranged for jacket water cooling only.

The radiator shall be mounted on the set and the fan(s) shall be mechanically driven from the engine. Where indicated the radiators shall be suitable for remote wall or floor mounting, in which case the fan shall be electric motor driven from a supply similar in voltage, phase and frequency to the alternator output and shall be started on line.

Where remotely mounted, the fan shall only operate when generating set is running and shall be controlled by a thermostat mounted in the radiator such that the fan motor will start on rising temperature 50^0C and stop on falling temperature.

Belt driven fans shall be provided with at least two belts and the drive shall be capable of transmitting the full load with one belt removed. Circulation of the jacket water and lubricating oil through the respective radiator sections and /or heat exchanger shall be by means of pumps mechanically driven by the engine. Belt driven pumps shall be provided with at least two belts and drive shall be capable of transmitting the full load with one belt removed.

Circulation by thermo-syphon will be accepted provided the engine will operate under the conditions of section 6 and in accordance with BS 649.
An easily visible flow indicator provided with contacts shall be fitted in the water outlet from the engine; the contacts shall close in the 'no flow' condition and shut down the set.

Alternatively in thermosyphon systems and sealed or pressurized radiator systems the flow indicator may be dispensed with providing the engine shuts down by the operation of the high temperature or low oil pressure safety devices in accordance with section 8.3.

A thermostatically controlled diverter valve shall be inserted in the engine water discharge pipe with a return to the circulating pipe section, to maintain the circulating water at the optimum temperature irrespective of the load. Alternatively a thermostatic bypass will be accepted.

A radiator make-up/expansion tank, fitted with float control inlet, shall be provided. If a sealed or pressurized unit is offered the tank may be dispensed with.
Where indicated provision shall be made on the radiator framework to permit the attachment of ducting for the discharge air.

A thermometer shall be mounted near the cylinder head(s) to indicate water temperature. Where a lubricating oil cooler is fitted, thermometers shall be mounted at the oil inlet too and outlet from the engine. Alternatively, thermocouple may be provided at all thermometer positions and taken to an instrument panel.

Adequate drains shall be provided at low points in the water and lubricating oil systems of the radiator and, where applicable, of the heat exchanger.

8.6 Governing System

Governing shall conform to B.S. 640 Class A. The governor shall control the frequency within the limits stated in Section 6 Part. Manual speed adjustment shall be provided over a range of +/-15% of the rated speed at any load. The governor system shall be of the mechanical or hydraulic type. In addition the engine shall be fitted with an approved overspeed trip device which shall operate independently of the normal speed governor and shall act directly upon the fuel supply to the engine.

The overspeed shall act at a speed of 12% to 15% in excess of normal operating speed.

8.7 Exhaust System

The diesel engine shall be provided with a suitable exhaust system for horizontal discharge outside the diesel generator room.
The silencer shall be of spark arresting type and shall be equipped with cleaning and draining arrangements.

If an exhaust driven turbo-charger is supplied it shall include air intake filters, mani-folds and outlet manifolds.

All necessary ducting, piping, supports and lagging required for the system shall be included.

Weatherproof wall boxes permitting expansion shall be fitted where the exhaust piping passes through the building wall or roof. Pipe work shall be connected at site by butt weld connections or use of flanged joints. The use of screwed connectors shall be avoided.

Flanges shall conform to the appropriate Table of B.S.10: 1962. Welding of flanges at site shall be carried out in accordance with B.S.806. The faces of flanges shall be machined and the backs shall be machined or spot faced to receive the bolt heads.

Valves and fittings shall be of approved design and manufacture and shall be subject to the same tests as the highest pressure piping or vessel to which they are connected.

8.8 Engine Instruments

Unless otherwise indicated the following instruments shall be provided:

(a) a lubricating oil pressure gauge
(b) a running hours meter
(c) a tachometer
(d) a water thermometer
(e) an exhaust gas pyrometer or thermometer mounted near the mani-fold
(f) lubricating oil thermometers on the inlet to and outlet from the engine, when a lubricating oil cooler if fitted
(g) Exhaust turbo-blower pressure gauge(s) as applicable

8.9 Pipe work, Valves and Fittings

All piping shall comply with requirements of KS-259:11989 for mild steel pipes.
Provision shall be made for ready handing of all parts of the plant during assembly or disassembly of the unit.

Adequate provision shall be made for attaching lifting devices, slings and eyebolts.

9. The Generator (Alternator and Exciter)

9.1 General

The generator shall comply with B.S.2613:197, for service in tropical conditions, and shall withstand being idle for considerable periods without any harmful drop in the insulation resistance.

The generators shall have prime rated net output of 120KVA and 170KVA as specified in the schedules of the Bills of Quantities, at 0.8 lagging power factor, 415 volts, 3 phase, 4 wire, 50 Hertz with brushless rotating rectifier excitation system and voltage regulator. It shall be directly coupled to the engine and be sized such that it will accept the maximum output of the engine including overload. The output voltage shall be maintained within plus or minus 2 ½ % from no load to full load conditions. The alternator shall be capable of operating within the range of plus or minus 15% of the nominal voltage according to the automatic voltage regulator.

Three phase machines shall be star connected, and a diagram showing the terminal marking and phase rotation shall be provided in the terminal box. Cables connecting the machine winding and machine terminals shall not have a higher de-rating factor for temperature than the windings.

The insulation shall comply with BS 2757 excluding Classes Y and A. The insulation shall have an oil, moisture and fungus proof finish, with a surface which will not retain dust or condensation. It shall be possible to put the set in service after long periods in unheated storage without necessarily drying out the insulation.

The alternator shall be capable of withstanding a short circuit for three seconds when under the control of the automatic voltage regulator.

9.2 Excitation

Excitation shall be by means of brushless direct coupled exciter armature.

The alternators shall be designed for an excitation voltage at full load of not less than 50 Volts unless prior approval is given.

9.3 ELECTRICAL CONTROL PANEL

The Automatic Mains Failure control panel shall be provided and fitted with the following:-

a) Two four pole contactors and two TP & N incoming MCCB's each of suitable rating for controlling the supply from the mains transformer and standby generator.
b) An automatic voltage regulator for the set.

c) Control equipments as necessary including phase failure protection relay for both the mains supply and the generator supply (with both under and over voltage protection) and phase sequence protection relay for the mains supply all to fulfill the functional requirements and automatic changeover as detailed in Part 9.3.2
d) One ammeter and a selector switch to measure each phase current and neutral current
e) One voltmeter and a selector switch to read line to line and line to neutral voltage
f) A frequency meter
The meters shall comply with BS 89, table 7.

9.3.1 General

The set is to be used for mains failure duty and an automatic starting panel shall be provided which shall contain all necessary equipment for controlling the automatic starting and stopping of the set, lubricating oil priming (if necessary), all auxiliaries, fault warnings and shut downs. All faults, warning and shut-downs shall be separately indicated. There shall be test facilities for indication lamps, etc, preferably by means of a single test button.

Means shall be provided for isolating all supplies to the starting panel either by an isolating switch or by withdrawable fuses.

When the set is stopped other than under lock-out conditions, it shall be self-resetting ready for the next start.

The set shall be suitable for starting by manual means. e.g. by cranking or direct operation of the starter solenoid.

All switches and push buttons shall be clearly marked to indicate their function.

It shall be possible to operate the ‘Start’ and ‘Stop’ buttons and to see the ‘Set Failure’ indications without opening the panel doors.

9.3.2 Automatic Changeover Controls

The controls shall be installed and wired in the machine control panel.
The control shall be provided such that on failure of the normal electricity supply, it will automatically initiate the starting of and effect the transfer of load to the standby generator. The schematic for the controls shall be approved by the Electrical Engineer before manufacture commences.

Where failure of the normal supply is referred to, it shall be defined as follows:

(a) Complete loss of voltage in one line 0r in all the three lines

b) Falling of voltage below 85% of the normal voltage between two lines or line and neutral

(c) Voltage overshoot to 110% of the normal voltage between two lines or line and neutral

d) Incorrect phase sequence

On failure of the normal supply, the unit shall operate in the following manner:

(a) After a delay, adjustable from 0 to 15 seconds (to avoid operation by a transient dip in voltage) a signal shall be given to start the standby generating set.

(b) On receipt of a signal from the standby generating set that it is ready to take load, and providing that the failure of the normal supply still persists, the normal supply contactor in the control panel shall open and the standby contactor shall close. If the normal supply has been restored before the changeover has taken place, the contactor shall not operate and the starting relay contacts shall open to initiate the shutting down of the standby generating set.

When the standby supply is in operation and the normal supply is restored and remains within 10% of rated voltage on all phases for a pre-set time (adjustable up to 120 second) the standby contactor shall open and the normal supply contactor shall close; the starting relay contacts shall then open to shut down the generating set.

Provision shall be made so that automatic return to normal supply can be prevented if required.

Once a start signal has been sent to standby generating set, the engine starting sequence shall be allowed to continue until the set is ready to take the load before a stopping signal is sent.

A push button labelled ‘Test’ shall be provided to enable a failure of normal supply to be simulated. If the button is pressed and released the equipment shall complete the starting sequence, and when the set is ready to take load it shall be shut down. If the button is held depressed the equipment shall change over to the standby supply when the set is ready to take load.

Indicating lamps or illuminated panels shall be provided on the front of the panel. They shall be appropriately labelled, easily visible and shall give the following information:

‘Main Supply Available’
‘Generator Supply Available’
‘Mains Supply on load’
‘Generator Supply on load’

9.4 Lock out

9.4.1 General

The set shall stop and lock out to prevent further starting when:

a) It fails to start when the electric starter motor has been in operation for 20 seconds under automatic start condition.

b) The lubricating oil pressure falls to a value at which it would be unsafe to continue running the engine.

c) The cooling water does not flow, when the engine is fitted with a visible flow indicator on the cooling water system.

d) (i) In water cooled engines the cooling water temperature exceeds a predetermined limit.

(ii) In air cooled engines the cylinder head temperature exceeds a safe maximum.

e) The overspeed trip has operated.

9.4.2 Failure of the circuits concerned in sub-section 9.4.1 (b) to 9.4.1(e) shall cause a set to shut down. Reset of lock out shall be by hand.

9.5 Fault indication

Each lock-out detailed in section 9.4.1 shall be indicated by a lamp on the panel together with an indication of the fault causing the shut-down. The fault warning lights shall be set to operate before the lock-out.

9.6 Starting Battery and Charger

The battery shall be 24 volts and capable of with-standing the loads imposed upon it by its specified duties. It may be of lead-acid or alkaline type and shall be of sufficient capacity for four starts in succession once in an eight-hour period. Auxiliary circuits connected to the battery shall be protected by fuses.

The battery shall be used to supply an automatic starting and control equipment, and relay operation shall not be impaired when the battery is supplying current to the starter motor.

A single phase supply for battery charging shall be available from the main M.V SWITCHBOARD.

A charger shall be provided which will recharge the battery after engine starting and maintain it in a charged condition when the set is standing or is in service. It may also supply the load of any automatic starting and control equipments, and an additional load up to 24 watts when the set is running and in service.

An alternative quick charge rate shall be provided. The charger shall be fitted with an ammeter to measure the charger and discharge current excluding the starter motor current.

9.7 Wiring and Earthing

Power cables and small wiring cables interconnecting major components shall be of the heat and oil resistant type and shall be metal sheathed or run in metal ducts or metal conduit, which shall be coded and terminated with lugs or eyes or to be soldered, the terminations shall be clearly marked with the numbers and letters of the terminals to which they are connected. Terminals shall be numbered or lettered, easily accessible and fitted with individual insulating barriers or adequately spaced. Barriers shall be fitted to separate control terminals from power wiring terminals.

All metal work housing electrical equipment shall be bonded to a brass earthing terminal and connected to station Earth and as detailed in the schedule.

9.8 Contactors

Contactors shall have magnetic circuits designed for a.c or d.c operation and shall be rated in accordance with ks 04-182:1982.Four pole- contactors shall be fitted for three phase-equipment and two-pole contactors for single phase equipments. Main and auxiliary contacts shall be silver faced or better.

9.9 Relays

Relays shall preferably be of sealed type mounted in approved plug-in bias with spring loaded retainers but if this is not practicable they shall be mounted on individual sub-bases and wired so that easy access is obtained to soldered connections. Unsealed relays shall be enclosed in individual or common dust protecting cases.

Time delays, if of the pneumatic type, shall operate on filtered air. The thermal type of time delay relay will not be accepted.

9.10 Fuses

Fuses shall comply with KS-183:1978. A spare fuse cartridge for each pole shall be mounted inside each equipment.

9.11 Rectifiers, Capacitors and solid State components

Rectifiers, capacitors and solid state components shall be suitable for any transient voltage and high currents likely to be uncounted during the operation of the equipment and for the internal operating temperature of the enclosures at the specified maximum external ambient temperature.

9.12 Enclosures for Equipment

Enclosures for electrical and control equipment shall be drip proof and dust protecting, with adequate front and rear access as necessary for maintenance and repair. Special attention shall be given to the method of construction and to the mounting of the components to minimize the effect of vibration. Diagrams of connections in durable form shall be mounted inside the enclosures.

10 Lifting Gear and Handling.

Provision shall be made for ready handling of all parts of the plant during assembly or disassembly of the unit. Adequate provision shall be made for attaching lifting devices, slings and eyebolts.

11 Commissioning

The Contractor shall include for fully commissioning the set and its control equipment and for the purpose of the required tests, shall provide all necessary instrument s, tools, fuel and lubricating oil.

The following tests and checks as applicable shall be carried out by the contractor in the presence of the electrical engineer or his representative.

a) Check that the main frame is level in all directions, engine and generator shafts are in proper alignment and the vibration absorbing devices are properly installed and located.

b) Check water and sump oil levels and that the water jacket and radiation heaters (if fitted) are in working order.

c) Check the battery electrolyte levels and the specific gravity.

d) Examine the containers in which the fuel and lubricating oils were delivered and check that the type and grade of oils are as recommended for the unit.

e) Ensure that sufficient fuel oil is in the fuel tank for a two hours test run.

g) Check engine bolts, main drive coupling, valve clearance, fuel pumps settings, governor settings, pipeline connections, water hose, exhaust couplings, flexible pipe work etc, and where a separate cooling water tank is fitted, that the water levels is satisfactory and the ball valve and overflow work.

h) Check all outgoing connections on the generator and the control panel. All lugs for principal connections shall have clean and bright contact surfaces. A suitable abrasive shall be used where necessary.

i) Check access panels and doors for proper opening and closing and for functioning of any interlocks fitted.

j) With the set isolated from the main supply and the selector switch in the 'manual' position, start the engine by means of the 'start' push button and allow it to run up to normal speed. Check that the main battery charger is automatically switched off to avoid its being overloaded by the reduction in voltage across the battery. Where a battery charging dynamo is fitted, check that the main battery charger is disconnected by the operation of the auxiliary contact during the time the engine is running.

k) Check instruments and gauges for normal operation and response and that the generator voltage is being maintained within the prescribed limits, making due allowance for no-load conditions. Compare the reading of the frequency meter with that of engine tachometer, where both are fitted

i) Stop engine by turning selector switch to off position and verify that the generator contactor opens at between 95% and 85% of normal voltage. Re-check water and oil levels.

m) Turn selector switch to 'Auto' position. Disconnect the sensing circuit supply and check that the set starts, the mains contactor opens, and the generator contactor closes in correct order. Reconnect the sensing circuit to verify that the engine stops on restoration of the mains supply and the contactors operate correctly. Check voltage sensing and time delays on each phase in turn and also the push buttons for mains failure simulation and engine stopping operate correctly.

NOTE: Running of the engine for any length of time under no load condition is undesirable and tests calling for such operation should be carried out in as short time as possible consistent with thoroughness.

n) Operate the necessary isolators and switches to put the set on standby for essential services network with the mains failure simulation push, verify that the set operates correctly with the appropriate time delay for taking up load and that the carrying of the load and its distribution over three phases are satisfactory.

o) Run the set at various loads for periods totaling at least 30 minutes. Check that the voltage and frequency are being maintained within the required limits with large alterations of load. Note the rate of charge on the dynamo ammeter with the engine running (if a dynamo is fitted), and the rate of charge on the battery charging ammeter with the engine stopped. Check against manufacturers recommendations and adjust charging rates if necessary.

p) Check that the various engine safeguards operate satisfactorily.

q) Check the vibration absorbing devices for proper operation and that performance of all flexible connections, both mechanical and electrical, is satisfactory.

r) When all tests are satisfactory and agreed with the Engineer or his representative, the lubricating oil and water levels shall be finally checked, the fuel oil tank replenished and set left in normal operating order.

s) An initial supply of all lubricating oils and greases shall be provided by the Contractor.

t) Additional lubricating oil shall be provided for recharging the engine sump once together with a supply of lubricating oils and greases to cover the normal use and serving of the set during the 12 months maintenance period referred to in Part 14 of Section D.

PART 4 (B) - INFORMATION TO BE SUPPLIED BY THE TENDERER

DESCRIPTION

1. General

2. Information on the set to be supplied

3. Deviations from the specifications

1. GENERAL

a) The tenderer shall complete Page H/45 -48 in full with details of the set he is offering.

b) Any equipment which he wishes to offer but which does not comply with the specification shall be fully detailed in Part 3 of section F together with details of any other deviation or omissions which he may wish to make.

Any tender which is submitted without filling these sections will be deemed non responsive.

c) The tenderers shall be required to submit, together with their tenders, brochures detailing technical specifications of the generator set they intend to supply. Any tender which is submitted without the brochures will be deemed non-responsive.

2 – INFORMATION OF THE SET TO BE SUPPLIED FOR 120KVA & 170KVA GENSETS

ITEM	EQUIPMENT	DETAILS 120KVA	DETAILS 170KVA
1.	**Diesel Engine**		
	Make	……..	……..
	Type	……	……
	Net continuous rating (B.S.649)		
	(a) at sea level	……..KVA	……..KVA
	(b) at site	…….KVA	…….KVA
	Speed	……..Rev/min	……..Rev/min
	Supercharger		
	Make	……	……
	Type	……	……
	Air cooling	Not Applicable	Not Applicable
	Quantity of air required		
	Details of ducting		
	Water cooling	To be Applicable	To be Applicable
	Details of water cooling circuits		
	Radiator:		
	Make	……	……
	Type	……	……
	Length	……..mm	……..mm
	Breadth	……..mm	……..mm
	Height	…….mm	…….mm

ITEM	EQUIPMENT	DETAILS 120KVA	DETAILS 170KVA
	Aspiration Method	…..……	…..……
	Quantity of air required	……..	……..
	Auxiliaries		
2.	Filters		
	Coolers		
	Primary pumps		
	Tachometer and drive		
	Governor		
	Special cold start devices		
	Running hours meter		
	Safety devices		
	High temperature		
	Low pressure (lubricating oil)		
	Cooling water flow trip over speed trip		
	Speed sensing devices		
	Lubricating oil thermometers:		
	Number		
	Position (s)		
	Water thermometer		
	Position Exhaust thermometer		
	Position		
	Starting Battery		
	Battery charger		
	Immersion Heater		
	Lubrication		
3.	Recommended oil (s)		
	Sump		
	Elsewhere (state where)	……..	……..
	Alternator and Exciter	Grade quantity (litres)	Grade quantity (litres)
4.	Make and type		
	Bearings		
	Insulation class (BS.2757)		

ITEM	EQUIPMENT	DETAILS 120KVA	DETAILS 170KVA
5.	**Electrical Control Panel**		
	Main circuit breaker	……Amps	……Amps
	Bypass switches	…….Amps	…….Amps
	Automatic changeover contactor	……Amps	……Amps
	Automatic voltage regulator	……Volts	……Volts
	Ammeter selector switch	……	……
	Voltmeter selector switch	……..	……..
	Frequency meter	……Hertz	……Hertz
	Ammeters –------ No.	……..Amps	……..Amps
	Voltmeters –.....No.	……..Volts	……..Volts
	Power factor meter	……KVAR	……KVAR
	Other equipment – give details	…….	…….
6.	**Performance data**	Rated output % / Consumption (Litres/hour)	Rated output % / Consumption (Litres/hour)
	Fuel consumption	110 ……	110 ……
		100 ……	100 ……
		75 ……	75 ……
		50 ……	50 ……
	Maximum output	Ambient temperature. ^{0}C / Out-put KVA	Ambient temperature. ^{0}C / Out-put KVA
		40 ……	40 ……
		30 ……..	30 ……..
		20 ……	20 ……
		10	10

ITEM	EQUIPMENT	DETAILS 120KVA	DETAILS 170KVA
6.	Performance Data (cont'd)		
	Voltage regulation	……..%	……..%
	Frequency regulation	……..%	……..%
	Time to accept 75% full load from 5^0C	……Seconds	……Seconds
	Time to accept 100% full load from 5^0C	……Seconds	……Seconds
	Time to accept 100% full load from 40^0C	……Seconds	……Seconds
7.	**Physical Details**		
	Auxiliary fuel storage tank for 72 hour operational running capacity	……..Litres	……..Litres
	Size of set	mm long……mm wide……. mm high……..	mm long……mm wide mm high……..
	Total weight of set Overall	……..Kg.	……..Kg.
	dimensions of set Weight of	mm long…….mm wide…….. mm high…….	mm long…….mm wide.. mm high…….
	heaviest component	……..Kg.	……..Kg.
	Weather proofing		
	Integral belly/base fuel tank for daily service for 8 hour operation capacity	……. Litres	……. Litres
8.	**Operational Details**		
	Description of Operation Sequence of the automatic control		
	Details of drawings, literature, etc., included with tender.		

3. DEVIATIONS FROM THE SPECIFICATION

The tenderer shall give details of any equipment which does not meet the specification, or any other deviations, omissions, additions or alternatives in respect of the set which he is offering.

If none, write none

3.0 TECHNICAL SPECIFICATIOS FOR COMPUTER AND ACCESSORIES

3.1 SPECIFICATIONS FOR DESKTOP COMPUTERS

ITEM	DESCRIPTION	MINIMUM REQUIREMENTS	BIDDER'S SPECIFICATIONS
A	**GENERAL SPECIFICATIONS**		
1	Make	BRANDED	
2	Model		
3	Country of Origin		
4	Manufacturer's brochure and specifications	Must be supplied	
B	**TECHNICAL SPECIFICATIONS**		
5	Processor	Core i7	
6	System Memory	4GB	
7	Disk cache	64Bit	
8	Storage sub system	1 TB HDD	
		48XCD –ROM and CD-Writer	
		1.44MB 3.5" FDD	
9	Display/Graphics	17" colour LCD	
10	Keyboard	PS/2 Enhanced keyboard	
11	Pointing device	PS/2 compatible optical mouse	
12	I/O interface	1xPS/2 – compatible keyboard 1xPS/2 – compatible mouse port 2x9 Pin Serial Ports 1x25 Pin parallel port 4xUSB Ports 1xRJ45 jack for ethernet 1xexternal VGA port HDMI	
13	Audio System	PCI 3D audio/video cards TV/FM cards External Amplified speakers	
14	Communication Interface	10/100Mbs fast ethernet, RJ 45 jack 56K ITU V.90 data/fax modern, wake-on-ring ready	
15	Operating System Pre-load	Ms Windows XP Pro 2003 (or latest version)	
16	Application Software, pre-installed, registered and CDs supplied	Ms Windows Vista or Ms Windows XP Pro (Service Pack 2)	
17	Power sub- system	220-240V ac, 50HZ	
18	Power connectivity	Power cable compatible with CPU and UPS	
C	**WARRANTY**	One year parts replacement warranty	

3.5 LAPTOP COMPUTER SPECIFICATIONS

ITEM	DESCRIPTION	MINIMUM REQUIREMENTS	BIDDER'S SPECIFICATIONS
A	**GENERAL SPECIFICATIONS**		
1	Make	BRANDED	
2	Model		
3	Country of Origin		
4	Manufacturer's brochure and specifications	Must be supplied	
B	**TECHNICAL SPECIFICATIONS**		
5	Processor	Core i7	
6	System Memory	4GB	
7	Disk cache	64Bit	
8	Storage sub system	500 GB HDD	
		48XCD –ROM and CD-Writer	
9	Display/Graphics	17" colour LCD	
12	I/O interface	1xPS/2 – compatible mouse port 2x9 Pin Serial Ports 1x25 Pin parallel port 4xUSB Ports 1xRJ45 jack for ethernet 1xexternal VGA port HDMI	
13	Audio System	PCI 3D audio/video cards External Amplified speakers	
14	Communication Interface	10/100Mbs fast ethernet, RJ 45 jack 56K ITU V.90 data/fax modern, wake-on-ring ready	
15	Operating System Pre-load	Ms Windows XP Pro 2003 (or latest version)	
16	Application Software, pre-installed, registered and CDs supplied	Ms Windows Vista or Ms Windows XP Pro (Service Pack 2)	
17	Power sub- system	220-240V ac, 50HZ	
18	Power connectivity	Power cable compatible with CPU and UPS	
C	**WARRANTY**	One year parts replacement warranty	

SECTION G

SCHEDULE OF UNIT RATES

SCHEDULE OF UNIT RATES

1. The tenderer shall insert unit rates against the items in the following schedules and may add such other items as he considers appropriate.

2. The unit rates shall include for supply, transport, insurance, delivery to site, storage as necessary, assembling, cleaning, installing, connecting, profit and maintenance in defects liability and any other obligation under this contract.

3. The unit rates will be used to assess the value of additions or omissions arising from authorised variations to the contract works.

6. Where trade names or manufacturer's catalogue numbers are mentioned in the specification, the reference is intended as a guide to the type of article or quality of material required. Alternative brands of **equal** and **approved** quality will be accepted.

7. Any bid returned with unfilled Schedule of Unit Rates shall be considered technically non-responsive, and the bidder shall automatically be disqualified.

SCHEDULE OF UNIT RATES
(MUST be completed by the Tenderer)

Item	Description	Unit	Qty	Rate (KShs)
	The rates entered in the schedule unless otherwise stated shall be the complete cost of supply, transportation, Insurance, Installation etc, to be added or deducted from the contract Price in respect to variations ordered during the course of the work.			
	The rates entered below shall be used in conjunction with and not in place of the rates entered within the Bills of Quantities. The rates below are intended to complement the Bills of Quantities where sections have been priced on lump sum basis Where any conflict occurs between the rates entered below and the rates entered in the Bill of Quantities the lowest rate shall be applied throughout. Certain items entered below may not be applicable to the Contract requirements as at present designed. However, the Contractor shall enter a rate against these items as future designed/alterations may include Some or all of the items scheduled.			
	Switchgear Supply, Installation and connecting up complete distribution boards of the following types and ratings:			
	8 way TP&N with integral 150 ampere isolating switch	No	1	
	10 way TP&N with integral 200 ampere isolating switch	No	1	
	Distribution cable Supply and Installation per linear metre drawn into trunking of PVC single core cable of the following cross-sectional areas/sizes:			
	2.5 sq. mm	m	1	
	4 sq. mm	m	1	
	6.0 sq. mm	m	1	
	10 sq. mm	m	1	
	16 sq. mm	m	1	
	PVC/SWA/PVC copper cables with conductors of the following sizes, as EAC:			
	10 sq. mm single core	m	1	
	16 sq. mm single core	m	1	
	35 sq. mm single core	m	1	
	50 sq. mm single core	m	1	

Item	Description	Unit	Qty	Rate (KShs)
	PVC/SWA/PVC copper cables with conductors of the following sizes:			
	2.5 sq. mm 2 core	m	1	
	6.0 sq. mm 2 core	m	1	
	10.0 sq. mm 2 core	m	1	
	16.0 sq. mm 2 core	m	1	
	PVC/SWA/PVC copper cables with conductors of the following sizes:			
	6 sq. mm 4 core	m	1	
	35 sq. mm 4 core	m	1	
	70 sq. mm 4 core	m	1	
	120 sq. mm 4 core	m	1	
	XPLE/SWA/PVC Cu. cables with conductors of the following sizes, as EAC:			
	70 sq. mm 4 core	m	1	
	50 sq. mm 4 core	m	1	
	35 sq. mm 4 core	m	1	
	25 sq. mm 4 core	m	1	
	16 sq. mm 4 core	m	1	
	10 sq. mm 2 core	m	1	
	16 sq. mm 2 core	m	1	
	25 sq. mm 2 core	m	1	
	<u>Conduit</u> Supply and Installation per linear metre including fixing of all accessories of PVC conduit of the following sizes:			
	25mm	m	1	
	32mm	m	1	
	50mm	m	1	
	As above but galvanized steel conduit:			
	20mm	m	1	
	32mm	m	1	
	40mm	m	1	
	50mm	m	1	
	<u>Cable trunking and Tray</u> Supply & install Deep Powder coated metal trunking complete with all necessary supports, fixings and dividing			
	50 x 25mm	m	1	
	75 x 50mm	m	1	
	100 X 50mm - 2compartment	m	1	
	250 X 50mm - 3compartment	m	1	

Item	Description	Unit	Qty	Rate (KShs)
	Cable trunking and Tray Supply & install high grade PVC trunking complete with all necessary supports, fixings and dividing			
	50 x 25mm	m	1	
	75 x 50mm	m	1	
	100 X 50mm - 2compartment	m	1	
	250 X 50mm - 3compartment	m	1	
	Miniature circuit breakers Supply and installation into distribution board of triple pole MCB of the following ratings:			
	250 amperes Adj.	No	1	
	125 amperes Adj.	No	1	
	32 amperes	No	1	
	LV - SWITCHBOARDS			
	Same as item 13.0 on page H/5 in the BQ, but comprising 150A TPN busbars, 125A TP MCCB main Incomer, Adjustable.	Item	1	
	Same as item 4.0 on page H/13 in the BQ, but comprising 200A TPN busbars, 150A TP MCCB main Incomer, Adjustable.	Item	1	
	10KVA, Single phase, Automatic Voltage Regulator (AVR) c/w all accessories as Sollatek or other equal and approved:	No	1	
	7.5KVA, Single phase, Automatic Voltage Regulator (AVR) c/w all accessories as Sollatek or other equal and approved:	No	1	
	As item 1.1 on page H/18 but 100Kva	No	1	
	As item 1.1 on page H/18 but 75Kva	No	1	
	Price for the 2No. Generator service for the first quarter of the first year (250hrs or 3 months whichever comes first).	Item	1	
	Price for the 2No. Generator service for the second quarter of the first year (500hrs or 6 months whichever comes first).	Item	1	
	Price for the 2No. Generator service for the third quarter of the first year (750hrs or 9 months whichever comes first).	Item	1	
	Price for the 2No. Generator service for the fourth quarter of the first year (1000hrs or 12 months whichever comes first).	Item	1	

SECTION H

BILLS OF QUANTITIES

B) SPECIAL NOTES

1. The Bills of Quantities form part of the contract documents and are to be read in conjunction with the contract drawings and general specifications of materials and works.

2. The prices quoted shall be deemed to include for all obligations under the contract including but not limited to supply of materials, labour, delivery to site, storage on site, installation, testing, commissioning and all taxes applicable atbthe time of tender.

3 All prices omitted from any item, section or part of the Bills of Quantities shall be deemed to have been included to another item, section or part there of.

4. The brief description of the items given in the Bills of Quantities is for the purpose of establishing a standard to which the contractor shall adhere. Otherwise alternative brands of **equal** and **approved** quality will be accepted.

   Should the contractor install any material not specified here in before receiving **written approva**l from the Project Manager, the contractor shall remove the material in question and, **at his own cost**, install the proper material.

5. The grand total of prices in the price summary page must be carried forward to the **Form of Tender for the tender to be deemed valid**.

6. Tenderers must enclose, together with their submitted tenders, manufacturer's brochures detailing technical literature and specifications of the following equipment and materials that they intend to offer:
   - Standby Generator set
   - Uninterruptible power supply unit (UPS)
   - Automatic voltage stabilizer (AVS)
   - CCTV Cameras
   - Data Cabinet
   - Communication / power Cables
   - Data switches
   - Network Video Recorder
   - LED monitors/display

   The brochures are to be used to ascertain the suitability of the components offered by the bidders. Bidders not complying with this requirement may be considered technically non-responsive and may subsequently be disqualified.

Statement of Compliance

a) I confirm compliance of all clauses of the General Conditions, General Specifications and Particular Specifications in this Tender.

b) I Confirm I have not made and will not make any payment to any person, which can be perceived as an inducement to win this tender.

Signed …… *for and on behalf of the tenderer*

Date. ……..

Official Rubber Stamp
……

SCHEDULE 3 (1)– 170KVA GENERATOR SHED -JKIA TOWER

CONTRACT PRELIMINARIES

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
1	Discrepancies clause 1.02				
2	Conditions of sub-contract Agreement clause 1.03				
3	Payments clause1.04				
4	Site location clause 1.06				
5	Scope of Contract Works clause 1.08				
6	Extent of the Contractor's Duties clause 1.09				
7	Firm price contract clause 1.12				
8	Variation clause 1.13				
9	Prime cost and provisional sum clause 3.14 (insert profit and attendance which is a percentage of expended PC or provisional sum.)				
10	Bond clause 1.15				
11	Government Legislation and Regulations clause 1.16				
12	Import Duty and Value Added Tax clause 1.17(Note this clause applies for materials supplied only. VAT will also be paid by the sub-contractor as allowed in the summary page)				
13	Insurance company Fees clause 1.18				
14	Provision of services by the Main contractor clause 1.19				
15	Samples and Materials Generally clause 1.21				
	SUB-TOTAL CARRIED TO PAGE H/5				

SCHEDULE 2 – cont'd 170KVA GENERATOR SHED

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
16	Supplies clause 1.20				
17	Bills of Quantities clause 1.23 Contractor's Office in Kenya clause 1.24				
18	Builder's Work clause 1.25				
19	Setting to work and Regulating system clause 1.29				
20	Identification of plant components clause 1.30				
21	Working Drawings clause 1.32				
22	Record Drawings(As Installed) and Instructions clause 1.33				
23	Maintenance Manual clause 1.34				
24	Hand over clause 1.35				
25	Painting clause 1.36				
26	Testing and Inspection – manufactured plant clause 1.38				
27	Testing and Inspection – Installation clause 1.39				
	Storage of Materials clause 1.41				
	Initial Maintenance clause 1.42				
	SUB-TOTAL CARRIED TO PAGE H/5				

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
29	Local and other Authorities notices and fees clause 1.60				
30	Temporary Works clause 1.63				
31	Patent Rights clause 1.64				
32	Mobilization and Demobilization Clause 1.65				
33	Extended Preliminaries Clause 1.66 (see Appendix - clause 1.70)				
34	Supervision by Engineer and Site Meetings Clause 1.67	1	Item	500,000	500,000.00
35	Allow for profit and Attendance for the above				
36	Amendment to Scope of Sub-contract Works Clause 1.68				
37	Contractor obligation and Employers Obligation clause 1.69.				
	Sub-total above				
	Sub-total brought forward from page H-3 **Sub-total brought forward from page H-4**				
	TOTAL FOR SCHEDULE No. 1- PRELIMINARIES- CARRIED FORWARDTO GRAND SUMMARY PAGE H/35				

SCHEDULE 3 (1)– 170KVA GENERATOR SHED -JKIA TOWER

SCHEDULE No. 1: JOMO KENYATTA - JKIA TOWER

Item	Description	Qty	Unit	Rate Kshs	Cost Kshs
	SUPPLY, DELIVER, INSTALL, TEST AND COMMISSION THE FOLLOWING:-				
A	Allow for proper cable management & labelling of the existing but untidy cabling.	1	Item		
B	Careful decommissioning and removal of the obsolete/ malfunctioned/ dilapidated/vandalised electrical items/ fittings, power distribution panels/ boards and associated switchgears. Carefully store and arrange for handing over to client.	1	Item		
C	Testing the status of existing earthing/ grounding system using appropriate electrical test equipment and compile formal report. If required allow for the appropriate remedial works to reinstate to the recommended functonal status.	1	Item		
D	Allow for assement, troubleshooting, testing by appropriate electrical test equipment and compile formal report and making good electrical faults associated with phase inbalancing on the existing clean power distribution panel	1	Item		
	JKIA Tower - Power Room				
1.0	95 mm^2 4-C PVC/SWA/PVC copper cable for AVS bypass, drawn in cable tray / trunking c/w approriate cable lugs as East African Cable (EAC) or approved equivalent **(Provisional quantity - Actual length to be confirmed on site)**	30	Lm		
	i) Cable glands for above cable	2	No.		
2.0	250A TPN Manual bypass switch & Isolator switch for above AVS wall mounted c/w housing and all other necessary accessories as **ABB/Schneider** or approved equivalent	1	No.		
3.0	10mm^2 4-C PVC/SWA/PVC copper cable for interconnection between the new LV Board panels (to be located in the new power room) and individual changeovers switches for the existing 2No. UPSs & 2No. Distribution boards, drawn in cable tray / trunking c/w approriate cable lugs & glands as East African Cable (EAC) or approved equivalent **(Provisional quantity - Actual length to be confirmed on site)**	80	Lm		
4.0	As detto but 6mm2 4-C PVC/SWA/PVC copper cable	40	Lm		
5.0	175A TPN Manual changeover switch wall mounted c/w all other necessary accessories as **ABB/Schneider** or approved equivalent	1	No.		
	Total for carried forward to the Next page				

Item	Description	Qty	Unit		Kshs.
	Total Brought forward from the previous page				
SCHEDULE 2 – cont'd 170KVA GENERATOR SHED	63A TPN Manual changeover switch wall mounted c/w all other necessary accessories as **ABB/Schneider** or approved equivalent	2	No.		
7.0	As detto but 32A TPN	2	No.		
8.0	Power points comprising wiring in 5 x 6.0mm2 SC PVC insulated CU cables drawn in cable tray / trunking complete with all necessary accessories, to and from the UPS. (Avg. cable run of 10m)	2	No.		
9.0	63A 5 Pin Industrial socket outlets for item above as Legrand or approved equivalent and labelled "As per application"	2	No.		
10.0	63A TPN Manual bypass switch & Isolator switch for above UPS wall mounted c/w housing and all other necessary accessories as **ABB/Schneider** or approved equivalent	1	No.		
11.0	Power points for extract fans comprising wiring in 5 x 4.0mm^2 PVC/SC/CU cables drawn in trunking complete with all necessary accessories	2	No.		
12.0	25A TPN, 50Hz moulded isolator c/w waterproof housing for item above as Legrand or approved equivalent	2	No.		
13.0	10-Way Modular type, free standing power distribution panel board for floor mounting with both rear and front access panels, cable manager compartments, metal clad 14SWG, 415 mains L.V Switch Board manufuctured to BS EN60 439-1, form 2b seperation and fully wired for one incoming MCCB and 10No. TP outgoing feeders as described here below with the following and all the other necessary accessories: i) 250 Amps 4 pole copper busbars ii) 40x10mm earth bar; iii) 160A TPN MCCB main Incomer, adjustable as **ABB/Schneider** or Equal and approved iv) 1No. 80A TPN MCCB v) 4No. 63A TPN MCCB vi) 1No. 32A TPN MCCB vii) 1No. 63A SPN MCCB viii) 2No Spare ways; ix) Set of digital energy multimetre (complete with current transformers and fuse holder/fuses) for indication of voltage, current, kW, kWh, KVA, power factor, etc. x) 25kA, 415V three-phase surge diverter as Furse ESP 415	2	Item		

	xi) All necessary interconnecting cables;				
14.0	300x75mm, 14SWG cable tray c/w mounting row bolts and all other necessary accessories	40	Lm		
	Total for carried forward to the Next page				

Item	Description	Qty	Unit		Kshs.
	Total Brought forward from the previous page				
	Tower - Power rooms (upper floor)				
15.0	Lighting points wired in 3 x 1.5mm^2 PVC/SC CU cables drawn in 20mmØ surface mounted HG/PVC conduits complete with all necessary accessories but excluding switches for *2way switching.*	10	No.		
15.1	10A, moulded plastic ivory white switch plates as MK or approved equivalent as follows:-				
	i) One gang two way	2	No.		
	ii) Two gang two way	3	No.		
1.11	20A, unswitched fused spur DP control switch with neon light and cord outlet for item above as MK or approved equivalent	1	No.		
16.0	Standard Recessed 600 X 600mm coolday LED Panel Light with 40watts, pf >0.9, CCT - 6500K, 100-240V, THD <15% and 50,000hrs c/w all the necessary acessories, as PHILLIPS or approved equivalent.	10	No		
16.1	As detto but EMERGENCY version with rechargeable battery for 3 hour duration	2	No		
17.0	Clean/UPS power socket outlet power points comprising wiring in 3 x 2.5mm^2 PVC/SC CU cables drawn in trunking including all accessories but excluding plates	3	No.		
18.0	13A Non-Standard switched socket outlet plates in moulded *Red colour* complete with with neon indicator and universal multiplug as MK or approved equivalent as follows:				
	i) Twin switched	5	No.		
19.0	Power points comprising wiring in 5 x 10.0mm2 SC PVC insulated CU cables drawn in cable tray / trunking complete with all necessary accessories, to and from the UPS. (Avg. cable run of 10m)	2	No.		
20.0	63A TPN Manual bypass switch & Isolator switch for above UPS wall mounted c/w housing and all other necessary accessories as **ABB/Schneider** or approved equivalent	1	No.		
21.0	10mm^2 4-C PVC insulated CU cables drawn in cable tray / trunking /38 mm Ø HG PVC conduits concealed in building fabric complete with all the necessary accessories wired to bypass the UPS.	10	Lm		
22.0	150A, 6-Way, TPN DB surface/flush mounted as Schneider or approved equivalent	2	No.		
23.0	SP Miniature circuit breakers for the distribution boards above				
	i) 10A SP MCB	2	No.		
	ii) 20A SP MCB	5	No.		
	iii) 30A SP MCB	6	No.		
	iv) 63A TP MCB	2	No.		
	v) 45A SP MCB	2	No.		
	vi) TP blanking plates	2	No.		
	Total for carried forward to the Next page				

Item	Description	Qty	Unit		Kshs.
	Total Brought forward from the previous page				
	JKIA Radar				
24.0	120 mm^2 4-C PVC/SWA/PVC copper cable for AVS bypass, drawn in cable tray / trunking c/w approriate cable lugs as East African Cable (EAC) or approved equivalent **(Provisional qunatity - Actual length to be confirmed on site)**	10	Lm		
	i) Cable glands for above cable	2	No.		
25.0	300A TPN Manual bypass switch & Isolator switch for above AVS wall mounted c/w housing and all other necessary accessories as **ABB/Schneider** or approved equivalent	1	No.		
26.0	150x75mm, 14SWG cable tray c/w mounting row bolts and all other necessary accessories	30	Lm		
27.0	Allow for labelling the distribution boards (both new and existing) under this section including all the incoming and outgoing circuits as per the specifications to Engineer's approval.	1	Item		
28.0	Allow for 4 sets (in A1 coloured print outs and soft copy in PDF format) of "As installed" drawings and Schematic wiring diagram to Engineer's approval and to be pinned at the station.	1	Item		
28.1	Supply and install 40x10mm compensation of potential main earth copper bar with porcelain insulators and provisions for connections to water pipes, cooking gas system, lightning protection system, main power switching panel and other utilities	1	Item		
	FIRE ALARM SYSTEM				
29.0	Fire Alarm points comprising wiring in 1.5mm^2 heat resistant cables drawn in 20mmØ concealed HG PVC conduits	5	No.		
30.0	Addressable Photoelectric Smoke Detector as Menvier or Approved Equivalent	4	No.		
31.0	Addressable Rate of Rise Heat Detector as Menvier or Approved equivalent	1	No.		
32.0	Addressable Manual Fire Alarm 'Break Glass' call points as MENVIER or approved equivalent.	3	No.		
33.0	Addressable Electronic Fire Alarm sounder complete with Red Flashing beacon as MENVIER or approved equivalent.	2	No.		
34.0	Microprocessor based 1-Loop Addressable Fire Alarm Control Panel as Menvier or Approved Equivalent	1	No.		
	TOTAL FOR JKIA C/F TO COLLECTION PAGE H/15				

SCHEDULE 3 (1)– 170KVA GENERATOR SHED -JKIA TOWER

Item	Description	Qty	Unit	Rate Kshs	Cost Kshs
	Supply, Install, Test and Commission the following				
A	Allow for proper cable management & labelling of the existing but untidy cabling.	1	Item		
B	Testing the status of existing earthing/ grounding system using appropriate electrical test equipment and compile formal report. If required allow for the appropriate remedial works to reinstate to the recommended functonal status.	1	Item		
1.0	$10mm^2$ 2-C PVC/SWA/PVC copper cable c/w approriate cable lugs from Power intake to changeover unit as EAC or approved equivalent **(Provisional qunatity - Actual length to be confirmed on site)**	20	Lm		
	i) Cable glands for above cables	4	No.		
2.0	Allow for disconnecting the existing 6mm2 4-C PVC/SWA /PVC cable from Meter Box to changeover unit, stripping into separate cores and rewiring/reorganizing and re-termination	1	Item		
	i) cable glands for re-termination	2	No.		
	ii) cable lugs for the above cables	2	No.		
3.0	$2.5\ mm^2$ 19-Core signal control cables for the generator sensor drawn in 20mmØ HG PVC conduits complete with all necessary accessories	15	Lm		
4.0	Trenching at an average depth of 750 mm laying, tilling and backfilling for the signal control cable above	10	Lm		
5.0	Interlocking concrete tiles marked DANGER-HATARI	25	No.		
	UPS				
6.0	3 x 4 mm2 SC PVC insulated copper cable for UPS Bypass switch drawn in cable tray / trunking c/w approriate cable lugs as East African Cable (EAC) or approved equivalent	10	Lm		
7.00	25A SPN Manual bypass switch & Isolator switch for above UPS wall mounted c/w housing and all other necessary accessories as ABB/Schneider or approved equivalent	1	No.		
	Total for carried forward to the Next page				

Item	Description	Qty	Unit		Kshs.
	Total Brought forward from the previous page				
8.0	6Ways SPN flush mounted Consumer Unit complete with 100A integral isolator as Schneider or approved equivalent	1	No.		
SCHEDULE 2 – cont'd 170K VA GENERATOR SHED	SP Miniature circuit breakers as Schneider or approved equivalent for item above.				
	(i) 45A SP MCB	1	No.		
	(ii) 32A SP MCB	1	No.		
	(iii) 20A SP MCB	1	No.		
	(iv) 10A SP MCB	1	No.		
	vi) Blanking plates	2	No.		
10.0	Construct 300mm x 450mm x 600mm deep concrete manhole complete with concrete metal waterproof cover as per technical specifications to Engineer's approval	1	Item		
11.0	Standard dual tariff weather proof meter box fabricated from steel sheet 16SWG Deep Powder coated complete with meter viewing Perspex windows and all the necessary accessories to Engineer's approval	1	Item		
12.0	Allow for labelling the distribution boards (both new and existing) under this section including all the incoming and outgoing circuits as per the specifications to Engineer's approval.	1	Item		
13.0	Allow for 4 sets (in A1 coloured print outs and soft copy in PDF format) of "As installed" drawings and Schematic wiring diagram to Engineer's approval and to be pinned at the station.	1	Item		
TOTAL FOR STONY ATHI C/F TO COLLECTION PAGE					

SCHEDULE 3 (1)– 170KVA GENERATOR SHED -JKIA TOWER					
Item	**Description**	**Qty**	**Unit**	**Rate Kshs**	**Cost Kshs**
	Supply, Install, Test and Commission the following				
A	Allow for proper cable management & labelling of the existing but untidy cabling.	1	Item		
B	Testing the status of existing earthing/ grounding system using appropriate electrical test equipment and compile formal report. If required allow for the appropriate remedial works to reinstate to the recommended functonal status.	1	Item		
	DVOR				
1.0	$10mm^2$ 2-C PVC/SWA/PVC copper cable c/w approriate cable lugs from KPLC meterboard to changeover	20	Lm		
	i) Cable glands for above cable	2	No.		
2.0	$10mm^2$ 2-C PVC/SWA/PVC copper cable c/w approriate cable lugs from generator to changeover	50	Lm		
	i) Cable glands for above cable	2	No.		
3.0	2.5 mm2 19-C signal control PVC CU cables drawn in 20mmØ XLPE/PVC conduits complete with all necessary accessories for genset	50	Lm		
4.0	Standard IP54 feeder pillar, complete with mounting concrete base and stands with space to accommodate 1No. Single Phase Meter, complete with all the necessary accessories	1	No.		
	AVS				
5.0	32A SPN Manual bypass switch & Isolator switch complete with appropriate cabling for above AVS wall mounted c/w housing and all other necessary accessories as ABB/Schneider or approved equivalent	1	No.		
	Total for carried forward to the Next page				

Item	Description	Qty	Unit		Kshs.
	Total Brought forward from the previous page				
	VHF				
6.0	Standard IP54 feeder pillar, complete with mounting concrete base and stands with space to accommodate 1No. Single Phase Meter, complete with all the necessary accessories	1	No.		
7.0	63A SP Isolation Switch as Schneider or approved equivalent	2	No.		
8.0	3x10mm^2 S-C PVC copper cable c/w approriate cable lugs from KPLC meterbox to the existing consumer unit at equipment room	10	Lm		
SCHEDULE 2 – cont'd 170KVA GENERATOR SHED					
9.0	32A SPN Manual bypass switch & Isolator switch complete with appropriate cabling for above AVS wall mounted c/w housing and all other necessary accessories as ABB/Schneider or approved equivalent	1	No.		
10.00	150x75mm, 14SWG cable tray c/w mounting row bolts and all other necessary accessories	10	Lm		
11.0	Allow for labelling the distribution boards (both new and existing) under this section including all the incoming and outgoing circuits as per the specifications to Engineer's approval.	1	Item		
12.0	Allow for 4 sets (in A1 coloured print outs and soft copy in PDF format) of "As installed" drawings and Schematic wiring diagram to Engineer's approval and to be pinned at the station.	1	Item		
TOTAL FOR NGONG HILLS C/F TO COLLECTION PAGE H/15					

SCHEDULE 3 (1)– 170KVA GENERATOR SHED -JKIA TOWER

Item	Description	Qty	Unit	Rate Kshs	Cost Kshs
	SUPPLY, DELIVER, INSTALL, TEST AND COMMISSION THE FOLLOWING:-				
A	Allow for proper cable management & labelling of the existing but untidy cabling.	1	Item		
B	Careful decommissioning and removal of the obsolete/ malfunctioned/ dilapidated/vandalised electrical items/ fittings, power distribution panels/ boards and associated switchgears. Carefully store and arrange for handing over to client.	1	Item		
C	Testing the status of existing earthing/ grounding system using appropriate electrical test equipment and compile formal report. If required allow for the appropriate remedial works to reinstate to the recommended functonal status.	1	Item		
	Equipment Room				
1.0	16.0 mm^2 4-C PVC/SWA/PVC copper cable for UPS bypass, drawn in cable tray / trunking c/w approriate cable lugs as East African Cable (EAC) or approved equivalent **(Provisional qunatity - Actual length to be confirmed on site)**	10	Lm		
	i) Cable glands for above cable	2	No.		
2.0	80A TPN AVS manual bypass switch wall mounted c/w housing and all other necessary accessories as **ABB/Schneider** or approved equivalent	1	No.		
	Generator House				
3.0	Allow for careful decommissioning and removal of the existing obsolete/ dilapidated power distribution panels and associated switchgears. Carefully store and arrange for handing over to client.	1	Item		
	Total for carried forward to the Next page				

Item	Description	Qty	Unit		Kshs.
	Total Brought forward from the previous page				
4.0	6-Way Modular type, free standing power distribution panel board for floor mounting with both rear and front access panels, cable manager compartments, metal clad 14SWG, 415 mains L.V Switch Board manufuctured to BS EN60 439-1, form 2b seperation and fully wired for one incoming MCCB and 6No. TP outgoing feeders as described here below with the following and all the other necessary accessories:	1	Item		
SCHEDULE 2 – cont'd 170KVA GENERATOR SHED	i) Provide space for mounting 1No.three phase KPLC meter ii) Provide space for mounting 2 No. set of KPLC cut out iii) 250 Amps 4 pole Automatic Transfer Switching (ATS) system c/w Manual-bypass switch as **ABB/Schneider** or equal and approved iv) 250 Amps 4 pole copper busbars v) 40x10mm earth bar; vi) 225A TPN MCCB main Incomer, adjustable as Merlin Gerin "BA" or Equal and approved vii) 2No. 125A TPN MCCB viii) 1No. 80A TPN MCCB ix) 2No. 63A SPN MCCB x) 2No Spare ways; xi)Voltmeter/ Ammeters meters complete with associated current transformers; xii) All necessary interconnecting cables;				
	Radar Station				
5.0	Allow for proper fixing of the existing but loose GI strip to the earth pit by saddling as appropriate and to Engineer's approval	1	Item		
6.0	Allow for careful decommissioning and removal of the existing obsolete/ dilapidated power distribution panels and associated switchgears. Carefully store and arrange for handing over to client.	1	Item		
	Total for carried forward to the Next page				

Item	Description	Qty	Unit		Kshs.
	Total Brought forward from the previous page				
7.0	6-Way Modular type, free standing power distribution panel board for floor mounting with both rear and front access panels, cable manager compartments, metal clad 14SWG, 415 mains L.V Switch Board manufuctured to BS EN60 439-1, form 2b seperation and fully wired for one incoming MCCB and 6No. TP outgoing feeders as described here below with the following and all the other necessary accessories: i) 150 Amps 4 pole copper busbars ii) 40x10mm earth bar; iii) 125A TPN MCCB main Incomer, adjustable as **ABB/Schneider** or Equal and approved iv) 2No. 125A TPN MCCB v) 3No. 80A TPN MCCB vi) 1No. 63A SPN MCCB vii) 2No Spare ways; viii)Voltmeter/ Ammeters meters complete with associated current transformers; ix) All necessary interconnecting cables;	1	Item		
8.0	Free standing modular type, automatic stepped, 75 kVAR, stepped as 25:50:75 Power Factor Correction Bank integral with the LV switchboard and complete with interconnecting cables.	1	Item		
9.0	As "detto" but 50kVA **(provide rate only)**	0	Item		
10.0	Supply and install 40x10mm compensation of potential main earth copper bar with porcelain insulators and provisions for connections to water pipes, cooking gas system, lightning protection system, main power switching panel and other utilities	1	Item		
11.0	Allow for labelling the switch board under this section including all the incoming and outgoing circuits as per the specifications	1	Item		
12.0	Allow for 4 sets (in A1 coloured print outs and soft copy in PDF format) of "As installed" drawings and Schematic wiring diagram to Engineer's approval and to be pinned at the station.	1	Item		
TOTAL FOR MUA HILLS C/F TO COLLECTION PAGE H/15					

SCHE

	BILL No. 1 COLLECTION PAGE	TOTAL
1	**TOTAL FOR JKIA B/F Page H/7……..……**	
2	**TOTAL FOR STONY ATHI B/F Page H/9……**	
3	**TOTAL FOR NGONG HILLS B/F Page H/11……..……**	
4	**TOTAL FOR MUA HILLS B/F Page H/14……**	
TOTAL FOR ELECTRICAL WORKS C/F TO GRAND SUMMARY PAGE H/35		

SCHE DULE

2 –

cont’d

170K VA GENE RATO R SHED

SCHEDULE 3 (1)– 170KVA GENERATOR SHED -JKIA TOWER

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
	Supply, deliver to site, install, test and commission the following:				
1.0	10kVA, AVS as described in the technical specifications of this document and complete with the neccesary accessories to engineers approval (for NGONG HILLS)	1	No		
2.0	As "detto" but 7.5kVA **(provide rate only)**	0	Item		
3.0	Allow for testing and commissioning of the AVS to satisfaction of the project engineer	1	No		
	TOTAL FOR AVS C/F TO GRAND SUMMARY PAGE H/35				

SCHEDULE 3 (1)– 170KVA GENERATOR SHED -JKIA TOWER

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
	Supply, deliver to site, install, test and commission the following:				
1.0	7.5kVA, UPS as described in the technical specifications of this document and complete with the neccesary accessories to engineers approval (for STONY ATHI STATION)	1	No		
2.0	As "detto" but 10kVA **(provide rate only)**	0	Item		
3.0	Allow for testing and commissioning of the UPS to satisfaction of the project engineer	1	No		
	TOTAL FOR AVS C/F TO GRAND SUMMARY PAGE H/35				

SCHEDULE 3 (1)– 170KVA GENERATOR SHED -JKIA TOWER

SCHEDULE No. 1: JKIA RADAR
BILL NO.1 – 170KVA GENERATING SET

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
	Supply, deliver to site, install, test and commission the following:				
1.1	Supply, deliver to site, install, test and commission a prime rated 170KVA, 3 phase, 415V, 50Hz diesel generating set with a continuous power factor of 0.8 lagging and as fully described in the particular specifications. The generator set is to be complete with a sound attenuated canopy and an integral base/belly daily service fuel tank with an operational running capacity of 8 hours.	1	No		
1.2	Supply and install complete external exhaust pipework for the above generators including all supports, hangers, hot air discharge ducting and weather grille, flanges and flexible connections, fixings, lagging and cladding with gauge 22 aluminiun sheet and all other materials as neccesary for the works as per the specifications	35	M		
1.3	Connect the exhaust pipe above in item 1.2 using steel pipes of adequate diameter, and flexible piping off engine exhaust manifold complete with heavy duty silencer	1	Item		
1.4	Supply and install earthing arrangements for the above generator sets comprising 50sq.mm earth lead, 1800mm long x 15mm diameter copper earth electrode with driving stud and clamp, 300mm x 300mm x 300mm deep concrete manhole, with removable cover, 1000mm x 1000mm copper earth mat, marconite backfill, red soil and all other neccesary accessories as per the requirements of the technical specifications	1	Item		
	SUB-TOTAL C/F TO PRICE COLLECTION PAGE				

BILL NO. 2- 170KVA AMF CONTROL PANEL

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
	Supply, deliver to site, install, test and commission the following:				
2.1	An electrical control panel complete with suitable rated incoming MCCBs, contactors and timer for automatic change over operation and complete with all other control accessories as fully described in clauses 9.3 to 9.10 of the particular specifications	1	No		
2.2	Suitable rated manual by-pass switch with clearly labeled **NORMAL-OFF-BYPASS** positions, **and shall such be wired that when the switch is on either OFF or BYPASS position, the generator shall receive no signal to start**	1	No.		
2.3	240V AC/12V DC mains power supply trickle battery charger as specified in clause 9.6 of specifications. The trickle charger shall charge the battery when the set is on **IDLE mode**, otherwise when the set is **RUNNING**, the battery shall be charged by the **generator charger**. Wiring shall be done such that the two chargers shall not operate at the same time.	1	No.		
SCHEDULE 2 – cont'd 170KVA GENERATOR SHED	12 Volts battery as specified in clause 9.6 of the particular specifications	2	No.		
2.5	Armoured cables complete with glands and pvc sleeves:				
	(a) 95 mm sq. 4 core PVC/SWA/PVC copper cable	50	M		
	(b) 4.0mm^2, 4 core, PVC/SWA/PVC copper cable	50	M		
2.6	Inter-wire the control panel with the Mains L.V board	1	Item		
2.7	Supply and install 300mm x 50 mm x 2 compartment 16SWG powder coated sheet steel cable tray including all brackets, bends, screws, covers, etc, as per the Technical Specification. Sample to be submitted for approval prior to procurement. SCREW-ON type	30	M		
2.8	Allow for testing and commissioning the generating system installation using load bank capable of delivering full load (provide test certificate)	1	Item		
2.9	100mm uPVC duct at 600mm below ground level across drive ways and concrete areas. Trenching at 600mm deep, sifting, cable laying on bed of of sand or soft earth not less than 75mm dep and surrounded and covered by a further 75mm of stone free sand or soft earth, danger hatari warning and backfilling.	40	M		
	SUB-TOTAL C/F TO PRICE COLLECTION PAGE				

BILL NO. 3 - 170KVA RECOMMENDED SPARE PARTS AND LUBRICATORS

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
	For the supply to the site of the following spare parts and lubricators:				
3.1	Oil Filters	4	No.		
3.2	Air Filters	4	No.		
3.3	Fuel Filter	4	No.		
3.4	Fuel injector nozzle to suit the set	4	No.		
3.5	Set of Fan belts to suit the set	1	No.		
3.6	10 litres container of sump oil of grade.....*	1	No.		
3.7	2 kilogram grease in a tin of grade .....*	1	No.		
3.8	10 litre plastic container of distilled water	1	No.		
3.9	20 litre of engine oil in a tin of grade.....*	1	No.		
3.10	Any other spare parts recommended by Tenderer **				
	*The tenderer to fill in the Grade quality to be supplied				
	**The tenderer to fill in the details and price of items but the price not to be included in total carried forward to summary page				
	SUB-TOTAL C/F TO PRICE COLLECTION PAGE				

BILL NO. 4 –TOOLS TO BE SUPPLIED WITH THE SETS

ITEM	DESCRIPTION	UNIT	QTY	RATE	KSHS
	For the supply to site of the following tools:				
4.1	Metal tool box with lock and two keys	No.	1		
4.2	Set of 8 No. Chrome vanadium ring spanners in sizes to suit the set	No.	1		
4.3	Set of 3 screwdrivers, 75mm, 200mm and 300mm plus one 200mm Philips type	No.	1		
4.4	- ditto -but open ended spanners	No.	1		
4.5	Set of feeler gauges	No.	1		
4.6	Grease gun to suit greasing points	No.	1		
4.7	Oil can, trigger type	No.	1		
4.8	Any other special tools which the tenderer recommends should be purchased as an optional:*****				
	NOTE* Tenderer should give detail and prices of item 9 but the price not to be included in total carried forward.				
	SUB-TOTAL C/F TO PRICE COLLECTION PAGE				

BILL NO.5 – AUXILIARY FUEL TANK

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
5.1	Supply, deliver to site and install, to the approval of the project manager, and connect to the daily service base/belly fuel tank, an auxiliary fuel tank with level indicator and with an operational running capacity of 72 hours. The tank is to beof mild steel plates of minimum thickness of 3mm complete with stand and all interconnecting G.I pipe work.	1	No		
5.2	Supply, install, test and commission a 240 V ac fuel booster pump complete with a suitable rated motor DOL starter and all interconnecting accessories and G. I piping	1	Item		
	SUB-TOTAL C/F TO PRICE SUMMARY PAGE				

PRICE COLLECTION PAGE

	DESCRIPTION	TOTAL
A	Sub-Total for Bill No. 1 - Generator Set	
B	Sub-Total for Bill No. 2 - AMF Panel	
C	Sub-Total for Bill No. 3 - Recommended Spare Parts and Lubricators	
D	Sub-Total for Bill No. 4 - Tools to be Supplied with the Set	
E	Sub-Total for Bill No. 5 - Auxiliary Fuel Tank	
TOTAL FOR SCHEDULE No. 1: JKIA RADAR C/F TO COLLECTION PAGE H/30		

SCHEDULE 3 (1)– 170KVA GENERATOR SHED -JKIA TOWER
BILL NO.1 – 120KVA GENERATING SET

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
	Supply, deliver to site, install, test and commission the following:				
1.1	Supply, deliver to site, install, test and commission a prime rated 120KVA, 3 phase, 415V, 50Hz diesel generating set with a continuous power factor of 0.8 lagging and as fully described in the particular specifications. The generator set is to be complete with a sound attenuated canopy and an integral base/belly daily service fuel tank with an operational running capacity of 8 hours.	1	No		
1.2	Supply and install complete external exhaust pipework for the above generators including all supports, hangers, hot air discharge ducting and weather grille, flanges and flexible connections, fixings, lagging and cladding with gauge 22 aluminiun sheet and all other materials as neccesary for the works as per the specifications	30	M		
1.3	Connect the exhaust pipe above in item 1.2 using steel pipes of adequate diameter, and flexible piping off engine exhaust manifold complete with heavy duty silencer	1	Item		
1.4	Supply and install earthing arrangements for the above generator sets comprising 50sq.mm earth lead, 1800mm long x 15mm diameter copper earth electrode with driving stud and clamp, 300mm x 300mm x 300mm deep concrete manhole, with removable cover, 1000mm x 1000mm copper earth mat, marconite backfill, red soil and all other neccesary accessories as per the requirements of the technical specifications	1	Item		
	SUB-TOTAL C/F TO PRICE COLLECTION PAGE				

BILL NO. 2- 120KVA AMF CONTROL PANEL

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
	Supply, deliver to site, install, test and commission the following:				
2.1	An electrical control panel complete with suitable rated incoming MCCBs, contactors and timer for automatic change over operation and complete with all other control accessories as fully described in clauses 9.3 to 9.10 of the particular specifications	1	No		
2.2	Suitable rated manual by-pass switch with clearly labeled **NORMAL-OFF-BYPASS** positions, **and shall such be wired that when the switch is on either OFF or BYPASS position, the generator shall receive no signal to start**	1	No.		
2.3	240V AC/12V DC mains power supply trickle battery charger as specified in clause 9.6 of specifications. The trickle charger shall charge the battery when the set is on **IDLE mode**, otherwise when the set is **RUNNING**, the battery shall be charged by the **generator charger**. Wiring shall be done such that the two chargers shall not operate at the same time.	1	No.		
2.4	12 Volts battery as specified in clause 9.6 of the particular specifications	2	No.		
SCHE	Armoured cables complete with glands and pvc sleeves:				
	(a) 50 mm sq. 4 core PVC/SWA/PVC copper cable	80	M		
	(b) 4.0mm^2, 4 core, PVC/SWA/PVC copper cable	80	M		
2.6	Inter-wire the control panel with the Mains L.V board	1	Item		
2.7	Supply and install 300mm x 50 mm x 2 compartment 16SWG powder coated sheet steel cable tray including all brackets, bends, screws, covers, etc, as per the Technical Specification. Sample to be submitted for approval prior to procurement. SCREW-ON type	30	M		
2.8	Allow for testing and commissioning the generating system installation using load bank capable of delivering full load (provide test certificate)	1	Item		
2.9	100mm uPVC duct at 600mm below ground level across drive ways and concrete areas. Trenching at 600mm deep, sifting, cable laying on bed of of sand or soft earth not less than 75mm dep and surrounded and covered by a further 75mm of stone free sand or soft earth, danger hatari warning and backfilling.	50	M		
	SUB-TOTAL C/F TO PRICE COLLECTION PAGE				

BILL NO. 3 - 120KVA RECOMMENDED SPARE PARTS AND LUBRICATORS

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
	For the supply to the site of the following spare parts and lubricators:				
3.1	Oil Filters	4	No.		
3.2	Air Filters	4	No.		
3.3	Fuel Filter	4	No.		
3.4	Fuel injector nozzle to suit the set	4	No.		
3.5	Set of Fan belts to suit the set	1	No.		
3.6	10 litres container of sump oil of grade.....*	1	No.		
3.7	2 kilogram grease in a tin of grade .....*	1	No.		
3.8	10 litre plastic container of distilled water	1	No.		
3.9	20 litre of engine oil in a tin of grade.....*	1	No.		
3.10	Any other spare parts recommended by Tenderer **				
	*The tenderer to fill in the Grade quality to be supplied				
	**The tenderer to fill in the details and price of items but the price not to be included in total carried forward to summary page				
	SUB-TOTAL C/F TO PRICE COLLECTION PAGE				

BILL NO. 4 –TOOLS TO BE SUPPLIED WITH THE SETS

ITEM	DESCRIPTION	UNIT	QTY	RATE	KSHS
	For the supply to site of the following tools:				
4.1	Metal tool box with lock and two keys	No.	1		
4.2	Set of 8 No. Chrome vanadium ring spanners in sizes to suit the set	No.	1		
4.3	Set of 3 screwdrivers, 75mm, 200mm and 300mm plus one 200mm Philips type	No.	1		
4.4	- ditto -but open ended spanners	No.	1		
4.5	Set of feeler gauges	No.	1		
4.6	Grease gun to suit greasing points	No.	1		
4.7	Oil can, trigger type	No.	1		
4.8	Any other special tools which the tenderer recommends should be purchased as an optional:*****				
	NOTE* Tenderer should give detail and prices of item 9 but the price not to be included in total carried forward.				
	SUB-TOTAL C/F TO PRICE COLLECTION PAGE				

PRICE COLLECTION PAGE

	DESCRIPTION	TOTAL
A	Sub-Total for Bill No. 1 - Generator Set	
B	Sub-Total for Bill No. 2 - AMF Panel	
C	Sub-Total for Bill No. 3 - Recommended Spare Parts and Lubricators	
D	Sub-Total for Bill No. 4 - Tools to be Supplied with the Set	
E	Allow for Kshs. 200,000 for burglar proofing generator location	**200,000**
	TOTAL FOR SCHEDULE No. 2: JKIA TOWER C/F TO COLLECTION PAGE H/30	

SCHEDULE 3 – 170KVA GENERATOR SHED -JKIA TOWER
PART A

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
6.10	1No. 2500 x1500 x 500mm thick reinforced concrete plinth with foundation	2	CM		
	SUBSTRUCURE (ALL PROVISIONAL)				
6.20	Excavate top soil to reduced levels commencing from stripped level over not more than 300mm deep and cart away as directed.	15	SM		
6.30	Excavate for strip foundation starting from reduced level not exceeding 1.5 meters deep and cart away as directed.	10	CM		
6.40	Return, fill- in and rum selected excavated material	9	CM		
6.50	Remove and cart away from site surplus excavated material as directed	10	CM		
6.60	Hardcore filling in making levels average 300mm thick, depositing and compacting in layers of 150mm maximum thickness.	20	CM		
6.70	Allow for keeping excavations free from all water by pumping or otherwise	1	Item		
6.80	50mm thick murram blinding to surfaces of fill.	15	SM		
	CONCRETE				
6.90	50mm thick mass concrete class Q (1: 4:8 class 15/20mm) to bottoms of foundations	9	SM		
6.10	Institute concrete; reinforced; class20/20mm); vibrated	3	CM		
6.11	400mm thick floor bed	15	SM		
	Reinforcement				
6.12	Bars; high yield steel type A142; cold worked to BS 4483 including bends; hooks, tying wire and distance blocks 8mm thick with 150mm side laps	320	KG		
	SUB-TOTAL C/F TO PRICE SUMMARY PAGE				

PART A – cont'd 170KVA GENERATOR SHED

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
	Fabric BS 4483				
6.13	Reference A198 mesh 200x200 min weight 2.22 legs per squire teeter (measured net – no allowance made for laps, including bends, tying wire and distance blocks).	15	SM		
	Sawn formwork to institute concrete as described:				
6.14	To sides; vertical or battering of foundation, ground beams or the like Edges of ground floor slab over 300mm wide.	10	SM		
	Walling				
6.15	200mm thick approved local natural stone; roughly squared to foundation walling; bedding and jointing in cement sand (1:6).	15	SM		
6.16	Screed; 20mm thick 2No. coat work, 15mm first coat of cement sand (1: 6); 5 mm second coat of cement and lime putty(1: 10); steel trowelled to concrete or block work base generally to plinth; internally.	15	SM		
	<u>SUPERSTRUCTURE</u>				
6.17	The following in mild steel grill fence comprising 75 x 75 x 4mm square hollow section corner and middle posts at 1500mm ceters and 25 x 25 x 3mm thick square hollow section purlitl, gilled square bars as described galvanized corrugated prepainted roof sheet; all	24	SM		
	Approximate 6.0 meters long; 75 x75 x 4mm thick post grout with and including mass concrete and carting away from site	15	SM		
	SUB-TOTAL C/F TO PRICE SUMMARY PAGE				

PART A – cont'd 170KVA GENERATOR SHED

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
6.18	Framed grills size 1500 x 2500mm high comprising 20 x 4 mm thick flats at top and bottom and 15 x 15 mm thick square rods at 30mm centers both sides welded to and between 75 x 75mm posts (m/s).	15	LM		
6.19	150 x150 x 2mm thick square hollow section purlins.	80	LM		
6.20	**Standard heavy duty Steel casement metal grilled door; of approved manufacture with hinges, handles and lock; fixed with lugs built into concrete or block work; painted externally in mastic and finished with one coat zinc chromate primer.** **A.** Steel painted panel double door size 1800x2400mm high	1	No		
	B. Prepare and apply one undercoat and two finishing coats of gloss oil paint to general metal surfaces	10	SM		
6.21	**Galvanised steel corrugated roofing sheets; 26 guage pre- painted covering; Fixing to steel purlins (m/s) with J bolts; 400mm end laps and one and half corrugated side laps**	15	SM		
	250X25MM wrot camphor Fascia board and barge board	15	LM		
6.22	**Paving Slabs** 600x600x50mm thick precast concrete paving slab around the building including 50mm thick sand bed and V – jointing with cement and sand mortar	10	SM		
	SUB-TOTAL FROM ABOVE				
	SUB-TOTAL B/F FROM PAGE H/27				
	SUB-TOTAL B/F FROM PAGE H/28				
	TOTAL CARRIED FORWARD TO COLLECTION PAGE H/30				

SCHEDULE 3 (1)– 170KVA GENERATOR SHED -JKIA TOWER

Item	Description	Amount (Kshs)
1	Sub-Total for Schedule 1 - JKIA RADAR B/F page H/22	
2	Sub-Total for Schedule 2 - JKIA TOWER B/F page H/26	
3	Sub-Total for Schedule 3 - GENERATOR SHED B/F page H/29	
TOTAL GENERATOR INSTALLATION WORKS C/F TO GRAND SUMMARY PAGE H/35		

BILL No. 5 - IP CCTV SYSTEM INSTALLATION - JKIA TOWER

Item	Description	Qty	Unit	Rate	Kshs.
	Supply, Install, Test and Commission the following as described in the specifications:				
1.01	Indoor, IP POE, Vandal resistant IR 3MP dome camera as described in the technical specifications of this document complete with housing, appropriate mounting brackets and all other accessories to approval	6	No.		
1.02	Indoor, IP POE Vandal resistant 3MP PTZ full HD low light dome camera as described in the technical specifications of this document and complete with power supply adaptors, housing, appropriate mounting brackets and all other accessories to engineers approval	1	No.		
1.03	Indoor, IP POE, Vandal resistant IR 5MP bullet camera as described in the technical specifications of this document complete with housing, appropriate mounting brackets and all other accessories to approval	2	No.		
1.03	12 Port PoE Switch-IPBase edge switch model complete with PoE plus, 10/100/1000Mbps on all Ports and as CISCO catalyst switch (currently available in the market and being supported by Cisco) or approved equivalent	1	No.		
1.04	Category 6A, 12 Port Patch Panel and as Siemon or approved equivalent.	1	No		
1.05	12 Port fibre patch panel as Siemon or approved equivalent.	1	No		
1.06	1m Port fibre patch cord as Siemon or approved equivalent.	2	No		
1.07	1M RJ45-RJ45 Cat 6A UTP factory terminated patch cord as Siemons or approved equivalent to be used at work station.	10	No		
1.08	3M RJ45-RJ45 Cat 6A UTP factory terminated patch cord as Siemons or approved equivalent to be used at work station.	5	No		
1.09	Cat 6A (or currently available in the market) UTP 4-pair cable as Siemons or approved equivalent (Provisional length - actual length to be established on site)	800	M		
1.091	As detto but STP	10	M		
1.10	12U wall mount data cabinet/ with glass door complete with Cable Managers, fans, power outlet points, grounding kits and castors. The data cabinet to be complete with 1No. APC Power Distribution Units (PDU) to accommodate power for the active devices.	1	No.		
1.11	2U vertical cable managers/organizers and as Siemon or approved equivalent	2	No.		
1.12	38mm HG Conduit complete with all accessories for surface mounting	50	M		
1.13	25 X 25mm - single compartment, gauge 16 sheet Deep Powder coated metal trunking along the walls complete with angled cover section, end covers and all other accessories.	200	M		
	Total for carried forward to the Next page				

Item	Description	Qty	Unit	Rate	Kshs.
	Total Brought forward from the previous page				
1.14	LED HD panel display 48" as described in the technical specifications of this document complete appropriate mounting brackets and all other accessories to approval	1	No.		
1.16	Digital universal key board complete with joystick and LCD screen	1	No.		
1.17	Operator workstation hardware/Desktop computer complete with software as described in particular specifications complete with necessary accessories	1	Item		
1.18	12channels IP Network video recorder with PoE complete with minimum recording speed of 256mbps, minimum recording HDD 16TB, video management software, redundant power supply and all other accessories and as described in the particular specifications	1	No.		
1.19	Outdoor 8 core single mode fiber cable complete with all accessories for backbone cabling to Monitoring room	70	Lm		
1.20	Grounding and bounding kit complete with 50mm diameter copper bounding bar and 6mm thick green and yellow wire. The Earthing the system is to be to the approval of the Engineer.	1	Item		
1.21	Provide for preparing and submitting individual fluke test results (for each network point) to be submitted as a bound report. Attach printed results and soft copy	1	Lot		
1.22	Any other items necessary to complete the above installation as per the system you propose to install. Please list the items, price and include in your totals a) b) c) d)	1	Lot		
	TOTAL FOR IP CCTV SYSTEM C/F TO GRAND SUMMARY PAGE H/35				

PROJECT MANAGER'S STATIONERY

Item	Description	Qty	Unit	Rate	Kshs
	STATIONERY **Tenderers shall price for the following stationery requirements. These shall then be delivered, upon their first demand to the Chief Engineer (Electrical) immediately after the award to the successful tenderer.**				
A	Laptop computer as described in the particular specifications of this document and complete with all other accessories as LENOVO or approved equivalent.	1	No.		
B	3in1 printer as **HP PageWide Pro MFP 477dw**, as per Particular specifications complete with Toner to the Project Engineer for project administration	1	No.		
C	Photocopy paper, size A4, 80g/cm^3, White, 500 sheets per ream	20	Reams		
D	HP Laser Jet Cartridges				
	i) Q5949A	2	No.		
	ii) Q6511A	2	No.		
	iii) CE505A/05A	2	No.		
	iv) C4911A (82), Cyan, 69ml	2	No.		
	v) C4912A (82), Magenta, 69ml	2	No.		
	vi) C4913A (82), Yellow, 69ml	2	No.		
E	Broadband USB 4G Modem, preloaded with 25GB of data (Kshs 5,000 worth of airtime) as approved by the Project Engineer.				
	i) Safaricom	1	No.		
	ii) Telkom	1	No.		
	iii) Zain	1	No.		
	Sub total for Project Managers Stationery C/F to Grand Summary page (H/35)				

PROVISIONAL SUMS

Item	Description	Cost Kshs
A.	**CONTINGENCY** Allow a Provisional Sum of Kenya Shillings 2.5 Million only contingency sum to be used at the discreation of the Project Engineer	**2,500,000.00**
B	**RELATED / ASSOCIATED BUILDERS WORKS** Allow a Provisional Sum of Sum of Kenya Shillings 1.0 Million for related/ associated Builders works	**1,000,000.00**
C	**MECHANICAL VENTILATION/EXTRACTION FANS WORKS** Allow a Provisional Sum of Sum of Kenya Shillings 1.0 Million for related/ associated Mechanical ventilation/extraction fans installation works at JKIA Tower power rooms	**1,000,000.00**
D	**TRAINING LEVY** Allow a Provisional Sum of Sum of Kenya Shillings Three Hundred Thousand only for Training Levy for SDPW offficers	**300,000.00**
	Total for Provisional Sums carried forward to Grand Summary Page (H/35)	**4,800,000.00**

GRAND SUMMARY PAGE

Item	Description	KSHS
1.0	Sub-total for Preliminaries B/F from page H/6	
2.0	Sub-total for Electrical Installation Works B/F from page H/15	
3.0	Sub-total for Automatic voltage stabilizer Installation Works B/F from page H/16	
4.0	Sub-total for Uninterruptible power supply unit (UPS) Installation Works B/F from page H/17	
5.0	Sub-total for Standby Generator set Installation Works B/F from page H/30	
6.0	Sub-total for IP CCTV system Installation Works B/F from page H/32	
7.0	Sub-total for Project Managers Stationery B/F from page H/33	
8.0	Sub-total for Provisional Sums B/F from page H/34	**4,800,000.00**
9.0	Allow for **training and certification** of 10No. equipment operators/Technical Staff in all aspect of operation and maintenance of the installed equipment/items as described in the technical specifications of this document	
10.0	Allow for **maintenance tools & Manuals** as described in the technical specifications of this document	
11.0	Provide for preparing and presenting warranty and documentation, for all equipment in both hard and soft copy	
	Grand total for Refurbishment of electrical power supply distribution installations works C/F to Form of Tender	

TOTAL AMOUNT IN WORDS

……..……..……

……

……

……

TENDERER'S NAME & STAMP

……..……

……

……

SIGNATURE ……. DATE……

P.I.N No.,…….. V.A.T CERTIFICATE No……

WITNESS……. ADDRESS……

SIGNATURE OF WITNESS……. DATE……

SECTION I TECHNICAL

SCHEDULE OF

ITEMS TO BE SUPPLIED

TECHNICAL SCHEDULE

1.0 The technical schedule shall be submitted by tenderers to facilitate and enable the Project Manager to evaluate the tenders

2.0 The filling of this schedule forms part of Technical Evaluation of the tenders, and bidders shall therefore be required to indicate the type/make and country of origin of all the materials and equipments they intend to offer to the employer as listed in the technical schedule.

3.0 **Any bid returned with unfilled Technical Schedule shall be considered technically non-responsive, and the bidder shall automatically be disqualified.**

TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED
(To be Completed by the Tenderer as a Mandatory Requirement)

ITEM	DESCRIPTION	TYPE/MAKE	COUNTRY OF ORIGIN
1	Uninterruptible Power Supply unit		
2	Automatic voltage stabilizer (AVS)		
3	Cable Trunking & Tray		
4	LED light fittings		
5	Power cable		
6	LED monitors/display		
7	CAT 6A cables		
8	Network Switches a) Edge Switch		
9	Fiber Cable		
10	Cameras a) Dome b) Bullet c) PTZ		
12	Network Video Recorder		
13	LED monitors/display		
14	Network Management System		
15	Standby generator sets		
16	Street lighting control pillar		
17	Socket Outlets (13 Ampere)		
18	Manual bypass switches		
19	Fire alarm system		
20	Distribution boards		
21	Circuit breakers		
22	Manual changeover switches		

SECTION J

STANDARD FORMS

CONTENTS OF SECTION J

TITLE **PAGE**

NOTE:

1.0 Tenderers must duly fill these Standard Forms as a mandatory requirement.

2.0 Any tender returned with **unfilled Standard Forms** shall be considered **non-Responsive and shall automatically be disqualified.**

PERFORMANCE BANK GUARANTEE

To: The Director General,
Kenya Civil Aviation Authority
P.O. Box 30163-00100
NAIROBI.

Dear Sir,

WHEREAS …….(hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. …… dated …… to execute …… (hereinafter called "the Works");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognised bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of:
Kshs. ……. (*amount of Guarantee in figures*)
Kenya Shillings ……
…….(*amount of Guarantee in words*),
and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Kenya Shillings ……..
…….. (*amount of Guarantee in words*) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change, addition or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall be valid until the date of issue of the Certificate of Completion.

SIGNATURE AND SEAL OF THE GUARANTOR …….

Name of Bank …….

Address ……

Date ……

TENDER QUESTIONNAIRE

Please fill in block letters.

1. Full names of Tenderer:

   ……

2. Full address of Tenderer to which tender correspondence is to be sent (unless an agent has been appointed below):

   ……

3. Telephone number (s) of Tenderer:

   ……

4. Telex/Fax Address of Tenderer:
   ……

5. Name of Tenderer's representative to be contacted on matters of the tender during the tender period:
   ……

6. Details of Tenderer's nominated agent (if any) to receive tender notices. This is essential if the Tenderer does not have his registered address in Kenya (name, address, telephone, telex):

   ……

   ……

_____
Signature of Tenderer

Make copy and deliver to: The Principle Secretary,
Ministry of Transport, Infrastructure, Housing and Urban Development - State Department of Public Works
P.O. Box 30743-00100,
NAIROBI

CONFIDENTIAL BUSINESS QUESTIONNAIRE

You are requested to give the particulars indicated in Part 1 and either Part 2 (a), 2 (b) or 2(c) and (2d) whichever applies to your type of business.

You are advised that it is a serious offence to give false information on this Form.

Part 1 – General

Business Name ……

Location of business premises: Country/Town…….

Plot No…… Street/Road ……

Postal Address…… Tel No……..

Nature of Business……..

Current Trade Licence No…… Expiring date……

Maximum value of business which you can handle at any time:

Kenya Shillings……

Name of your bankers……

Branch……

Part 2 (a) – Sole Proprietor

Your name in full…… Age……

Nationality…… Country of Origin……

Citizenship details ……

Part 2 (b) – Partnership (provide CR12)

Give details of partners as follows:

	Name in full	*Nationality*	*Citizenship Details*	*Shares*
1.	……	……	……	……..
2.	……	…….	……	……
3.	……	……	……	……
4.	……	……	……	..... ……

Part 2(c) – Registered Company

Private or Public ……

State the nominal and issued capita of the company:

Nominal KShs. ……..

Issued KShs. ……..

Give details of all directors as follows:

	Name in full	*Nationality*	*Citizenship Details**	*Shares*
1.	……..	…	…… ....……..	…..
2.	……..	…	…… .... ……	……..
3.	……..	……	..... ……	…….
4.	……..	……	.....……	…….

Part 2(d) Interest in the Firm:

Is there any person/persons in the employment of the Government of Kenya WHO has interest in this firm? Yes/No ……. (Delete as necessary)

I certify that the above information is correct.

…….. …… ……

Title Signature

Date

* *Attach proof of citizenship*

KEY PERSONNEL

Qualifications and experience of key personnel proposed for administration and execution of the Contract.

POSITION	NAME	YEARS OF EXPERIENCE (GENERAL)	YEARS OF EXPERIENCE IN PROPOSED POSITION
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

I certify that the above information is correct

…….. …… ……

Title Signature Date

CONTRACTS COMPLETED IN THE LAST FIVE (5) YEARS

Work performed on works of a similar nature, complexity and volume over the last 5 years.

PROJECT NAME	*NAME OF CLIENT*	**TYPE OF WORK AND YEAR OF COMPLETION**	**VALUE OF CONTRACT (Kshs.)**

I certify that the above works were successfully carried out and completed by ourselves.

……. …… …….

Title Signature Date

SCHEDULE OF ON-GOING PROJECTS

Details of on-going or committed projects, including expected completion date.

PROJECT NAME	*NAME OF CLIENT*	*CONTRACT SUM*	*% COMPLETE*	*COMPLETION DATE*

I certify that the above works are currently being carried out by ourselves.

……. ……..…… …….

Title Signature Date

SCHEDULE OF MAJOR ITEMS OF CONTRACTOR'S EQUIPMENT PROPOSED FOR CARRYING OUT THE WORKS

ITEM OF EQUIPMENT	DESCRIPTION, MAKE AND AGE (Years)	CONDITION (New, good, poor) and number available	OWNED, LEASED (From whom?), or to be purchased (From whom?)

AUDITED FINANCIAL REPORTS FOR THE LAST THREE YEARS (2018, 2017 and 2016)

EVIDENCE OF FINANCIAL RESOURCES TO MEET QUALIFICATION REQUIREMENTS

(Cash in Hand, Lines of credit, e.t.c. List below and attach copies of supportive documents.)

1. _____.

2. _____.

3. _____.

4. _____.

5. _____.

6. _____.

7. _____.

8. _____.

9. _____.

10 _____.

BIDDER'S BANK INFORMATION

(This information is mandatory and should be for banks to provide reference if contacted by employer)

NAME OF BANK	BANK BRANCH	ACCOUNT NAME	ADDRESS	TELEPHONE

DETAILS OF LITIGATIONS OR ARBITRATION PROCEEDINGS IN WHICH THE TENDERER IS INVOLVED AS ONE OF THE PARTIES

1._____.

2._____.

3._____.

4._____.

5._____.

6._____.

7._____.

8._____.

9._____.

10_____.

PRE-TENDER SITE VIST FORM

SITE VISIT FORM

(TO BE RETURNED DULY SIGNED AND STAMPED WITH TENDER DOCUMENT)

PROPOSED REFURBISHMENT OF ELECTRICAL POWER SUPPLY DISTRIBUTION TO KENYA CIVIL AVIATION AUTHORITY'S STATIONS

THIS IS TO CONFIRM THAT ---------- (COMPANY NAME) HAS MADE A SITE VISIT TO JKIA, RADAR STATION IN NAIROBI.

COMPANY REPRESENTATIVE

NAME ----------

DESIGNATION----------

SIGNED ---------- DATE ----------

OFFICIAL STAMP

KCAA REPRESENTATIVE

NAME ----------

DESIGNATION----------

SIGNED ---------- DATE ----------

OFFICIAL STAMP

REPUBLIC OF KENYA

IN THE MATTER OF OATHS AND STATUTORY DECLARATION ACT

CHAPTER 15 LAWS OF KENYA

AND

IN THE MATTER OF

THE PUBLIC PROCUREMENT AND ASSET DISPOSAL ACT, 2015

I, …… holder of Identity card no……..and care of P. O. Box …… and being a resident of …… in the Republic of Kenya do hereby make oath and state as follows: -

1. **THAT** I am the Chief Executive/Managing Director/Principal Officer /Director of …… (name of the Candidate) which is a Candidate in respect of Tender Number ……. to supply goods, render services and/or carry out works for Kenya Civil Aviation Authority and duly authorized and competent to make this Affidavit.

2. **THAT** the aforesaid Candidate has not been requested to pay any inducement to any member of the Board, Management, Staff and/or employees and/or agents of Kenya Civil Aviation Authority, which is the procuring entity.

3. **THAT** the aforesaid Candidate, its servants and/or agents have not offered any inducement to any member of the Board, Management, Staff and/or employees and/or agents of Kenya Civil Aviation Authority.

4. **THAT** the aforesaid candidate has not committed any offence under the Laws of Kenya or the Procurement Laws or been debarred from participating in any tenders by virtue of non-performance/poor-performance or any other legal

reason and is not undergoing any adverse disciplinary action/claim before the Public Procurement and Disposal Authority.

5. **THAT** the aforesaid candidate, its directors and shareholders have not been convicted of corrupt or fraudulent practices in any court of competent jurisdiction within the Republic of Kenya.

6. **THAT** the aforesaid candidate has not defaulted in his/her/their/its tax obligations per the tax laws of the Republic of Kenya.

7. **THAT** the aforesaid candidate has not been in breach of the employment laws of the Republic of Kenya.

8. **THAT** what is deponed to hereinabove is true to the best of my knowledge information and belief.

SWORN at …… by the said }

…….. }

Name of Chief Executive/Managing Director/ }

Principal Officer/Director }

on this ……. day of ……..... 20… }

} _____

} DEPONENT

Before me }

}

Commissioner for Oaths }

J/13