



REPUBLIC OF KENYA

THE PARLIAMENTARY SERVICE COMMISSION

PROPOSED MULTI STOREY OFFICE BLOCK FOR THE KENYA NATIONAL ASSEMBLY.

W.P. ITEM NO. D29 NB/NB 901 –JOB NO. 7753C

1. TECHNICAL TENDER DOCUMENT

TENDER NO. PSC/012/2016-2017 SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF A BUILDING MANAGEMENT SYSTEM

ARCHITECT

Chief Architect
Ministry of Transport, Infrastructure, Housing and Urban
Development
P.O. Box 30743-00100
NAIROBI

ENGINEER (STRUCTURAL)

Chief Engineer Structural
Ministry of Transport, Infrastructure, Housing and Urban
Development
P.O. Box 30743-00100
NAIROBI

MECHANICAL ENGINEER

Chief Engineer (Mechanical) (BS)
Ministry of Transport, Infrastructure, Housing and Urban
Development
P.O. Box 41191-00100
NAIROBI

QUANTITY SURVEYOR

Chief Quantity Surveyor
Ministry of Transport, Infrastructure, Housing and Urban
Development
P.O. Box 30743-00100
NAIROBI

ELECTRICAL ENGINEER

Chief Engineer (Electrical) (BS)
Ministry of Transport, Infrastructure, Housing and Urban
Development
P.O. Box 41191-00100
NAIROBI

PROJECT CONSULTANTS

CONSULTING ARCHITECT

Mutiso Menezes International
P.O. Box 44934 - 00100
NAIROBI.

CONSULTING QUANTITY SURVEYOR

Quantech Consultancy
P.O. Box 44660 – 00100
NAIROBI

CONSULTING ELECT. AND MECH. ENGINEER

Mecoy Consultants Ltd
P.O. Box 20198-00200
NAIROBI

CONSULTING STRUCTURAL & CIVIL ENGINEER.

Wanjohi Mutonyi Consult
P.O. Box 21714 - 00505
NAIROBI

CLIENT

The Parliamentary Service Commission
P.O. BOX 41842,
Nairobi

FEBRUARY, 2017

CONTENTS	PAGES
1. CONTENTS	1
2. DEFINITIONS	2
3. PROJECT CONSULTANTS	3
4. SPECIAL NOTES FOR ALL TENDERERS	4
5. FORM OF TENDER SECURITY (BANK)	5
6. FORM OF TENDER SECURITY (INSURANCE)	6
7. SECTION A: INSTRUCTIONS TO TENDERERS EVALUATION CRITERIA	A/1– A/18 A/19– A/25
8. SECTION B: CONDITIONS OF CONTRACT (MAIN WORKS)	B/1– B/22
9. SECTION C: SUB-CONTRACT AGREEMENT (KABCEC)	1-22
10. SECTION D: PRELIMINARIES AND GENERAL CONDITIONS	D/1-D/18
11. SECTION E: GENERAL SPECIFICATIONS OF MATERIALS AND WORKS	E/1-E/4
12. SECTION F: PARTICULAR AND TECHNICAL SPECIFICATIONS FOR BMS SYSTEM INSTALLATIONS	F/1-F/45
13. SECTION G: SCHEDULE OF BMS INPUT AND OUTPUT POINTS	G/1-G/8
14. SECTION H: SCHEDULE OF DRAWINGS	H/1
15. SECTION I: TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED	I/1-I/2
16. SECTION J: STANDARD FORMS	J/1-J/12

DEFINITIONS

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

The Employer	Parliamentary Service Commission P.O. Box 41842 Nairobi.
Employer's Representative	Clerk of Senate/ Secretary, P.O. Box 41842 Nairobi
Architect	Chief Architect, Ministry of Transport, Infrastructure, Housing and Urban Development, P.O. Box 30743-00100, Nairobi.
Electrical Engineer	Chief Engineer (Electrical), Ministry of Transport, Infrastructure, Housing and Urban Development, P.O. Box 41191-00100, Nairobi.
Mechanical Engineer	Chief Engineer (Mechanical), Ministry of Transport, Infrastructure, Housing and Urban Development, P.O. Box 41191-00100, Nairobi.
Quantity Surveyor	Chief Quantity Surveyor, Ministry of Transport, Infrastructure, Housing and Urban Development, P.O. Box 30743-00100, Nairobi.
Structural Engineer	Chief Engineer (Structural), Ministry of Transport, Infrastructure, Housing and Urban Development, P.O. Box 30743-00100, Nairobi.
Project Manager	The Works Secretary Ministry of Transport, Infrastructure, Housing and Urban Development, P.O. Box 30743 – 00100, Nairobi.
Main contractor	The firm appointed to carry out the builders works.
Sub contractor	The firm appointed to carry out the supply, delivery, installation, testing and commissioning of Building Management System Installations.
Site	Central Business District, Nairobi City.

PROJECT CONSULTANTS

Architect	Mutiso Menezes International, P.O. Box 44934 - 00100, <u>NAIROBI</u>
Quantity Surveyor	Quantech Consultancy, P.O. Box 44660 - 00100, <u>NAIROBI</u>
Structural Engineer	Wanjohi Mutonyi Consult, P.O. Box 21714 - 00505, <u>NAIROBI</u>
Electrical and Mechanical Engineer	Mecoy Consultants Ltd, P.O. Box 20198 - 00200, <u>NAIROBI</u>

SPECIAL NOTES FOR ALL TENDERERS:

Important: *The site for the proposed works has a number of existing installations. The Sub-contractor will be required to ensure there's no interference with supply of services to neighbouring organizations. The sub-contractor will be required to take all precaution and care so that no damage will occur to the existing installations on site. The sub-contractor is also advised to secure all the necessary insurance policies as he will be solely held responsible for any damages to the existing system, injuries to persons resulting from his activities and/or interference with normal operations of the building that may result from his negligence, actions or otherwise.*

1. These notes shall form part of the Instructions to Tenderers and Conditions of Contract.
2. The Tenderer is required to check the number of pages in this document and should he find any missing, or in duplicate or indistinct he should inform the Mecoy consultant limited at once and have the same rectified.
3. The Tenderer shall not alter or otherwise qualify the text of this specification. Any alteration or qualification made without authority will be ignored and the text of the specification as printed will be adhered to.
4. The Tenderer shall be deemed to have made allowances in his unit prices generally to cover items of preliminaries or additions to Prime cost Sums or other items, if those have not been priced against the respective items.
5. The Tenderer's price shall include all government taxes including duties, V.A.T. etc. No claims whatsoever will be allowed in respect of duties, VAT etc if the tenderer fails to include them in his unit prices. It is also to be noted that VAT will be included in the unit rates and **NOT** worked out as a percentage of the total.
6. In no case will any expenses incurred by the tenderer in preparation of this tender be reimbursed.
7. The copyright of this specification is vested in the Engineers and no part thereof may be reproduced without their express permission, given in writing.
8. The specifications must be priced in Kenya Currency i.e. Shillings and Cents.
9. All the tenderers must make a declaration that they have not and will not make any payment to any person which can be perceived as an inducement to enable them to win this tender.
10. The works shall be carried out in accordance with provisions of the 16th Edition of IEE wiring Regulations, the most current Kenya Standards governing such works, and relevant provisions of the current KPLC by-laws.
11. **The tender is a two tier process comprising of Technical and Financial bidding.** Only Tenderers who qualify in the Technical bid evaluation will proceed to financial evaluation. The Two bids must therefore be enclosed in separate sealed envelopes, and the two sealed envelopes enclosed and sealed in an outer envelope.
12. The bid security **MUST** be submitted with the Technical bid.

Signed (As in Tender) Date/Stamp

FORM OF TENDER SECURITY (BANK)

WHEREAS (Hereinafter called “the Tenderer”) has submitted his tender dated For **THE SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF A BUILDING MANAGEMENT SYSTEM AT THE PROPOSED MULTI-STORIED OFFICE BLOCK FOR THE KENYA NATIONAL ASSEMBLY.**

NOW 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 binds itself, its successors and assigns by these presents sealed with the Common Seal of the said Bank thisDay of20

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 his 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 his 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 minimum of One hundred and fifty (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 (INSURANCE)

WHEREAS (Hereinafter called “the Tenderer”) has submitted his tender dated For **THE SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF A BUILDING MANAGEMENT SYSTEM AT THE PROPOSED MULTI-STORIED OFFICE BLOCK FOR THE KENYA NATIONAL ASSEMBLY.**

NOW ALL PEOPLE by these presents that WE
Having our registered office at
(Hereinafter called “the Insurance”), 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 Insurance Company binds itself, its successors and assigns by these presents sealed with the Common Seal of the said Bank thisDay of20

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 his 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 his 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 minimum of One hundred and fifty (150) days from the date of tender opening, and any demand in respect thereof should reach the Insurance not later than the said date.

.....
(date)

.....
(Signature of the Insurance)

.....
(Witness)

.....
(Seal)

SECTION A:
INSTRUCTIONS TO TENDERERS

CONTENTS

CLAUSE NUMBERS		PAGE
	<u>DESCRIPTION</u>	
	<u>GENERAL</u>	
1.	Definitions	A-1
2.	Eligibility and Qualification Requirements	A-1-A-2
3.	Cost of Tendering	A-3
4.	Site Visit	A-3
 TENDER DOCUMENTS		
5.	Tender Documents	A-3-A-4
6.	Clarification of Tender Documents	A-4
7.	Amendments of Tender Documents	A-4-A-5
 PREPARATION OF TENDER		
8.	Language of Tender	A-5
9.	Documents Comprising the Tender	A-5
10.	Tender Prices	A-5-A-6
11.	Currencies of Tender and Payment	A-7
12.	Tender Validity	A-7
13.	Tender Surety	A-7-A-8
14.	No Alternative Offers	A-8
15.	Pre-Tender Meeting.....	A-9
16.	Format and Signing of Tenders	A-9
 SUBMISSION OF TENDERS		
17.	Sealing and Marking of Tenders	A-9-A-10
18.	Deadline and Submission of Tenders	A-10
19.	Modification and Withdrawal of Tenders	A-10-A-11
 TENDER OPENING AND EVALUATION		
20.	Tender Opening	A-11
21.	Process to be Confidential	A-12
22.	Clarification of Tenders	A-12

	<u>PAGE</u>
23. Determination of Responsiveness	A-12-A-13
24. Correction of Errors	A-13
25. Conversion to Single Currency	A-13
26. Evaluation and Comparison of Tenders	A-13-A-14

AWARD OF CONTRACT

27. Award	A-14
28. Notification of Award	A-15
29. Performance Guarantee	A-15
30. Advance Payment	A-16
Appendix to Instructions to Tenderers	A-17-A-18
Tender evaluation criteria	A-19-A-26

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.

3. 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.

4. Site Visit

4.1 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.

4.2 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 indemnify 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.

4.3 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

5. Tender Documents

5.1 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

5.2 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.

5.3 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".

6. Clarification of Tender Documents

6.1 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.

7. Amendment of Tender Documents

7.1 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.

- 7.2 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.
- 7.3 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.
- 7.4 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

8. 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.

9. 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).

10. Tender Prices

- 10.1 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.

- 10.2 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.

- 10.3 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.
- 10.4 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.
- 10.5 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.

11. 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.

12. Tender Validity

- 12.1 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.
- 12.2 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.

13. Tender Surety

- 13.1 The Tenderer shall furnish as part of his tender, a Tender Surety in the amount stated in the Appendix to Instructions to Tenderers.
- 13.2 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.

- 13.3 Any tender not accompanied by an acceptable Tender Surety will be rejected by the Employer as non-responsive.
- 13.4 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.
- 13.5 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.

14. No Alternative Offers

- 14.1 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.

- 14.2 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.

15. Pre-Tender Meeting

15.1 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.

15.2 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.

16. Format and Signing of Tenders

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

16.2 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.

16.3 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

17. Sealing and Marking of Tenders

17.1 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 annul 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 to tender is “open to all eligible Tenderers as per the tender invitation notice”

2. OMIT

Clauses 5.1 (a), (d), (f), (i), (j), 10.3, 10.4, 11.2, 11.4, 15, 25, 26.6

3. ADD TO CLAUSE 13.1

Amount of tender surety shall be **Kshs. 500,000.00**

4. ADD TO CLAUSE 13.2

The tender surety can also be an insurance bond from an insurance company in the current list of authorised insurance companies’ issued by the Public Procurement Regulatory Authority (PPRA). Tender surety shall be valid for 150 days from the date of tender opening; the tender surety expiry date and the tender opening date all being inclusive.

5. MODIFY CLAUSE 16.1 AND 17.

Only original tender document shall be submitted.

6. MODIFY CLAUSE 17.2

The name and address of the Employer’s representative for the purpose of submission of tenders shall be as per the tender invitation notice.

7. ADD TO CLAUSE 20

The tender opening date and time is as stated in the tender advertisement notice.

8. MODIFY CLAUSE 28.4

Replace “twenty eight (28)” with twenty one (21).

9. MODIFY CLAUSE 29.1

Replace “twenty eight (28) with twenty one. Amount of performance security shall be five per cent (5%).

10. ADD TO CLAUSE 29.2

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

11. 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 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.

12. MODIFY CLAUSE 30

Advance payment shall be granted for imported materials only upon approval by the Employer, and shall be against a bank guarantee from a reputable bank located within the Republic of Kenya.

Section 47 of the Act, 2015 sets a limit of the advance payment at not more than 20% of the price of the tender.

13. ADD TO CLAUSE 26

The evaluation criteria here below (on page A-19 to A-26) shall form part of the evaluation.

14. ADD TO CLAUSE ON DETERMINATION OF CORRECTED TENDER SUM

Section 82 of the Public Procurement and Disposal Regulations, 2015 Act, provides that there should be no correction of errors

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. Recommendation for Award.

STAGE 1: PRELIMINARY EXAMINATION

These conditions may include the following:

- i) Company Certificate of incorporation/registration;
- ii) Over Four Years' experience in works of similar nature;
- iii) Proof of payment for tender document if required;
- iv) 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);
- v) Provision of a tender security that is in the required format, amount and that the tender security is valid for the period required;
- vi) Duly filled Form of Tender;
- vii) Valid Tax Compliance Certificate;
- viii) Duly filled Confidential Business Questionnaire;
- ix) Duly signed Statement of Compliance;
- x) The required number of copies of the Bid have been submitted, and all required documents and information have been submitted as stipulated in the tender, advertisement/Invitation letter;
- xi) Signed Pre-tender site visit form.
- xii) 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). Provide also Form CR12 from the Registrar of Companies.
- xiii) Manufacturer's Authorization Letter for the equipment being offered by the bidder.

Note:

The bid security shall be in accordance with clauses 13 and 23.2 of Instruction to Tenderers which states as follows:

- **Clause 13.1** of Instruction to Tenderers, "the tenderers shall furnish as part of his tenders a tender surety in the amount stated in the tender document in the Appendix to Instructions to Tenderers".
- **Clause 13.2** of Instruction to Tenderers, "the unconditional Tender surety shall be in Kenya shillings and be in form of a certified cheque, bank draft, an irrevocable letter of credit or a guarantee from a reputable Bank/ Insurance approved by PPOA located in the Republic of Kenya. The format of the surety shall be in accordance with the sample form included in the tender documents and the tender surety shall be valid for **150 days** from the date of tender opening".

- **Clause 23.2 of Instruction to Tenderers:** “For the purposes of this clause, a substantially responsive tender is one which conforms to all terms and condition and specifications of the tender document without material deviation or reservation and has a valid Bank/Insurance guarantee”.

The employer/procuring entity may seek further clarification/confirmation if necessary to confirm authenticity/compliance of any condition of the tender. Further, in case of a discrepancy between the amounts stated in the appendix to instruction to tenderers and the one stated in the advertisement or invitation letter, the bid security shall be taken as the amount in the advertisement/letter of invitation.

The tenderers who do not satisfy any of the above requirements shall be considered Non-Responsive and their tenders will not be evaluated further

STAGE 2 TECHNICAL EVALUATION

The tender document shall be examined based on clause 2.2 of the Instruction 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;

- a) *To fill the Standard Forms provided in the bid document for the purposes of providing the required information. The tenderers may also attach the required information if they so desire;*
- b) *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 **using a marker pen**. 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 so as to comply with the bid technical specifications.

The bid will then be analyzed, using the information in the technical brochures, to determine compliance with the technical specifications for the works as indicated in the tender document. The tenderer shall also fill in the Technical Schedule as specified in the tender document for Equipment and Items indicating the Country of Origin, Model/Make/Manufacturer and catalogue numbers of the Items/Equipments they propose to supply.

The award of points considered in this section shall be as shown below

<u>PARAMETER</u>	<u>MAXIMUM POINTS</u>
(i) Compliance with Technical Specifications.....	40
(ii) Tender Questionnaire -----	3

(iii) Key personnel -----	12
(iv) Contract Completed in the last Five (5) years -----	9
(v) Schedules of on-going projects -----	4
(vi) Schedules of contractors equipment -----	12
(vii) Audited Financial Report for the last 3 years -----	6
(viii) Evidence of Financial Resources -----	9
(ix) Name, Address and Telephone of Banks (Contractor to provide).....	3
(x) Litigation History -----	2
TOTAL	<u>100</u>

The pass-mark under the Technical Evaluation is 70 percent.

The detailed scoring plan shall be as shown in table 1 below: -

TABLE 1: Technical Evaluation

Item	Description	Points Scored	Max. Point
1	<p>Compliance with Technical Specifications</p> <ul style="list-style-type: none"> Compliant -----40 Non-compliant-----0 <p><i>(Note: Tender Evaluation Committee to carryout analysis showing how decision on this requirement has been arrived at. Attach analysis on this as an Appendix)</i></p>		40
2	<p>Tender Questionnaire Form</p> <ul style="list-style-type: none"> Completely filled -----5 Not filled -----0 		5
3	<p>Key Personnel (Attach evidence)</p> <p>Director of the firm</p> <ul style="list-style-type: none"> Holder of degree in relevant Engineering field ----- 4 Holder of diploma in relevant Engineering field ----- 3 Holder of certificate in relevant Engineering field-----2 Holder of trade test certificate in relevant Engineering field-----1 No relevant certificate -----0 <p>At least 1No. degree/diploma holder of key personnel in relevant field</p> <ul style="list-style-type: none"> With over 10 years relevant experience ----- 4 With over 5 years relevant experience----- 2 With under 5 years relevant experience ----- 1 <p>At least 1No certificate holder of key personnel in relevant field</p> <ul style="list-style-type: none"> With over 10 years relevant experience----- 2 With over 5 years relevant experience ----- 1 With under 5 years relevant experience -----0.5 <p>At least 2No artisan (trade test certificate in relevant field)</p> <ul style="list-style-type: none"> Artisan with over 10 years relevant experience ----- 2 Artisan with under 10 years relevant experience ----- 1 Non skilled worker with over 10 years relevant experience --- 0 		12
4	<p>Contracts completed in the last five (5) years (Max of 3No. Projects)- Provide Evidence</p> <ul style="list-style-type: none"> Project of similar nature, complexity or magnitude ----- 3 Project of similar nature but of lower value than the one in consideration ----- 2 No completed project of similar nature -----0 		9

5	On-going projects – Provide Evidence <ul style="list-style-type: none"> • Four and above Project of similar nature, complexity and magnitude -----8 • Three and below Project of similar, nature complexity and magnitude -----6 • No project of similar, nature complexity and magnitude - ----4 			8
6	Schedule of contractors equipment and transport (proof or evidence of ownership/Lease) <p>a) Relevant Transport</p> <ul style="list-style-type: none"> • Means of transport (Vehicle) ----- 10 • No means of transport ----- 0 		10	20
	<p>b) Relevant Equipment</p> <ul style="list-style-type: none"> • Has relevant equipment for work being tendered----- 10 • No relevant equipment for work being tendered----- 0 		10	
7	Financial report <p>a) Audited financial report (last three (3) years)</p> <ul style="list-style-type: none"> • Average Annual Turn-over equal to or greater the cost of the project ----- 10 • Average Annual Turn-over above 50% but below 100% of the cost of the project ----- 6 • Average Annual Turn-over below 50% of the cost of the project - ----- 3 			10
	<p>b) Evidence of Financial Resources (cash in hand, lines of credit, over draft facility etc.)</p> <ul style="list-style-type: none"> • Has financial resources to finance the projected monthly cash flow* for three months -----15 • Has financial resources equal to the projected monthly cash flow* -----10 • Has financial resources less than the projected monthly cash flow* -----5 • Has not indicated sources of financial resources ----- 0 			
8	Litigation History <ul style="list-style-type: none"> • Filled ----- 2 • Not filled ----- 0 			2
	TOTAL			100

Any bidder who scores 70% and above shall be considered for further evaluation

Monthly Cash Flow = Tender Sum/Contract Period

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 under-priced 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 - RECOMMENDATION FOR AWARD

The successful bidder shall be the Tenderer with the lowest evaluated tender price

SECTION B:

CONDITIONS OF CONTRACT (MAIN WORKS)

CONDITIONS OF CONTRACT

1.0 Definitions

1.1 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. 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.

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 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.

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 entitled 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 60 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 as 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 of 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:

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

Where:

R = the amount to be reimbursed

A = the amount of the advance which has been granted

X¹ = the amount of proposed cumulative payments as a percentage of the original amount of the Contract. This will exceed 20% but not exceed 80%.

X¹¹ = 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 assumed 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.

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.

- 24.4 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.

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

- 24.6 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.

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 the case may be.

- 25.3 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 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 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.
- 25.4 The price contained in the Contract Bills of Quantities shall be deemed to be based upon the basic prices of materials to be permanently 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.
- 25.5 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.
- 25.6 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.

25.7 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. Liquidate 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. Dayworks

29.1 If applicable, the Dayworks 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 Dayworks 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 Dayworks subject to obtaining signed Dayworks 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.
- 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.
- 30.4 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.

30.5 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.

30.6 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

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.

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.

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.

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 of 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.

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 Contractor; 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

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.

Any breach of this Condition by the Contractor or by anyone employed by him 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:

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

- 37.5.2 Whether or not the issue of an instruction by the Project Manager is empowered by these Conditions.
 - 37.5.3 Whether or not a certificate has been improperly withheld or is not in accordance with these Conditions.
 - 37.5.4 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, Parliamentary Service Commission.**

Address: **P.O. Box 41842, Nairobi**

Name of Employer's Representative: **Clerk of Senate/ Secretary, Parliamentary Service Commission.**

Address: **P.O. Box 41842, Nairobi**

CONDITIONS OF CONTRACT CLAUSE 1

The Project Manager is: **The Works Secretary, Ministry of Transport, Infrastructure, Housing and Urban Development**

Address: **P.O. Box 30743-00100, Nairobi**

The name (and identification number) of the Contract is **THE PROPOSED MULTI STOREY – OFFICE BLOCK FOR THE KENYA NATIONAL ASSEMBLY: WP ITEM No. BD29NB/NB901/JOB No. 7753C**

The Works consist of THE SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF A BUILDING MANAGEMENT SYSTEM.

CONDITIONS OF CONTRACT CLAUSE 1

The start date shall be **agreed with the Project Manager.**

CONDITIONS OF CONTRACT CLAUSE 1

The Intended Completion Date for the whole of the Works shall be **as per the Main Contract.**

CONDITIONS OF CONTRACT CLAUSE 2

The following documents also form part of the Contract:

- 1. Drawings**
- 2. Bills of Quantities**
- 3. Specifications**

CONDITIONS OF CONTRACT CLAUSE 1

The Site is located at **CENTRAL BUSINESS DISTRICT - NAIROBI COUNTY**

The Site Possession Date shall be **as stated in the letter of acceptance.**

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 **6 months from practical completion date.**

CONDITIONS OF CONTRACT CLAUSE 32

Period of final measurement: **6 months after practical completion**

INSTRUCTION TO TENDERERS CLAUSE 20

The tender opening date and time is **as stated in the Tender Invitation Notice.**

INSTRUCTION TO TENDERERS CLAUSE 20

The name and Address of the Employer's representative for the purposes of submission of Tenders is **as stated in the Tender Invitation Notice**

INSTRUCTION TO TENDERERS CLAUSE 13

Amount of Tender Security is **Kshs. 500,000/=.**

INSTRUCTION TO TENDERERS CLAUSE 29

The amount of performance security is **5 percent** bank guarantee of the Contract Price.

CONDITIONS OF CONTRACT CLAUSE 27

Liquidated and Ascertained damages: **as per the main contract.**

CONDITIONS OF CONTRACT CLAUSE 23

Period of honouring certificate : **45 days**

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

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

Period between program updates is **14 days**

The Completion Period for the Works is **42 Months.**

Copies of tender documents: only one copy will be required

MODIFY CLAUSE 23.7

Advance payment shall be granted for imported materials only upon approval by the Employer, and shall be against a bank guarantee from a reputable bank located within the Republic of Kenya.

Section 47 of the Act, 2015 sets a limit of the advance payment at not more than 20% of the price of the tender.

SECTION C:
SUB-CONTRACT AGREEMENT (KABCEC)

CONTENTS

Clause		Page
1.0	- Agreement	1-3
2.0	- General obligations of the Contractor	4
3.0	- General obligations of the Sub-Contractor	4
4.0	- Sub-contract documents	5
5.0	- General liability of the Sub-Contractor	5-6
6.0	- Insurance against injury to persons and property	6-7
7.0	- Performance bond	7
8.0	- Possession of site and commencement of works	7-8
9.0	- Architect's instructions	8
10.0	- Variations	8
11.0	- Liability for own equipment	8
12.0	- Provision of facilities by the Contractor	8-9
13.0	- Liability for own work	9-10
14.0	- Co-operation in use of facilities	10
15.0	- Assignment and subletting	10

16.0	-	Work prior to appointment of Contractor	10-11
17.0	-	Sub-Contractor design	11
18.0	-	Specification of goods, materials and workmanship	11
19.0	-	Compliance with statutory and other regulations	11-12
20.0	-	Royalties and patent rights	12
21.0	-	Antiquities and other objects of value	12
22.0	-	Suspension of works	12
23.0	-	Payments	12-14
24.0	-	Practical completion and defects liability	14-15
25.0	-	Extension of time	15
26.0	-	Loss and expense caused by disturbance of regular progress of the works	16
27.0	-	Damages for delay in completion	16
28.0	-	Fluctuations	16-17
29.0	-	Termination of the main contract	17
30.0	-	Termination of the Sub-contract	17-18
31.0	-	Settlement of disputes	18-20
	-	Sub-Contractor's performance bond	21
	-	Appendix	22

1 ORIGINAL

COUNTERPART

embossed stamp

embossed stamp

1.0 AGREEMENT

1.1 This agreement is made on

between

of (or whose registered office is situated at)

.....

(hereinafter called "the Contractor") of the one part

and

of (or whole registered office is situated at)

.....

(hereinafter called "the Sub-Contractor") of the other part:

1.2 SUPPLEMENTAL to an agreement(hereinafter referred to as the "the main contract")

made on

Between

.....

(hereinafter called "the Employer") of the one part and the Contractor of the other part based on the Agreement and Conditions of Contract for Building Works, published by the Joint Building Council, Kenya .

..... edition.

1.3 WHEREAS the contractor is desirous of sub-letting to the Sub-Contractor

.....

.....

.....

hereinafter called “the sub-contractor works” at.....

on Land Reference No.....being part of the main contract works.

- 1.4 And whereas the Su-Contractor has supplied the Contractor with a priced copy of the bills of quantities (hereinafter referred to as “the sub-contractor bills”), where applicable, which together with the drawings numbered.....
.....
(hereinafter referred to as “the sub-contract drawings), the specifications and the conditions of sub-contract have been signed by or on behalf of the parties thereto.

And whereas the Sub-Contractor has had reasonable opportunity of inspecting the main contract or a copy thereof except the detailed prices of the Contractor included in the bills of quantities or schedule of rates.

- 1.5 And whereas the Architect, with the approval of the Employer, has nominated the Sub-Contractor to carry out the works described at clause 1.3 herein:

NOW IT IS HEREBY AGREED AS FOLLOWS:

- 1.6 For the consideration herein stated, the Sub-Contractor shall upon and subject to the conditions annexed hereto carry out and complete the sub-contract works shown upon the sub-contract drawings and described by or referred to in the sub-contract bills, specifications and in the said conditions.

- 1.7 The Contractor shall pay the Sub-Contractor the sum of the Kshs (in words).....
.....
.....Kshs.....)
(hereinafter referred to as “the sub-contractor price”) or such sum as shall become payable hereinafter at the times and in manner specified in the said conditions.

- 1.8 The term ‘Architect’, ‘Quantity Surveyor’ and ‘Engineer’, where applicable, shall refer to the persons appointed by the Employer to administer the sub-contract in accordance with the main contract agreement. Where applicable reference to the Architect shall be deemed to include reference to the Engineer.

- 1.9 In the event of the need to appoint a replacement Architect, Quantity Surveyor, Engineer or other specialist (whether named in this agreement or not) the Employer shall make such appointment as soon as practicable after the need for such appointment arises and shall communicate the appointment to the Sub-Contract through the Contractor.

1.10 Where the sub-contract does not incorporate bills of quantities, the term “sub-contract bills” and “bills of quantities” wherever appearing shall be deemed deleted and replaced with the term “schedule of rates” as applicable.

1.11 The terms defined in clause 1.0 of the main contract shall have the same meaning in this sub-contract as that assigned to them therein.

1.12 AS WITNESS the hands of the said parties;

Signed by the said

.....(Contractor)

In the presence of

Name

Address

Signed by the said

.....(Sub-Contractor)

In the presence of

Name

Address

CONDITIONS OF SUB-CONTRACT

2.0 GENERAL OBLIGATIONS OF THE CONTRACTOR

- 1.1 The Contractor shall:
- 2.1 Timeously obtain from the Architect on behalf of the Sub-Contractor all drawings, necessary details, instructions and other information required by the Sub-Contractor for the proper carrying out of the sub-contract works.
 - 2.2 Provide all such facilities and attend upon the Sub-Contractor as required and as provided in the specifications, bills of quantities and these conditions to the extent compatible with the provisions of the main contract
 - 2.3 Observe, perform and comply with all the provisions of the main contract and of this sub-contract on the part of the Contractor to be observed, performed and complied with to ensure satisfactory completion of the sub-contract works.

3.0 GENERAL OBLIGATIONS OF THE SUB-CONTRACTOR

- 3.1 The Sub-Contractor shall be deemed to have notice of all the provisions of the main contract except the detailed prices of the Contractor included in the bills of quantities or in the schedule of rates.
- 3.2 The Sub-Contractor shall carry out and complete the sub-contract works in accordance with this sub-contract and in all respects to the reasonable satisfaction of the Contractor and of the Architect and in conformity with all reasonable directions and requirements of the Contractor regulating the due carrying out of the contract works.
- 3.3 The Sub-Contractor shall observe, perform and comply with all the provisions of the main contract on the part of the Sub-Contractor to be observed, performed and complied with so far as they relate and apply to the sub-contract works or any portion thereof and are not inconsistent with the expressions of this sub-contract as if all the same were set out herein.
- 3.4 Without prejudice to the generality of the foregoing requirements, the Sub-Contractor shall especially observe perform and comply with the provisions of clauses 9.0, 18.0, 19.0 22.0, 30.0, 31.0, 34.0 and 36.0 of the main contract as they apply to the sub-contract works

4.0 SUB-CONTRACT DOCUMENTS

- 4.1 The sub-contract documents for use in the carrying out of the sub-contract works shall be:-
 - 4.1.1 The agreement and these conditions
 - 4.1.2 The sub-contract drawings as listed in the agreement
 - 4.1.3 The sub-contract bill of quantities or schedule of rates as applicable
 - 4.1.4 The specifications as separately supplied or as contained in the sub-contract bills.
- 4.2 Upon the execution of the sub-contract, the Contractor shall register the agreement with the relevant statutory authority and pay all fees, charges, taxes, duties and all costs arising therefrom.
- 4.3 The manner of supplying contract documents, their custody, display on site and their interpretation in the event of discrepancies shall be as provided in the main contract in respect of the main contract documents with the necessary amendments made to refer to the sub-contract.

5.0 GENERAL LIABILITY OF THE SUB-CONTRACTOR

- 5.1 The Sub-Contractor shall be liable for and shall indemnify the Contractor against and from:
 - 5.1.1 Any breach, non-observance or non-performance by the Sub-Contractor, his servants or agents of any of the said provisions of the main contract and of this sub-contract.
 - 5.1.2 Any act or omission of the Sub-Contractor, his servants or agents which involve the Contractor in any liability to the Employer under the main contract
 - 5.1.3 Any claim, damage, loss or expense due to or resulting from any negligence or breach of duty on the part of the Sub-Contractor, his servants or agents.
 - 5.1.4 Any loss or damage resulting from any claim under any statute or common law by an employee of the Sub-Contractor in respect of personal injury or death arising out of or in the course of his employment.

- 5.2 Provided that nothing contained in this sub-contract shall impose any liability on the Sub-Contractor in respect of any negligence or breach of duty on the part of the Employer, the Contractor, other sub-contractors or their respective servants or agents nor create any privity of contract between the Sub-Contractor and the Employer or any other sub-contractor.

6.0 INSURANCE AGAINST INJURY TO PERSONS AND PROPERTY

- 6.1 Without prejudice to his liability to indemnify the Contractor under clause 5.0 above, the Sub-Contractor shall maintain:-
- 6.1.1 Such insurances as are necessary to cover the liability of the Sub-Contractor in respect of injury or damage to property including damage to the works arising out of or in the course of or by reason of the carrying out of the sub-contract works except for liability against the contingencies specified at clause 6.3 herein.
- 6.1.2 The insurances required under sub clause 6.1.1 and 6.1.2 above shall be placed with insurers approved by the Contractor and the Architect.
- 6.2 Notwithstanding the provisions of clause 23.0 of these conditions, the Contractor shall not be obliged to make payments to the Sub-Contractor before the said policies have been provided.
- 6.3 Where clause 13.0 of the main contract applies, the sub-contract works, including materials and goods of the sub-Contractor delivered to the works, shall as regards loss or damage by the contingencies stated at clause 13.0 therein, namely, fire, earthquake, fire following earthquake, lightning, explosion, storm, tempest, flood, bursting or overflowing of water tanks, apparatus or pipes, aircraft and other aerial devices or articles dropped therefrom, riot and civil commotion, be at the sole risk of the contractor. The Contractor shall cover his liability for the works by procuring insurances as required in the said clause.
- 6.4 Where clause 14.0 or 15.0 of the main contract applies, the sub-contract works, including materials and goods of the Sub-Contractor delivered to the works shall, as regards loss or damage by the contingencies stated therein be at the sole risk of the Employer. The Employer shall cover his liability for the works by procuring insurances as required in the said clause.

- 6.5** The Sub-Contractor shall observe and comply with the conditions contained in the policy or policies of insurance of the Contractor or of the Employer, as the case may be, as regards loss or damage which may be caused by the stated contingencies. For this purpose, the Contractor or the Employer as the case may be, shall avail the said policies to the Sub-Contractor for his perusal.
- 6.6** If any loss or damage affecting the sub-contract works or any part thereof or any unfixed goods or materials is occasioned by any one or more of the said contingencies, then,
- 6.6.1 The occurrence of such loss or damage shall be disregarded in computing any amounts payable to the Sub-Contractor under the sub-contract, and
- 6.6.2 The Sub-Contractor shall, with due diligence, restore the work damaged, replace or repair any unfixed materials or goods which have been destroyed or damaged, remove and dispose of any debris and proceed with the carrying out and completion of the sub-contract works.
- 6.6.3 The restoration of work damaged the replacement and repair of unfixed materials and goods and the removal of debris shall be deemed to be a variation required by the Architect. Such work shall be paid for in accordance with clause 30.0 of the main contract.

7.0 PERFORMANCE BOND

Before commencing the works, the Sub-Contractor shall provide one surety who must be an established bank or insurance company to the approval of the Contractor and who will be bound to the Contractor in the sum equivalent to seven and a half per cent (7.5%) of the sub-contract price for the due performance of the sub-contract until the certified date of practical completion. Notwithstanding the provisions of clause 23.0 of these conditions, no payments shall be made to the Sub-Contractor before the said bond is provided.

8.0 POSSESSION OF SITE AND COMMENCEMENT OF WORKS

- 8.1** Within the period stated in the appendix to these conditions, the Contractor shall give possession of the site works to the Sub-Contractor and such access as may be necessary to enable the Sub-Contractor to commence and proceed with the sub-contract works in accordance with the sub-contract.
- 8.2** On or before the date for commencement of works stated in the appendix to these conditions, the Sub-Contractor shall commence the carrying out of the sub-contract works and shall proceed regularly and diligently with the same in accordance with the sub-contract programme, the main contract programme and or with the progress of the main contract works and complete on or before the

date stated in the appendix to these conditions as the date for practical completion or within any extended time granted under clause 25.0 of these conditions.

9.0 ARCHITECT'S INSTRUCTIONS

- 9.1 The Sub-Contractor shall forthwith comply with all the instructions issued to him by the Architect, either directly or through the Contractor, in regard to any matter in respect of which the Architect is expressly empowered by the main contract conditions to issue instructions.
- 9.2 The manner of complying with or querying the validity of an Architect's instruction shall be as provided in clause 22.0 of the main contract. The Sub-Contractor shall not be obliged to carry out instructions not issued in the manner provided therein.

10.0 VARIATIONS

- 10.1 The term "variation" shall have the meaning assigned to it at clause 30.0 of the main contract.
- 10.2 The valuation of variations shall be made by the Quantity Surveyor in accordance with sub-clause 30.6 of the main contract.
- 10.3 Effect shall be given to the measurement and valuation of variations in interim certificates and by the adjustment of the sub-contract price.

11.0 LIABILITY FOR OWN EQUIPMENT

The construction equipment and other property belonging to or provided by the Sub-Contractor and brought onto the site for carrying out the works shall be at the sole risk of the Sub-Contractor. Any loss or damage to the same or caused by the same shall, except for any loss or damage due to any negligence, omission or default of the Contractor, be at the sole risk of the Sub-Contractor who shall indemnify the Contractor against loss, damage or claims in respect thereof. Insurance against any such loss, damage or claims shall be the sole responsibility of the Sub-Contractor.

12.0 PROVISION OF FACILITIES BY THE CONTRACTOR

- 12.1 Where provided in the main contract, the Contractor shall supply at his own cost all necessary water, lighting, electric power, telephones and security required for the sub-contract works. Where not so provided, the Sub-Contractor shall provide the said services at his own cost.

- 12.2 Except as otherwise provided in the main contract, the Sub-Contractor shall construct at his own expense all necessary workshops, stores, offices, workers' accommodation and other temporary buildings required for the carrying out of the works at such places on site as the Contractor shall identify. The Contractor undertakes to give the sub-Contractor the required space and all reasonable facilities for such construction. Upon practical completion of the works, the Sub-contractor shall remove the said facilities and reinstate disturbed surface to the satisfaction of the Contractor.
- 12.3 The Contractor shall provide, without charge, general attendance to the Sub-Contractor to facilitate the carrying out of the works which attendance shall include facilities for access to and movement within the site and sections or parts of the building or buildings where the sub-contract works are being carried out, the use of temporary roads, paths and access ways, sanitary and welfare facilities.
- 12.4 The Contractor shall permit the Sub-Contractor to use, without charge, at all reasonable times, any scaffolding and hoisting equipment belonging to or provided by the Contractor while it remains so erected upon the site. The use by the Sub-Contractor of any other equipment, facilities or services provided by the Contractor for the works shall be subject to private arrangements between the parties hereto and shall not be regulated by these conditions.
- 12.5 Provided that such use of the scaffolding and hoisting equipment shall be on the express condition that no warranty or other liability on the part of the Contractor shall be created or implied in regard to fitness, condition or suitability for the intended purpose except that the Sub-Contractor shall be liable for any damage caused thereto or thereby.
- 12.6 Where required, the Contractor shall provide the facilities, equipment and the like and carry out any necessary builder' works within a reasonable time of the request by the Sub-Contractor to enable timely performance of the sub-contract.

13.0 LIABILITY FOR OWN WORK

- 13.1 The Contractor and the Sub-Contractor shall be liable for the due carrying out of their respective works in accordance with their respective contracts without causing damage or injury to the works of the other sub-contractors, and in particular:
- 13.2 Should the carrying out of the sub-contract works cause injury or damage to the main contract works, or to the work of the other sub-contractors, the Sub-contractor shall rectify the damage so caused at his own cost.
- 13.3 Should the carrying out of the main contract works cause damage or injury to the sub-contract works, the Contractor shall rectify the damage at his own cost.

- 13.4 If in the course of carrying out the sub-contract works, the Sub-Contractor is required to carry out work not included in his sub-contract by reason of any materials of workmanship not being in accordance with the main contract or with other sub-contracts, the Contractor shall reimburse the Sub-Contractor the expenses incurred therein.

14.0 CO-OPERATION IN USE OF FACILITIES

- 14.1 The Contractor and the Sub-Contractor undertake to co-operate with each other and co-ordinate work arrangements and procedures required in carrying preventing interference, disruption or disturbance to the progress of the works or to the activities of other sub-contractors.
- 14.2 The Contractor and the Sub-Contractor undertake not to wrongfully use or interfere with equipment, scaffolding, appliances, ways, temporary works, temporary buildings and other property belonging to or provided by the other part or by other sub-contractors.
- 14.3 Provided that nothing contained in this clause shall prejudice or limit the rights of the Contractor or of the sub-Contractor in carrying out their respective statutory and or contractual duties under this sub-contract or under the main contract.

15.0 ASSIGNMENT AND SUBLETTING

- 15.1 Neither the Contractor nor the Sub-Contractor shall, without the written consent of the other and the Employer, assign this sub-contract.
- 15.2 The Sub-Contractor shall not sub-let the whole of the works without the written consent of the Contractor and the Architect.
- 15.3 Provided that any assignment and any sub-contracts as well as this sub-contract shall terminate immediately upon (for whatever reason) of the main contract.

16.0 WORK PRIOR TO APPOINTMENT OF CONTRACTOR

- 16.1 Where the Sub-Contractor is appointed before the Contractor is appointed, any work done by the Sub-Contractor prior to the said appointment shall be treated as a separate contract between the Employer and the Sub-Contractor and shall be valued by the Quantity Surveyor and paid for directly by the Employer without the involvement of the Contractor.

- 16.2 Where the Sub-Contractor is appointed before the Contractor is appointed, the Sub-Contractor shall be permitted, when the identity of the Contractor is known and within 30 days thereof, to raise objections (on reasonable grounds) against entering into a sub-contract with the Contractor
- 16.3 Where work which is outside the sub-contract is ordered directly by Employer or the Architect, that work shall be treated as a separate contract between the Sub-Contractor and the Employer and shall be valued and paid for directly to the Sub-Contractor in accordance with sub-clause 16.1 herein without the involvement of the Contractor. The cost of equipment, facilities and the like provided by the Contractor to the Sub-contractor and any builder's work carried out by the Contractor with regard to such work shall be paid directly by the Sub-Contractor to the Contractor.

17.0 SUB-CONTRACTOR DESIGN

Where the sub-contract includes a design component by the Sub-Contractor, the design shall be to the approval of the Architect and the Employer. Notwithstanding and approvals, the Sub-Contractor shall be liable directly to the Employer for any consequences of failure of the design to comply with the requirements of the Employer or to be fit or suitable for the purposes for which the sub-contract works or the relevant part thereof were intended.

18.0 SPECIFICATION OF GOODS, MATERIALS AND WORKMANSHIP

- 18.1 All materials, goods and workmanship shall, so far as procurable, be of the respective kinds and standards described in the sub-contract bills, specifications and drawings.
- 18.2 The provisions of clause 23.0 of the main contract regulating the procurement, specification and quality assurance of materials, processes and workmanship and the requirements of clause 24.0 therein dealing with the provision of samples and the carrying out of specified tests shall apply to the sub-contract in the same manner as they apply to the main contract.

19.0 COMPLIANCE WITH STATUTORY AND OTHER REGULATIONS

The Sub-Contract shall comply with all statutory and other regulations of competent authorities regulating the carrying out of the works in accordance with the provisions of clause 17.0 of the main contract, as applicable.

20.0 ROYALTIES AND PATENT RIGHTS

20.1 All royalties or other sums payable in respect of the supply and use of any patented articles, processes or inventions in carrying out the works as described by or referred to in the sub-contract bills, specifications or drawings shall be deemed to have been included in the sub-contract price.

20.2 The provision of clause 25.0 of the main contract dealing with the same shall apply to the sub-contract in the same manner as they apply to the main contract.

21.0 ANTIQUITIES AND OTHER OBJECTS OF VALUE

All fossils, antiquities and other objects of interest or value which may be found on the site or in excavating the same during the progress of the sub-contract shall be dealt with in accordance with the provisions of clause 44.0 of the main contract.

22.0 SUSPENSION OF WORKS

22.1 An instruction by the Architect to postpone or suspend the works under clause 28.0 of the main contract shall have the same effect on the sub-contract works as it has on the main contract works.

22.2 If the suspension arises due to default by the contractor and the sub-contract works are adversely effected by the suspension, the sub-contractor shall be entitled to reimbursement by the contractor of all expenses arising therefrom.

22.3 If the suspension arises due to default by the sub-contractor, the sub-contractor shall be liable to the contractor for all expenses arising therefrom.

22.4 A notice by the contractor to suspend the works under clause 29.0 of the main contract shall have the same effect on the sub-contract works as it has on the main contract works.

22.5 Should the sub-contract works be adversely affected by suspension under clause 29.0 of the main contract, the sub-contractor shall be entitled to the remedies provided for at clauses 25.0 and 26.0 of this sub-contract.

23.0 PAYMENTS

23.1 Procedures for originating and processing applications for payments and payment certificates as regards the sub-contract works shall be the same as those prescribed for the Contractor in the main contract at clause 34.0. All references therein to the contractor shall be deemed to include references to the Sub-contractor.

- 23.2 Before submitting an application for payment to the Quantity Surveyor in accordance with clause 34.1 of the main contract, the Contractor shall give the Sub-Contractor a notice of not less than 7 days to submit the details of the amounts which the Sub-Contractor considers himself entitled to for the relevant period. Such details, when received, shall be annexed to the said Contractor's application.
- 23.3 Where it is necessary to measure the sub-contract works for purpose of interim valuation or for the preparation of the final account, the Quantity Surveyor shall give the Sub-Contractor a reasonable opportunity to be present at the time of the measurements and to take notes and measurements as he may require.
- 23.4 Neither the Quantity Surveyor nor the Architect shall be bound to issue a valuation or a payment certificate in respect of the sub-contract works, as the case may be, whose value is less than the amount stated in the appendix to these conditions as the minimum amount of a payment certificate before the issue of the certificate of practical completion of the main contract or of the sub-contract, as applicable.
- 23.5 Provided that where the minimum amount of a certificate inserted in the appendix to these conditions has been achieved but the corresponding minimum inserted in the appendix to the main contract in respect of the Contractor's work has not been achieved, or the Contractor has not applied for payment within the stated period, the Architect may with the consent of the Contractor, issue a payment certificate directly to the Sub-Contractor for payment by the Employer.
- 23.6 Within 7 days of receipt by the Contractor of payment by the Employer, the Contractor shall notify and pay to the Sub-Contractor the total value certified therein in respect of the sub-contract works less the portion of the retention money attributable to the sub-contract works and less amounts previously paid to the Sub-Contractor.
- 23.7 Where certificates are not paid by the Employer within the prescribed period, the Sub-Contractor shall be entitled to be paid by the Contractor, upon receipt of payment from the Employer, the interest certified for the delay in accordance with sub-clause 34.6 of the main contract in respect of the portion of the sub-contract works included in the certificate.
- 23.8 Where the Contractor has received payment from the Employer but has not released the appropriate amount to the Sub-Contractor within the stated period, the Contractor shall pay to the Sub-Contractor in addition to the amount not paid, simple interest on the unpaid amount for the period it remains unpaid at the commercial bank lending rate in force during the period of default.

- 23.9 If, upon application by the Sub-Contractor and Architect agree, or if the Contractor fails to make payment to the Sub-Contractor in accordance with sub-clause 23.6 herein and continues such default for 14 days thereafter, the Architect may issue a payment certificate directly to the Sub-Contractor for payment by the Employer, where applicable, and deduct the amount from subsequent payment to the Contractor.
- 23.10 Upon the issue of the certificate of practical completion and the release of one half of the total amount of the retention of money to the Contractor, the Contractor shall pay the portion attributable to the sub-contract to the Sub-Contractor within 7 days of receipt of the payment.
- 23.11 Upon the issue of the certificate of rectification of defects and receipt of the balance of the retention money by the Contractor, the Contractor shall pay the balance of the portion of the retention money attributable to the sub-contract to the Sub-Contractor within 7 days of receipt of the payment.
- 23.12 The sub-contract final account shall be agreed between the Sub-Contractor, the Contractor, the Quantity Surveyor and the Architect and shall be annexed to the Contractor's final accounts which shall be agreed as provided for in the main contract. For purpose of finalizing the accounts, the Quantity Surveyor may request the Sub-Contractor to submit further documents as he may deem necessary.
- 23.13 The final certificate issued under sub-clause 34.21 of the main contract shall be final and binding on the Sub-Contractor in the same manner it is binding on the Contractor.
- 23.14 If the Architect desires to secure final payment to the Sub-Contractor before final payment is due to the Contractor, the provisions of sub-clause 31.10 of the main contract shall apply.
- 23.15 The Contractor shall be entitled to deduct from or set off against any money due from him to the Sub-Contractor in interim certificates any sum or sums which the Sub-Contractor is liable to pay to the Contractor arising under or in connection with the sub-contract.

24.0 PRACTICAL COMPLETION AND DEFECTS LIABILITY

- 24.1 The Sub-Contractor shall proceed with the works regularly and diligently and complete the same within the period stated in the appendix to this sub-contract or within such extended period as may be granted under clause 25.0 of this sub-contract.

- 24.2 Where the sub-contract works are to be completed in sections or where the sub-contract works are to be completed in advance of the main contract works, the provisions of clause 42.0 of the main contract shall apply, as appropriate, to the sub-contractor in the same manner as they apply to the main contract.
- 24.3 The procedures for certifying practical completion and for dealing with defects in the sub-contract works as well as the main contract works are as prescribed at clause 41.0 of the main contract. Upon the issue of the certificate of practical completion of the whole of the works or of the sub-contract works, as applicable, the Sub-contractor shall be entitled to release of one half of the retention money attributable to the sub-contract works within 7 days after the Contractor has received payment.
- 24.4 The balance of the retention money shall be released to the Sub-Contractor after the defects appearing in the works have been rectified in accordance with sub-clause 41.6 and 41.7 of the main contract and after the Contractor has received the said payment as provided for in sub-clause 34.16.3 of the main contract.

25.0 EXTENSION OF TIME

- 25.1 Upon it becoming reasonably apparent that the progress of the sub-contract works is or will be delayed, the Sub-Contractor shall forthwith give written notice of the cause of the delay to the Contractor and to the Architect with supporting details showing the extent of delay caused or likely to be caused. Thereafter, the Architect shall evaluate the information supplied by the Sub-Contractor and if in his opinion the completion of the works is likely to be or has been delayed beyond the date for practical completion stated in the appendix to these conditions or beyond any extended time previously fixed under this clause, by any of the reasons entitling the Contractor to extension of time under sub-clause 36.1 of the main contract, then the Architect shall, so soon as he is able estimate the length of the delay beyond the date or time aforesaid, recommend to the Contractor a fair and reasonable extension of time to be granted for the completion of the sub-contract works.
- 25.2 Thereupon, the Contractor shall grant in writing to the Sub-Contractor the recommended time. Provided that the Contractor shall not grant any extension of time to the Sub-Contractor without the written recommendation of the Architect. And provided that the Sub-Contractor shall constantly use his best endeavors to prevent delay and shall do all that may be reasonably required to proceed with the works.
- 25.3 The procedures for dealing with requests for extension of time and the observance of time limits prescribed at clause 36.0 of the main contract shall apply to the sub-contract in the same manner as they apply to the main contract.

26.0 LOSS AND EXPENSE CAUSED BY DISTURBANCE OF REGULAR PROGRESS

- 26.1 If upon written application being made by the Sub-Contractor to the Contractor and to the Architect, the Architect is of the opinion that the Sub-Contractor has been involved in direct loss and or expense, for which he would not be reimbursed by a payment made under any other provision in this sub-contract, by reasons of the regular progress of the sub-contract works or any part thereof having been materially affected by any of the reasons which would entitle the Contractor to reimbursement under clause 37.0 of the main contract, the Quantity Surveyor shall assess the amount of such loss and or expense.
- 26.2 Any amount so assessed shall be added to the sub-contract price and if an interim certificate is issued after the date of assessment, any such amount shall be added to the amount which would otherwise be stated as due in such certificate as regards the Sub-Contractor's entitlement.
- 26.3 The procedures for dealing with loss and or expense claims prescribed at clause 37.0 of the main contract shall apply to the sub-contract in the same manner as they apply to the main contract, as appropriate.

27.0 DAMAGES FOR DELAY IN COMPLETION

- 27.1 If the Sub-Contractor fails to complete the sub-contract works by the date for practical completion stated in the appendix to these conditions or within any extended time fixed under clause 25.0 herein, and the Architect certifies in writing that in his opinion the same ought reasonably so to have been completed, then the Sub-Contractor shall pay or allow to the Contractor a sum calculated at the rate stated in the said appendix as liquidated damages for the period during which the works shall so remain or have remained incomplete.
- 27.2 The Contractor may deduct such sum from any money due or to become due to the Sub-Contractor under the sub-contract or recover the same from the Sub-Contractor as a debt. Provided that the Contractor shall not be entitled to recover any liquidated damages from the Sub-Contractor without first obtaining the Architect's certificate of delay prescribed herein.

28.0 FLUCTATIONS

- 28.1 Unless otherwise stated in the sub-contract bills or specifications, the sub-contract price shall be deemed to have been calculated to include all duties and taxes imposed by statutory and other competent authorities in the country where the works are being carried out, and

- 28.2 The sub-contract price shall be deemed to be based on currency exchange rates current at the date of tender as regards materials or goods to be specifically imported for permanent incorporation in the works.
- 28.3 Should duties, taxes and exchange rates vary during the period of the contract, compensation thereof shall be calculated in accordance with sub-clause 35.1 and 35.2 of the main contract.
- 28.4 Compensation for change in prices of goods and materials incorporated in the works and in the rates of wages provided for at sub-clause 35.3,35.4 and 35.5 of the main contract shall not apply to the sub-contract unless specifically provided for in the bill of quantities or specifications.

29.0 TERMINATION OF MAIN CONTRACT

- 29.1 If, for any reason, the contractor's employment is terminated either under clause 38.0, 39.0 or 40.0 of the main contract, this sub-contract shall thereupon also terminate.
- 29.2 Upon termination, the sub-contractor shall cease all work and vacate the site. He shall not remove any equipment or any materials brought onto the site for the carrying out of the works without the written approval of the contractor and the Architect
- 29.3 Where the termination of the main contract occurs without the default of the sub-contractor, the sub-contractor shall be paid by the contractor for work done in the like manner as the Contractor is paid at clause 39.5 of the main contract.
- 29.4 Where the termination of main contract arises from the default by the sub-contractor, the adjustment of the sub-contract accounts shall be performed in the like manner as is provided at sub-clause 38.8 of the main contract regarding the main contract accounts.

30.0 TERMINATION OF SUB-CONTRACT.

- 30.1 Without prejudice to any other rights and remedies which the contractor may possess, if the sub-contractor shall make default in any one or more of the respects which would entitle the employer to terminate the main contract under clause 38.0 therein, the contractor shall give the sub-contractor a notice, with a copy to the Architect and to the employer by registered post of recorded delivery specifying the default. Should the sub-contractor continue the default for 14 days after receipt of such notice or at any time thereafter repeat such default and should the Architect certify that the sub-contractor is in default, the contractor

may terminate the Sub-contract forthwith after the expiry of the notice provided that the notice is not given unreasonably or vexatiously. The termination letter shall be copied to the Architect and to the Employer.

- 30.2 Where the sub-contract is terminated due to the default of the sub-contractor as in sub-clause 30.1 herein, the adjustment of sub-contract accounts shall be performed in the like manner as is provided at sub-clause 38.8 of the main contract regarding the main contract accounts.
- 30.3 Without prejudice to any other rights and remedies which the Sub-Contractor may possess, if the Contractor shall make default in one or more of the respects which, if committed by the Employer, would entitle the contractor to terminate the main contract under clause 39.0 therein, the Sub-Contractor shall give the Contractor a notice, with a copy to the Architect and to the Employer, by registered post or recorded delivery specifying the default. Should the contractor continue the default for 14 days after receipt of such notice or at any time thereafter repeat such default, and should the Architect certify that the contractor is in default, the Sub-Contractor may terminate the sub-contract forthwith after expiry of the notice, provided that the notice is not given unreasonably or vexatiously. The termination letter shall be copied to the Architect and to the Employer.
- 30.4 If the Sub-Contract is terminated due to the default of the Contractor as in sub-clause 30.3 herein, the Contractor shall pay the sub-contractor for work done in the like manner as the Contractor would be paid at sub-clause 39.5 of the main contract where the termination is done by the Contractor.
- 30.5 Where the sub-contract is terminated due to the default of the Contractor, all expenses arising from the termination shall be done wholly by the Contractor and the termination shall not create any liability on the Employer.
- 30.6 Where the sub-contract is terminated due to the default of the Sub-Contractor, the sub-contractor shall be liable to the contractor for all expenses arising therefrom.

31.0 SETTLEMENT OF DISPUTES

- 31.1 In case any dispute or difference shall arise between the Contractor and Sub-Contractor, either during the progress or after the completion or abandonment of the sub-contract 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 30 days of the notice.

- 31.2 The dispute shall be referred to the arbitration and final decision of a person to be agreed by the parties. Failing agreement to concur in the appointment of an Arbitrator, the Arbitrator shall be appointment by the Chairman or Vice Chairman of the Architectural Association of Kenya or the Chairman or Vice Chairman of The Chartered Institute of Arbitrators, Kenya Branch, at the request of the applying party.
- 31.3 The arbitration may be on the construction of this sub-contract or on any matter or thing of whatsoever nature arising thereunder or in connection therewith including the rights and liabilities of the parties during the currency of the sub-contract and subsequent to the termination of the sub-contract.
- 31.4 Where the sub-contractor is aggrieved by the manner in which the Architect has exercised or failed to exercise his powers stipulated in the main contract, or in the sub-contract or by any action or inaction of the Employer, and in particular, if he is aggrieved by:
- 31.4.1 The failure or refusal of the Architect to recommend to the contractor an extension of sub-contract time, or
- 31.4.2 The extend of the recommended time, or
- 31.4.3. The amount certified to the sub-contractor either in an interim in a final certificate, or
- 31.4.4 The issue of an instruction which the sub-contractor contends is not authorised by the main contract or the sub-contract, or
- 31.4.5. Any other matter left to the discretion of the Architect in the main contract or in the sub-contract, then.
- 31.5 Subject to the Sub-Contractor giving the Contractor such indemnity and security as the Contractor may reasonably require, the Contractor shall allow the Sub-Contractor to use the contractor's name and, if necessary, shall join the Sub-Contractor in arbitration proceeding against the employer to decide the matters in dispute or in difference.
- 31.6 Provided that no arbitration proceedings shall be commenced on any dispute or difference where notice of a dispute or difference where notice of a dispute or difference has not been given by the applying party within 90 days of the occurrence or discovery of the matter or issue giving rise to the dispute or difference.
- 31.7 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.

- 31.8 In any event, no arbitration shall commence earlier than 90 days after the service of the notice of a dispute or difference, except as provided for at sub-clause 31.9 herein.
- 31.9 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 sub-contract without having to comply with sub clause 31.8 herein.
- 31.9.1 Whether or not the issue of an instruction by the Architect is authorized by the main contract or these conditions, and
- 31.9.2 Whether or not a payment certificate has been improperly withheld or is not in accordance with the main contract or these conditions or though issued, it has not been honoured.
- 31.10 All other matters in dispute shall only be referred to arbitration after the practical completion or alleged practical completion of the works or abandonment of the works or termination or alleged termination of the sub-contract, unless the Architect the contractor and the sub-contractor agree otherwise in writing.
- 31.11 The Arbitrator shall, without prejudice to the generality of his powers, have power to direct such measurements, computations, tests, or valuations as may in his opinion be desirable in order to determine the rights of the parties and assess and award any sums which ought to have been the subject or included in any payment certificate.
- 31.12 The Arbitrator shall, without prejudice to the generality of his powers, have power to open up, review and revise any certificate, opinion, 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.
- 31.13 Provided that any decision of the Architect which is final and binding on the contractor under the main contract shall be final and binding between the contractor and the sub-contractor.
- 31.14 The award of such Arbitrator shall be final and binding upon the parties.

SUB CONTRACTOR’S PERFORMANCE BOND

BY THIS AGREEMENT we(SURETY)

of

are bound to(CONTRACTOR)

in the sum of Kenya shillings

.....(Kshs.)

to be paid by us to the said(CONTRACTOR)

WHEREAS by an agreement in writing dated

.....(SUB-CONTRACTOR)

entered into a sub-contract with(CONTRACTOR)

to carry out and complete the works therein stated in the manner and by the time therein specified all in accordance with he provisions of the said sub-contract, namely:

(description of works).....

NOW the condition of the above written bond is such that if the said sub-contractor, his executors, administrator, successors or assigns shall duly perform his obligations under the sub-contract, of if on default by the sub-contractor the surety shall satisfy and discharge the damages sustained by the contractor thereby up to the amount of the above written bond, then this obligation shall be void, otherwise it shall remain in full force and effect. Upon default, and without prejudice to his other rights under the sub-contract, the contractor shall be entitled to demand forfeiture of the bond and we undertake to honour the demand in the amount stated above.

PROVIDED always and it is hereby agreed and declared that no alteration in the terms of the said sub-contract or in the extend or nature of the works to be carried out and no extension of time by the contractor under the sub-contract shall in any way release the surety from any liability under the above written bond.

IN WITNESS whereof we have set out hand this..... day of

.....

Surety

Witness

Authorised by Power of Attorney No

APPENDIX

Clause

Name of sub-contractor's insurers	6.0
Name of sub-contractor's surety	7.0
Amount of surety	7.0
Period of possession of site	8.1
Date of commencement of works	8.2
Date for practical completion	8.2
Interval for application of payment certificates	23.1
Minimum amount of payment certificate	23.4
Percentage of certified value retained	23.6
Limit of retention fund, if any	23.6
Name of the sub-contractor's bank for purposes of interest calculation.	23.7,23.8
Defects liability period	23.11
Period of final measurement and valuation	23.12
Damages of delay in completion	27.1 at the rate of Kshs

Signed by the said:

.....

.....

CONTRACTOR

SUB-CONTRACTOR

SECTION D

SUB-CONTRACT PRELIMINARIES

AND

GENERAL CONDITIONS

CONTRACT PRELIMINARIES AND GENERAL CONDITIONS

<u>CLAUSE</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
1.01	Examination of Tender Documents	D-1
1.02	Discrepancies	D-1
1.03	Conditions of Contract Agreement	D-1
1.04	Payments	D-1
1.05	Definition of Terms	D-1
1.06	Site Location	D-2
1.07	Duration of contract	D-3
1.08	Scope of contract Works	D-3
1.09	Extent of the Contractor's Duties	D-3
1.10	Execution of the Works	D-3
1.11	Validity of Tender	D-4
1.12	Firm – Price Contract	D-4
1.13	Variation	D-4
1.14	Prime Cost and Provisional Sums	D-4
1.15	Bond	D-4
1.16	Government Legislation and Regulations	D-4
1.17	Import Duty and Value Added Tax	D-5
1.18	Insurance Company Fees	D-5
1.19	Provision of Services by the Main Contractor	D-5
1.20	Suppliers	D-5
1.21	Samples and Materials Generally	D-6
1.22	Administrative Procedure and Contractual Responsibility	D-6
1.23	Bills of Quantities	D-6
1.24	Contractor's Office in Kenya	D-6
1.25	Builders Work	D-6
1.26	Structural Provision for the Works	D-7
1.27	Position of Services, Plant, Equipment, Fittings and Apparatus	D-7

1.28	Checking of Work	D-7
1.29	Setting to Work and Regulating System	D-7
1.30	Identification of Plant and Components	D-8
1.31	Contract Drawings	D-8
1.32	Working Drawings	D-8
1.33	Record Drawings (As Installed) and Instructions	D-9
1.34	Maintenance Manual	D-10
1.35	Hand – Over	D-11
1.36	Painting	D-11
1.37	Spares	D-11
1.38	Testing and Inspection – Manufactured Plant	D-12
1.39	Testing and Inspection – Installation	D-12
1.40	Labour Camps	D-12
1.41	Storage of Materials	D-12
1.42	Initial Maintenance	D-12
1.43	Maintenance and Servicing after Completion of the Initial Maintenance	D-13
1.44	Trade Names	D-13
1.45	Water and Electricity for the Works	D-13
1.46	Protection	D-13
1.47	Defects After Completion	D-13
1.48	Damages for Delay	D-13
1.49	Clear Away on Completion	D-13
1.50	Final Account	D-14
1.51	Fair Wages	D-14
1.52	Supervision	D-14
1.53	Test Certificates	D-14
1.54	Labour	D-14
1.55	Discounts to the Main Contractor	D-14
1.56	Guarantee	D-15
1.57	Direct Contracts	D-15

1.58	Attendance Upon the Tradesmen	D-15
1.59	Trade Union	D-15
1.60	Local and other Authorities notices and fees	D-15
1.61	Assignment or Subletting	D-15
1.62	Partial Completion	D-16
1.63	Temporary Works	D-16
1.64	Patent Rights	D-16
1.65	Mobilization And Demobilization	D-16
1.66	Extended Preliminaries	D-16
1.67	Supervision by Engineer and Site Meetings	D-17
1.68	Amendment to Scope of Contract Works	D-17
1.69	Contractors Obligation and Employers Obligation	D-17
1.70	Appendix to Sub-Contract preliminaries and General conditions	D-18

SECTION D

SUB-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:

Work detailed in the Specification and in the Contract Drawings.

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

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 Sub-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 Sub-contract with the Main Contractor.

The Conditions of the Contract between the Main Contractor and any Sub-contractor 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 Main 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 Parliamentary Service Commission**
- ii) **Architect:** The term “Architect” shall mean **Mutiso Menezes International**
- iii) **Quantity Surveyor:** The term “Quantity Surveyor” shall mean **Quantech Consultancy.**
- iv) **Civil/Structural Engineers:** The term “Civil/Structural Engineers ” shall mean **Wanjohi Mutonyi Consult.**
- v) **Engineer:** The term “Engineer” shall mean **Mecoy Consultants Ltd.**
- vi) **Main Contractor:** The term “Main Contractor” shall mean the firm or company appointed to carry out the Building Works and shall include his or their heir, executors, assigns, administrators, successors, and duly appointed representatives.

Sub-contractor: The term “Sub-contractor” shall mean the persons or person, firm or Company whose tender for this work has been accepted, and who has entered into a contract agreement with the Contractor for the execution of the Sub-contract Works, and shall include his or their heirs, executors, administrators, assigns, successors and duly appointed representatives.

- viii) **Sub-contract Works:** The term “Sub-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 Sub-contract and whether the same may be on site or not.

Contract Drawings: The term “Contract Drawings” shall mean those drawings required or referred to herein and forming part of the Bills of Quantities.

Working Drawings: The term “Working Drawings” shall mean those drawings required to be prepared by the Sub-contractor as hereinafter described.

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

- xii) **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 or **KS** 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 in Nairobi City. 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 sub-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 Sub-Contract**

The Contractor shall be required to phase his work in accordance with the Main contractor's programme (or its revision).

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 by the Sub-Contractor but to be fixed and commissioned under this contract.

1.09 **Extent of the Sub-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 B.S. and C.P. respectively).
- c) General specifications of materials and works Section D of this document
- d) The Contract Drawings.
- e) The Bye-laws of the Local Authority.
- f) The Architect's and/or Engineer's Instructions.

The Contract Drawings and Specifications are 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 Sub-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 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 Architect requires additional work to be performed, the Sub-contractor, if he considers it necessary, will give notice within seven (7) days to the Main Contractor of the length of time he (the Sub-contractor) requires over and above that allotted for completion of the Contract.

If the Sub-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 Sub-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 Government for an amount equal to 5 % of the Contract amount as Clause 28 of the Conditions of 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 Sub-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 Main Contractor**

In accordance with Clause 1.08 of this Specification the Contractor shall make the following facilities available to the Sub-contractor:

- a) Attendance on the Sub-Contractor 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, etc., except that all plugging for fixing, fittings, machinery, fan ducting, etc., and all drilling and tapping of steel work shall be the responsibility of the Sub-contractor. Any purpose made fixing brackets shall not constitute Builder's Work and shall be provided and installed by the Sub-contractor unless stated hereinafter otherwise.
- b) The provision of temporary water, lighting and power: the Contractor pay for all these services utilized.
- c) Fixing of anchorage and pipe supports in the shuttering, shall be supplied by the Contractor who shall also supply the Project Manager with fully dimensioned drawings detailing the exact locations.
- d)
 - i) Provision of scaffolding, cranes, etc. It shall be the Contractor's responsibility to liaise with the Project Manager to ensure that there is maximum co-operation with other nominated Sub-contractors in the use of scaffolding, cranes, etc.
 - ii) Any specialist scaffolding, cranes, etc. by the Contractor for his own exclusive use shall be paid for by the Sub-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**

Wherever within the Specification it is mentioned or implied that the Contractor shall deal direct with the Employer or Engineer, it shall mean "through the Project Manager who is responsible to the Employer for the whole of the works including the Sub-contract Works.

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 Engineer 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 Engineer Manager and such supporting technical and clerical staff as necessary to control and coordinate the execution and completion of the Contract Works.

The Engineer Manager and his staff shall be empowered by the Contractor to represent him at meetings and in discussions with the Project Manager, 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, licences, 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 Sub-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 mark out in advance and shall 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.

Any purpose made fixing brackets shall be provided and installed by the Contractor.

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 works.

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 through 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 Sub-contractor's responsibility.

The Sub-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 Sub-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 Sub-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 Sub-contractors whose installations and works might be affected, then he shall be liable to pay for any alterations or modification to his own, or other Sub-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:

Any drawings required by the 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.

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.

Schematic Layout Drawings of services and of control equipment.

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

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

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 Project Manager by the Sub-contractor for information and distribution to other Sub-contractors carrying out work associated with or in close proximity to or which might be affected by the Sub-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 Sub-contract nor relieve him from correcting any errors found subsequently in the Approved Working Drawings or other Working Drawings and in the Sub-contract Works on site or elsewhere associated therewith.

The Contractor shall ensure that the Working Drawings are submitted to the Engineer 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 Engineer.

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: Working Drawings amended as necessary but titled "Record Drawings" and certified as a true record of the "As Installed" Sub-contract Works. Subject to the approval of the Engineer such Working Drawings as may be inappropriate may be omitted. Fully dimensioned drawings of all plant and apparatus.

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.

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

Relay adjustment charts and manuals.

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

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

Grading Charts.

Wiring and piping diagrams of plant and apparatus.

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.

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:-

The Marked-up Drawings during the execution of the Contract Works or

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:

System Description.

Plant

Valve Operation

Switch Operation

Procedure of Fault Finding

Emergency Procedures

Lubrication Requirements

Maintenance and Servicing Periods and Procedures

Colour Coding Legend for all Services

Schematic and Writing Diagrams of Plant and Apparatus

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

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.

The procedure to be followed will be as follows:

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.

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

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.

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 Sub-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**
The Contractor shall provide storerooms and workshop where required. He shall also provide space for storage to nominated sub-contractors who shall be responsible for these lock-up shades or stores provided.
- Nominated Sub-contractors are to be made liable for the cost of any storage accommodation provided specially for their use. No materials shall be stored or stacked on suspended slabs without the prior approval of the 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 especially for his 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 6 months from the date of practical completion of the Works in the Contract and 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 unauthorized 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 - Summarizing 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 fulfill the following conditions:

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.

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 sub-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 sub-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 Main Contractor**

No discount to any Sub-Contractor will be included in the tender for this installation.

1.56 **Guarantee**

The whole of the work will be guaranteed for a period of six months from the date of the Engineer's certification of completion and under such guarantee the Sub-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 temporary 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 contract

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 total Contractor works. 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 sub-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 and 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 sub-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 1.70)

1.69 Contractor Obligation and Employers Obligation

The sub-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 sub-contractor, or for loss of profit (expectation loss) in case of premature termination, reduction or increase of works as the sub-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 SUB-CONTRACT PRELIMINARIES AND GENERAL CONDITIONS

1 ADD TO CLAUSE 1.40

There are no labour camps.

2 ADD TO CLAUSE 1.17

Prices quoted shall include 16% VAT. In accordance with Government policy, the 16% VAT and 3% Withholding Tax shall be deducted from all payments made to the sub-contractor, and the same shall subsequently be forwarded to the Kenya Revenue Authority (KRA).

3. ADD TO CLAUSE 1.66

The amount or percentage that may be inserted in the bills of quantities for this item should not exceed the anticipated Liquidated damages amount for the same period.

4. OMIT CLAUSE 1.12

SECTION E

GENERAL SPECIFICATIONS OF MATERIALS AND WORKS

GENERAL SPECIFICATIONS OF MATERIALS AND WORKS

- 1.1 General
- 1.2 Standard of Materials
- 1.3 Workmanship
- 1.4 Procurement of Materials
- 1.5 Shop Drawings
- 1.6 Record Drawings
- 1.7 Regulations and Standards
- 1.8 Setting out Works
- 1.9 Factory Inspection
- 1.10 Testing on Site

1.1 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.

1.2 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 Sub-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.

1.3 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.

1.4 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.

1.5 SHOP DRAWINGS

Before manufacture or fabrication or supply/delivery of any equipment to site is commenced, the contractor shall submit two copies of detailed drawings (if required in this contract) and coloured brochures of all materials /equipments / components showing all pertinent information including sizes, capacities, construction details, technical specifications and literature etc, as may be required to determine the suitability of the equipment for the approval of the Engineer. Approval of the foregoing shall not relieve the contractor of the full responsibility of errors or the necessity of checking all the details himself or of furnishing the materials and equipment and performing the work required by the plans or specifications.

1.6 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.

1.7 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 (IEE) Wiring Regulations, Current recommendation of CCITT and CCIR, and with the Regulations of the Local Electricity Authority and the Communications Authority of Kenya (CAK)

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

1.8 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.

1.9 FACTORY INSPECTION

The employer shall be entitled to have the quantity and quality of the imported equipment/materials inspected by two number (2 No.) engineers appointed by the Project Manager, and one (1 No.) representative for the employer.

The said inspection shall be carried out at the factory of manufacture of the equipment/materials during normal working hours

The Engineer shall be given adequate notice in writing of the date and time that the equipment/materials are ready for inspection and given all reasonable facilities for his own tests during the course of the inspection.

Travel (including ground, air travel and airport passage taxes) and full board accommodation expenses in at least a three (3) star hotel incurred by the engineers appointed by the Project Manager, and the employer's representative shall be borne by the contractor. The sub-contractor shall also meet out of pocket expenses for the officers at Government of Kenya rates for the duration of the factory inspection. The costs incurred shall be re-imbursed to the sub-contractor from the provisional sum allowed in page (K/12) of the Bills of Quantities.

The inspection period shall be five (5) working days excluding travelling time.

If as a result of the inspection any of the equipment/materials are found to be defective, the Sub-contractor shall replace the defective materials and determine a new date as when a new inspection shall be performed at the expense of the Sub-contractor.

The Sub-contractor shall only ship the equipment/materials after the said factory inspection.

1.10 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 Authority of Kenya (CAK) 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 F

**PARTICULAR AND TECHNICAL SPECIFICATIONS OF BUILDING
MANAGEMENT SYSTEM**

PARTICULAR AND TECHNICAL SPECIFICATIONS OF BUILDING MANAGEMENT SYSTEM

1. Particular Specification

1.1 General

The increasing complexity of technical building equipment demands a management system with superior performance, optimally combining the different technologies into a global security solution. This will protect persons and assets, while effectively utilizing manpower.

The management system must guarantee the strict regulation of security technologies, the highest level of reliability, and integrate new infrastructures such as the Internet.

Operators of buildings and facilities increasingly demand complete system solutions. A high capacity of integration and continuity of the system is a basic requirement for a management system.

Therefore the Building Management System shall provide bi-directional communication with monitoring and control of the following systems:

- Fire Detection Systems
- Intrusion Detection Systems
- Video Systems, such as DVR/NVR, matrix switches, encoders, decoders, storage devices, VCA and IP cameras
- Online and offline access control systems, visitor management systems, guard tour systems
- Public Address and Voice Alarm systems (PA/VA) for evacuation and audio information
- Perimeter fence control
- Emergency exit/escape route management
- People and asset tracking systems
- Intercom systems
- Building automation systems, such as DDC, heating/ventilation/air-conditioning (HVAC), elevators, escalators, light and energy management
- IP network and device surveillance (e.g. switches, routers)
- Mobile devices for security guards

1.1.1. Definition of Terms

ACS	Access Control System
BAS	Building Automation System
BMS	Building Management System
CCTV	Closed Circuit Television
DDC	Direct Digital Control (devices often used with BAS)
FAS	Fire Alarm System
HVAC	Heating, Ventilation, Air-Conditioning
IDS	Intrusion Detection System
LAN	Local Area Network
OLE	Object Linking and Embedding
OPC	OLE for Process Control
PA	Public Address
SMS	Security Management System
T&A	Time & Attendance
VA	Voice Alarm
VLAN	Virtual Local Network Area
WAN	Wide Area Network
WLAN	Wireless Local Area Network
...	

1.1.2. System Design and Functionality

The Building Management System (BMS) must be an open-architecture, PC-based system installed under Windows operating systems. It shall provide convenient control and information for security systems such as fire panels, intrusion detection systems, IP and analogue video systems and DVRs, access control systems, or public address / voice alarm systems, as well as for building automation systems such as lighting or blind control or HVAC.

The BMS shall run using the latest standard Microsoft SQL Server database for configuration and central event logging. It must be modularly designed, providing an individual system for specific requirements.

The system requires only a software license key on the central login server for system operation even for redundant server systems. No hardware dongle is needed. The feature licensing is done via an activation key created on a secure licensing server. The system's functionality can be extended by entering a new activation key. Hardware or software keys are not required at the client workstations.

1.1.3. Open Architecture

The BMS will have an open architecture design. It must support industry standards for databases, networks, drawings, video cameras, and more, such as OPC, AutoCAD, HTML, ASPX, JScript and SQL. No customized or proprietary PC software or hardware will be required to operate the system.

1.1.4. Server Structure and Workstations

Depending on the configuration or occurring load, the management system runs on one or more servers operating as one system. One or several of these servers are the central login servers for the operating level. The central login servers and optional connection servers run under one of the following operating systems:

- Windows Server 2008 R2 or Windows Server 2012 R2
- Windows 7 or Windows 8.1

The system operation uses networked workstations running under the following operating systems:

- Windows 7 or Windows 8.1 (32 or 64 bit)

The BMS must provide a web server-based solution. Only Internet Explorer is required for a workstation to access the BMS login server.

The BMS server, the optional connection servers, and the workstations all connect using a standard IP network. It is also possible for wireless connection of mobile workstations (for example mobile phones or tablet PCs).

Workstations can connect using Intranet or Internet networks. Location maps and video images are delivered and adapted to the transmission conditions.

Communication between the central BMS server and the workstations must be encrypted with 128-bit data encryption or better. The system displays the operating status of all servers and workstations/operators.

The BMS can access a remote database server by browsing remote SQL server instances or by manually entering the server name and database instance.

1.1.5. Subsystem Connections and Standard Interfacing

All subsystems, such as fire or intrusion panels, evacuation systems, or video devices are connected using the OPC interface standard. The BMS monitors these interfaces. The monitoring signals malfunctions and operational availability of the connection to each subsystem in the BMS user interface.

The OPC server supports the import of existing subsystem configurations for direct use inside the BMS configuration, avoiding double input of similar data.

It is possible to use OPC servers (software drivers) running on any PC inside the corporate network.

The BMS provides flexible expansion options for the hardware (interfaces, connection server). The connection of subsystems is possible on any connection server in the network. Redundant connections are available when supported by subsystems.

1.1.6. Workstations and User Interfaces

Client workstations are connected by standard IP network. Any computer in the corporate network is usable as a workstation. Mobile computers (notebooks) can access the system by wireless network connection (WLAN).

The system is expandable to support an unlimited number of integrated client workstations where at least 40 clients can operate concurrently per logon server.

The BMS user interface is browser based and provides a flexible and simple way (standard HTML/CSS format and JScript) to adapt to specific requirements, such as different operator groups. The adaptation must be possible with standard HTML editors such as Microsoft Share Point Designer.

The BMS supports up to four monitors per client workstation by using a corresponding graphics card. The user interface is easily adaptable to the number of monitors using standard HTML editors.

The BMS automatically adapts the screen resolution and number of client workstation monitors from where the operator logs in. It automatically provides the user interface and screen resolution assigned to that operator.

1.1.7. System Modularity

The BMS should have a modular structure that provides specific project solutions. The system can be extended at anytime. Common extensions are the number of operators, monitored detector points or camera channels.

Each module itself is also modular and extendable. The modules and their extensions, as well as all the common system features, must allow any combination, such as access control management with video or intrusion alarm management with video.

1.2 System Overview

The system can perform a wide variety of security management and administrative functions as part of a total integrated package. These functions include the following:

- Central alarm management and monitoring
- Distributed alarm management and monitoring
- Intrusion detection and security management
- Fire detection system and life safety management
- Video management and monitoring
- Access control management
- Public Address and Voice Alarm
- 3rd party system support, such as automation systems

1.2.1 Central Alarm Management and Monitoring

To support central or distributed alarm management and monitoring, the BMS must provide a wide range of display and control features. The user interface shall provide the same look and feel regardless of which alarm comes in.

Central Alarm Queue

The central alarm management and monitoring provides an alarm/event queue where all incoming events display on up to 3 different inboxes. At a minimum, the queue must provide the following information:

- Alarm date/time
- Alarm state
- Current alarm state
- Alarm location
- Operator who is working on the alarm/event when it was acknowledged

Up to 3 inboxes with different priorities can be configured. Each message will be automatically displayed in one of the 3 inboxes according to its priority. Messages can be manually moved from one inbox to another one.

Only authorized operators see the alarm. The display is controlled by the alarm/event priority. The alarm queue provides the acknowledging, deleting, and forwarding of entries. The system must handle up to 5000 alarms/events simultaneously for a short period.

A minimum of 500 events per second must be handled even on a long term.

Graphical Location Maps

The BMS must support the display of location maps in AutoCAD DWF format and other bitmap and vector graphics format. Drawings from AutoCAD versions up to 2015 must be supported.

The drawing format for the location maps must support a logical partitioning by defining sub-areas inside the drawing, by marking the area and giving a logical name.

The time-consuming conversion into a bitmap format and the splitting into sections should be avoided. In the case of structural changes inside the drawing (new walls, doors, and so on), no changes inside the BMS are necessary.

The BMS must provide a location tree to allow easy selection of locations and sub-locations, such as single floors or rooms. The location tree shall have no limits in the number of levels or sub-levels. Creating the location tree and the location names automatically by scanning the drawings for logical sub-areas shall be possible. A single click on the location/sub-location shall show the assigned graphics or sub-areas with all detector icons visible for that area.

The BMS must provide a zoom and pan feature for zooming into a location and move around inside the drawing, simply by using a standard mouse with click and draw operation. This allows operators to find a specific detector, door, or reader for fast control, such as open door manually, switch on/off lights, show camera live image, and so on.

The BMS must support multi-layered drawings and allow layers to be shown or hidden depending on the incoming event. For example, this allows the display of escape routes and fire extinguisher locations when there is a fire alarm. A manual layer control during normal operation must also be possible.

The BMS must provide an extensible library of standard icons for fire and intrusion detectors, doors, readers, cameras, PA amplifiers, loudspeakers, in 2D and 3D. You can place these icons directly onto the drawing. All assigned control commands are provided when clicking the icon.

When a detector point sends an alarm/event message, the assigned icon animates inside the drawing, displaying the corresponding event colour. The location and the relative size of an icon are definable inside the drawing and should be done by the architect or planner.

The BMS must provide a means of displaying icons corresponding to the current detector status, e.g.

- door open - closed – blocked - ...
- barrier: open - closed – blocked - ...
- camera: motion alarm – recording - ...

All icons are provided in a vector format, so that when the operator zooms in and out, the size scales automatically to the view.

Moving the mouse cursor over a detector icon provides a tool tip with detailed detector information, such as complete address, actual status, and detector type.

Alarm Documents/Plans

The BMS must support the display of individual alarm documents/plans depending on the alarm type. Individual documents display for:

- intrusion detection alarms
- fire alarms
- access control alarms
- video alarms
- maintenance and service alarms, such as pollution
- 3rd party events

The documents shall provide at least the following information:

- Alarm/event date and time
- Alarm/event state
- Alarm/event location
- Detector type and detailed address
- Detailed step-by-step instructions (Standard Operating Procedures)

To minimize the number of documents, they must support macros which are dynamically substituted by the real alarm/event data when displayed.

The documents must support the integration of bitmaps, live video, form elements (checkboxes, tables, and so on) as used in Microsoft Office to create specific forms, customizable control buttons to control subsystems directly, and any combination of these items.

The documents must be assignable to locations inside the location tree to display information when an alarm/event comes from a specific location.

The BMS must store an unchangeable snapshot of the alarm documents in the event log during alarm/event operation, providing seamless event reporting. The document's format is based on open standards, allowing you to configure them using standard editors.

Device condition counter

The BMS must provide a means of basic status overview on all relevant system functions and subsystem devices. This display shall be freely customizable and placeable individually inside the BMS user interface. Possible content shall be

- Number of operators logged in
- Number of doors open
- Number of barriers open
- Number of windows open (magnetic contacts)
- Number of detectors in malfunction/technical alarm
- Number of fire detectors in fire alarm
- Number of fire detectors blocked
- Number of detectors in maintenance mode
- ...

The content of that status overview or parts of it should be shown only to authorized operators.

A double-click on one of the entries shall provide a filtered list with all the individual detectors and devices corresponding to that status.

Schedules and Timers

The BMS must provide timer and schedule functions to support:

- time based display of information
- time based automatic controls into any subsystem
- time based access

The timer supports minimum 4 time frames per weekday, public holidays, and individual special days.

Operator Alarm

The BMS must support a manual alarm trigger by an operator to allow alarm operating caused, for example, by a bomb threat phone call.

The operator clicks on the relevant location inside the location tree and enters the specific alarm code. The alarm operating behind that trigger is identical to alarms/events from detectors, which means all assigned documents and drawings are displayed accordingly.

Message Processing and Escalation

The BMS analyzes all incoming events and messages. It provides a wide range of standard alarm/event states. There should be no limitation in creating additional customer specific states. For each event state, the following parameters are definable:

- State name
- Background/foreground color
- Alarm sound
- Priority

For alarm sounds, standard formats such as WAV, MP3 or WMA are supported. The priority directly controls the order how events are displayed. For example, if an operator is working on a malfunction event, and an intrusion alarm with higher priority comes in, this event is automatically placed in the foreground. The previous event is maintained in the background. The operator can toggle between all events he has acknowledged on his workstation. Assigned location maps and documentation toggle automatically as well.

The defined colors are used when animating a detector icon which has sent an event.

The BMS must support the definition of escalation scenarios if an operator does not react within a defined period of time. The BMS forwards the alarm/message automatically to the next defined and authorized operator group when the time period is exceeded. There is no limitation to the escalation levels. If no operator group acknowledges the alarm, the BMS supports a separate and automatic way of alarm notification as a final step.

The BMS provides a workflow feature to the operator that allows the forwarding of events to other operator groups which are also authorized to respond to such events.

Multi-client Capability and Partitioning

The BMS supports a multi-client capability that separates message distribution to dedicated operator or operator groups which are permitted to operate on those events. This shall allow at least:

- individual display of locations/location maps
- individual access to subsystems
- individual control into subsystems
- individual assignment of access hardware to tenants

Device Overview

The BMS must provide a real-time device overview of the entire system's status. All connected subsystems are shown on a status tree, such as intrusion detection system (IDS), fire alarm system, video systems, access control hardware, and individual detectors, as well as internal items, such as server or operator status. A direct control into subsystems is possible by clicking on panel/detector address.

The device overview supports state filtering/sorting to search for specific states, such as all detectors in malfunction or all doors in an open state.

The states inside the device overview are shown using the same colours as on the detector icon. This option can be blocked to certain operators.

1.2.2 Intrusion Detection and Security Management

The BMS shall provide the advanced and seamless connection, monitoring and control of OPC-compliant intrusion detection systems (IDS) and similar security systems, such as hold-up systems or perimeter fence control. It should support the standard detector types typically connected to those systems, such as:

- motion detectors
- glass break sensors
- seismic detectors
- hold up buttons
- magnetic contacts
- Light barriers
- RF barriers
- Electronic Radio Seals
- Input contacts (2- and 4-state mode)
- relay outputs
- and so on

The BMS must provide the real-time overview on actual status of all connected detectors as well as the typical controls, such as reset, block, or activate single detector points. The BMS shows all possible states coming from a single detector, such as:

- alarm states, like intrusion or motion alarm
- malfunction states, like pollution or offline
- standby mode

The states are shown with corresponding event color/text and detailed detector group/address. If the detector is assigned to an individual location inside the location tree, the full location path is shown too, immediately identifying where the alarm is coming from.

The BMS must provide a library of detector icons, directly to be used in location maps, that support direct controlling of the detector by clicking an icon. The BMS configuration tool provides a simple way of assigning a detector type/icon to the detector addresses inside the subsystems by drag and drop or by auto assignment.

Arming and Disarming Zones/Areas

The BMS must allow authorized operators to arm or disarm existing areas/zones defined inside the IDS. The actual status of the areas/zones are shown real-time in the device overview.

Alarm Monitoring, Display, and Event Log

Any alarm/event coming from an IDS detector, the IDS itself, or from a similar system must be displayed real-time to all authorized operators on their dedicated workstations with all corresponding location maps, animated icons, and assigned alarm documents. At the same time alarms/events are stored in the BMS event log. All operator actions on such an event are also stored in the event log for seamless reporting.

Seamless Integration with Video Management

The BMS must be able to link directly to connected video systems. It displays live video from one or more dedicated cameras in the same user interface corresponding to the intrusion alarm/event highlighting the relation of the alarm with the alarm related video. The BMS also allows the automatic trigger of alarm archives in corresponding OPC compliant DVR systems. Links to such alarm archives are stored in the BMS event log, and allow direct access to the archive in later reporting.

Fire System and Life Safety Management

The BMS provides an advanced and seamless connection, monitoring and control of OPC compliant fire alarm systems. It supports the standard detector types typically connected to those systems, such as:

- smoke detectors
- flame detectors
- heat detectors
- fire push buttons, manual call points
- and so on

The BMS must provide a real-time overview of the actual status of all connected detectors, as well as typical control functions, such as reset, block, or activate single detector points, or switch them into maintenance mode. The BMS displays all possible states coming from a single detector, such as:

- alarm states, like pre-alarm or fire alarm
- malfunction states, like pollution or offline
- standby mode

The BMS displays all states using corresponding event color/text and detailed detector group/address. If the detector is assigned to an individual location inside the location tree, the full location path is displayed, providing immediate information about where the alarm is coming from.

The BMS must provide a library of detector icons, to be used directly in location maps, and which support direct controlling of individual detectors by clicking the icon. The BMS configuration tool provides a simple way of assigning a detector type/icon to the detector addresses inside the subsystems by drag and drop or auto assignment.

Fire Detector Maintenance Mode and Blocking

The BMS must allow to switch individual detectors or detector groups into maintenance mode, for operational testing on the fire system and the connected detectors. Activating a fire detector by using test gas or heat causes a maintenance alarm inside the BMS, and is handled according to the configuration.

The BMS must allow to deactivate/block individual fire detectors. This helps prevent false alarms if, for example, welding is taking place in the vicinity of a detector or detector group.

The actual status of the fire system, down to the individual detectors, must be visualized real-time in the device overview.

Alarm Monitoring, Display, and Event Log

Any alarm/event coming from a fire detector or the fire panel itself must be displayed real-time to all authorized operators, on their dedicated workstations, with all corresponding location maps, animated icons, and assigned alarm documents. At the same time, the BMS must store the alarms/events in the event log. All operator actions on an event must also be stored to the event log for seamless reporting.

Seamless Integration with Access Control Management

The BMS must allow to link directly to a connected access control hardware or an emergency door management system to open all doors along a dedicated escape route automatically.

Seamless Integration with PA or Evacuation Management

The BMS must allow to trigger automatically announcements in a public address/evacuation system. With the BMS timer functions, progressive evacuation scenarios must be definable. This allows, for example, the triggering of the same announcement with a defined delay for different floors.

Seamless Integration with Video Management

The BMS must allow to link directly to connected video systems. It can display live video from one or more dedicated cameras, in the same user interface for the surveillance of an escape route for example. At the same time, the BMS allows the automatic trigger of alarm archives in corresponding OPC compliant DVR systems. Links to such alarm archives must be stored in the BMS event log, and allow direct access to the archive when generating reports.

1.2.3 Video Management

The BMS must provide a fully integrated video management module for interaction with the following video systems:

- DVR and NVR systems
- IP video web server
- analogue matrix switches
- video encoder/decoder
- IP-based matrix switches based on encoders/decoders
- Network storage devices
- IP cameras

Any combination of the above systems must be possible to be able to mix existing video equipment with new devices.

The video management module must at least allow the display of live and archive images from these sources. The video streaming shall be IP based to allow flexible visualization on client workstations. Analogue video sources must be converted by an IP-based video web server or encoder.

Interfacing of Video Subsystems

Beside pure video streaming the BMS must provide a fully bi-directional interface to the video subsystems for monitoring and control. The BMS must provide the following features and commands:

- Show live image
- Show archive images
- Search/filter archives
- Status monitoring of digital inputs
- Control of digital relay outputs
- Switch camera to monitor (analogue and IP based-matrix switches)
- Auto dome controls
- Activating/deactivating video motion detection

The interfacing should be OPC compliant to provide direct import of existing video subsystem configuration, including all connected cameras and the camera type, inputs, outputs, available event states, and control commands. A second configuration of these devices inside the BMS should be minimized or avoided.

Video Display Features

The BMS video management module must provide additional display features for the visualization of live video or archive images inside the BMS user interface. The following visualizations must be possible:

- A matrix view with up to 16 camera sources per screen for manual camera selections
- An alarm matrix with up to 16 (4x4) camera sources for displaying alarm/event based live images
- Alarm documents with pre-defined video sources per alarm/event

The matrix view must provide a dynamic layout depending on the number of cameras selected simultaneously as well as a fixed layout where the operator can choose from 3:4 and 16:9 formats like 2x2, 3x3, 4x4 and asymmetric 1+5 and 1+7. When fixed layout is selected the operator must have the opportunity to display cameras in preferred fields/cameos, e.g. main entrance always in the middle.

The BMS must provide the possibility to simultaneously display different video sources/codecs. It must support at least the following video codecs:

- JPEG
- MPEG2
- MPEG4
- Wavelet
- H.264

The BMS must support an easy way for extending the system with other codecs.

Maximize and Zoom Feature

The video management module must allow operators to maximize single camera images, providing a better overview when something interesting happens inside the view. Additionally, a digital zoom feature must be provided for non-PTZ cameras.

Camera Selection

Cameras are selectable for visualization by clicking on a camera icon inside a location map, by click an address entry inside the BMS device overview, or automatically by defined alarm/event triggers. If chosen manually, the operator must have the possibility to select a live image or, if available, archive images from that camera. The mixed selection of live and archive images, and the simultaneous display in the same matrix view must be possible, to allow seamless reporting/replay of alarms/events, such as intrusion.

Playback of DVR Archives

An operator must be able to play DVR archives in the same way as selecting a live image display. The BMS video management module must allow the selection of an instant replay when clicking on a camera icon or device overview entry. A search, filtering by date and time, must be provided. This feature must be uniform for different DVR types in a mixed installation.

Camera and Matrix Favorites

The video management module must provide the storage of camera selections as favourites from the operator's workstation. This should allow operators a fast and easy toggle between different camera selections, such as a day view and a night view, by simply selecting from the favourites list.

Auto Dome Control

Auto dome cameras that are detected during import of the video subsystem must be controllable using an onscreen keypad or, if supported by the subsystem, as an in-window PTZ control by using the mouse. The feature must be uniform for different auto dome types or video subsystems.

Analog Matrix Switch Control

The video management module must provide the control of analog matrix switches, including:

- switch camera to monitor control
- auto dome control
- monitoring alarm inputs

IP-Based Video Encoders/Decoders and Network Matrix

The video management module must provide the control of IP-based digital video encoders and decoders, allowing the setup of a network matrix switch distributed over the entire building or enterprise.

Video Content Analytics

The BMS must provide direct use of intelligent video analytics and alarming inside the central alarm management when supported by a camera or IP video device. It must be possible to trigger action on different recognized video scenarios, e.g. Idle Object, Crossing Line, Entering Field, Leaving Field, Crowd Detection and other

Video Motion Detection

The BMS must provide direct use of video motion detecting and alarming inside the central alarm management when supported by a camera or IP video device. All pre-defined alarm documents will be displayed and the camera's icon shown in the location map is animated. The BMS must allow the operator to arm and disarm the video motion detection and alarming for an individual camera or globally for all video devices. This helps preventing false alarms during normal office hours, for example.

Privacy Zones

The BMS video management module must provide a means of defining privacy zones inside video live images to hide specific areas. This shall be independent from the video source. The hidden area inside a live image shall be dependent from the operator and his permission.

Other Video Alarms

Other video alarms, such as video loss or events on alarm inputs, are handled by the central BMS alarm management and monitoring. They are displayed in the alarm queue with all corresponding alarm documents and location maps.

Local Storage and Snapshots

In addition to DVR archives, the video management module must provide a local recording feature on an operator's workstation. The recording must be captured in a standard format, such as AVI or DivX, so that the operator can replay the video using Windows Media Player or standard DVD player. Recording and replay has to be started with a single mouse click.

If the video source supports audio this should be recorded and replayed too.

The operator must also be able to capture snapshots of live images from individual cameras or the entire matrix. The snapshot must be captured in a standard graphical format, such as JPEG. The snapshot must include the following data:

- Date/time of snapshot
- Video source name(s)
- Workstation name where snapshot was captured

The snapshot must provide a print button for direct printing on a connected printer.

The BMS shall be able to access video files on iSCSI devices.

Reference Images

The video management module must provide the storage and retrieval of reference images per selected camera, to allow a simple detection of manipulation on a camera, e.g. viewing angle was changed.

Image freeze/unfreeze

The video management module must provide a means of freezing/unfreezing live images from any video source for enhanced analysis of critical situations.

Video Tour/Optical Guard Tour

The video management module must support a video tour from the selected cameras inside the matrix view, and also from a favourite camera list. After the video/camera sources are selected, the video tour starts with a single mouse click. The time for toggling must be definable by the operator.

Video Keyboard

The BMS video management should provide an interface to a video keyboard which supports all features available on screen, such as:

- favorite selection
- maximize view
- create snapshot
- start video guard tour
- digital zoom in/out
- start/stop local recordings

The keyboard shall provide a joystick for auto dome control with moving and zooming and a jog-dial for quick search in the video archive. The control shall be uniform in a mixed installation of video subsystems.

The keyboard should be connectable by standard USB port to a BMS workstation, and is auto detected by the video management module.

Seamless Integration with IP video based Intercom

The BMS video management should provide a means of using the intercom functions of IP video devices supporting it, to set up a bi-directional communication to certain doors, for example, including the live streaming from the door's camera. Together with the access control management complete door management solutions shall be provided.

Seamless Integration with Access Control Management

The BMS must provide a direct interaction with the access control management module, allowing the operator to display dedicated camera images when there is an access control alarm, such as

- duress alarm
- door open time exceeded
- card/cardholder not authorized
- card unknown
- tamper alarms

Together with the alarm document feature inside the BMS' central alarm monitoring, the video management module shall provide a higher security level together with the video verification mode of the access control management.

Seamless Integration with Intrusion Management

The BMS must provide a direct interaction with the intrusion management module to allow the display of dedicated camera images when there is an intrusion alarm. The BMS must be able to trigger alarm recordings inside connected DVR systems. The BMS must store those alarms in its event log that an operator can directly link from the alarm entry to the corresponding alarm archive of the DVR.

1.2.4 Access Control Management

The BMS access management must provide a seamless integration and interaction with the access control system containing an access management module and the connected access controller, access readers, and input/output extensions.

The access management module shall provide a wide range of access control functions, for individual customizing of site, building, and floor access permissions, time profiles, schedules, and access alarm events.

All access control alarms, such as door open time exceeded, access denied, card unknown, and more, must be directly handled by the central BMS alarm management and monitoring. Access alarms/events must be visualized with all the common BMS display features like location maps, alarm documents/instructions, live video, and more.

Access Control Management Alarm Events

The access control management must provide a wide range of standard alarm and event states. The following alarms/events must be supported:

- Card unknown
- Card not authorized
- Card outside time profile
- Card anti-pass back
- Access timeout
- Door open time exceeded
- Door opened unauthorized
- Door blocked
- Tamper alarm controller
- Tamper alarm reader
- PIN code error
- Duress alarm code
- Access denied
- Wrong card version
- Card blocked
- Card blacklisted
- Card out of route
- Guard tour alarms

- Random screening
- Other individual alarm extensions

All access control alarm/events must be handled by the central BMS alarm monitoring and management, so that corresponding location maps, alarm documents, and live video are shown in the configured way.

All events are logged in the central BMS event log together with all assigned alarm documents for a complete reporting.

Seamless Interaction with Video Management

The BMS access management must provide a seamless integration and interaction with the video management module, allowing video verification or surveillance of parking lots.

Seamless Interaction with Fire Management

The BMS access management must provide a seamless integration and interaction with the fire management module, allowing the automatic opening of dedicated doors along an escape route.

Seamless Interaction with Intrusion Management

The BMS access management must provide a seamless integration and interaction with the intrusion management module, allowing the automatic blocking of dedicated doors belonging to the intrusion area.

Seamless Interaction with Offline Doors

The BMS access management must provide a seamless integration and interaction with offline locks or door fittings on remote doors which do not have cables or online connection.

Seamless Interaction with Key and Asset Management Systems

The BMS access management must provide a seamless integration and interaction with key and asset management systems to manage and monitor access to brass keys and assets like mobile phones, weapons and documents.

Seamless Interaction with Automatic Number Plate Recognition System

The BMS access management must provide a seamless interaction with Automatic Number Plate Recognition systems as additional check from the access controller.

1.2.5 3rd Party System Support

The BMS must provide the connection of OPC-compliant 3rd party systems, integrating them into the entire security solution. The following systems should be supported as subsystems:

- Building automation systems
- Perimeter fence/wall control systems
- IP network and device monitoring
- Emergency exit management
- And so on

The BMS must be able to perform a selective import of the existing 3rd party subsystem configuration, such as detector addresses and corresponding event states.

The BMS must provide at least the possibility to monitor the status of such subsystems and their peripheral devices. If supported by the subsystem, control is also possible.

The BMS must provide the definition of the specific event states as an alarm event, which are handled in the central BMS alarm management and monitoring with all corresponding alarm documents and location maps.

Building Automation Systems

The BMS must allow the monitoring of defined items inside OPC-compliant building automation systems, such as DDC/PLC units, air conditioning, ventilation, and others. This allows alarms in case of malfunctions, such as the air conditioning of a computer centre, which might cause damage of computer equipment.

If provided by the subsystem's controls, the BMS can, for example, control ventilation flaps if there is a fire alarm.

If the subsystem's OPC server provides raw (analog) values the BMS must be able to display them via configurable means on the client monitor.

Perimeter Fence/Wall Control System Monitoring

The BMS must allow the monitoring of perimeter fence/wall control systems. In case of an alarm at the fence/wall, the BMS must show the location inside the location map view, display live images from dedicated cameras, switch exterior lights on in that area at night, and trigger an archival image storage inside a connected DVR system.

IP Network and Device Monitoring

The BMS must allow the monitoring of vital IP network devices, such as servers, printers, routers, using standard SNMP traps and existing OPC-compliant drivers. In case of malfunctions, the defined procedures in the central alarm management and monitoring are activated, showing location map, animated detector/item, and alarm documents instructing the operator what procedure to follow.

Emergency Exit Management Systems

The BMS must support the connection of OPC-compliant emergency exit management systems, such as Dorma, allowing the automatic release of emergency/escape exits in case of a fire alarm.

Seamless Interaction with other BMS Modules

The BMS must provide a seamless integration and interaction between the 3rd party systems and the access control, intrusion, video and fire management modules.

1.2.6 Integration with Third Party Applications

Remote Control Interface

The BMS must provide a means of remote control interface that allows to connect itself as a subsystem to other building management systems, such as

- Building automation management systems
- SCADA systems (Supervisory Control and Data Acquisition)
- ERP systems systems (Supervisory Control (Enterprise Resource Planning))

Those systems can monitor all to the BMS connected subsystems, e.g. status of doors from the BMS access control management.

Proxy OPC-DA Server

The BMS must offer a means to integrate third party system (other PSIM or SCADA systems) via OPC-DA server. It shall be possible to send events (state changes) to the third party application as well as receive commands from the third party application.

Access Control SDK

The BMS must offer an SDK based on C++ or .NET languages to integrate third party applications with the BMS. It shall be possible to synchronize master data (i.e. cardholder data, authorizations) with, send time stamps (i.e. access events) to and receive commands (i.e. door commands) from the third party application.

1.2.7 System Operation

Operators and Authorization Management

The BMS must allow the creation of individual authorizations per operator or operator group. This includes:

- selectable displaying, monitoring, and control of locations, such as individual floor, building, or site permissions
- selectable displaying, monitoring, and control of subsystems, such as intrusion, video, fire, or access control panels
- selectable displaying, monitoring, and control of detector points, such as readers, doors, cameras, or intrusion detectors

Especially when the BMS access control management is used, the system grants access control operators the following permissions on the master records and event data, per dialog:

- read only
- read and write
- read, write, and change
- read, write, change, and delete

Operators and Login

The BMS must provide a separate login as well as login via Windows authentication (single login). The behaviour must be customizable. A 2-men-rule login for certain operators and permissions must also be possible.

Dedicated Workstation and Encryption

The BMS must allow to associate an operator login to a dedicated workstation. The BMS must support a 128-bit data encryption according to a certified algorithm for communication between the central server and all connected workstations.

Central Configuration Tool

The BMS configuration must be simple and intuitive for the administrator. The system provides one central configuration platform/tool from where everything concerning subsystems, system behaviour, cardholder settings, display features, and authorizations is set up.

The BMS configuration must support the direct implementation of OPC-compliant subsystems. Existing subsystem configurations are imported by the BMS configuration to avoid entering data a second time.

The BMS configuration must support a network search/browse of network devices, such as DVR or video web server. Network settings of subsystems and the integration of 3rd party configuration must be possible.

Subsystem and Detector Programming

Subsystems and their peripheral devices must be easily and intuitively configurable in the BMS configuration tool. If supported by the subsystem, a direct import of its data must be provided by the BMS.

Customizing the User Interface

The user interface must be adaptable to the information requirement and the expertise of the operator, and to the configuration of the workstations (resolution and number of monitors).

The BMS application shall be a web server-based solution. On the operator workstations, no additional software must be installed locally. Only Internet Explorer (version 9, 10 or 11) is required to log into the BMS. The user interface shall be browser-based, using standard HTML format.

This allows easy customization using standard HTML editors. The BMS shall provide one default user interfaces which adapts to all 1-monitor standard resolutions and also for 2048x768, 2560x1024 (2-monitor operation).

The BMS administrator or installer can adapt these default interfaces to individual requirement using a standard editor. The following adaptations must be easily possible:

- Integration of corporate logo(s)
- Integration of corporate images as wallpaper
- Individual contents per operator or operator group
- Individual contents corresponding to the workstation

These settings are necessary only once. The BMS must automatically detect from where an operator is logging in, and supplies the right contents and resolution to him.

The BMS must provide a toolbox containing all specific controls for display features, such as location tree, alarm queue, toolbar, customizable action buttons, for individual use in HTML files.

To create customized workflows and user interfaces scripting shall be supported in HTML pages using JScript.

From any detector a predefined URL shall be available by a simple mouse click displaying additional information to the detectors / objects on demand.

Association Management for Display and Control

The BMS must provide an easy and intuitive way of defining/designing the system behavior in case of events/alarms. The system must allow the definition by easy IF/THEN or IF/THEN/ELSE conditions as well as AND and OR operations. The following triggers are possible for these conditions:

- Event/alarm from any single detector point
- Event/alarm from any group of detectors
- Event/alarm from any subsystem, such as common status
- Event/alarm from any subsystem interface
- Internal timers, such as timeout in alarm operating
- Status changes of alarms/events, such as deletion or forwarding by operator

The following outputs are possible when a condition/trigger is TRUE:

- Display message to authorized operators
- Display corresponding alarm documents and location maps
- Control automatically the triggering detector, such as reset
- Control automatically any other connected detector, such as displaying a dedicated camera
- Control automatically any group of detectors, such as switch all lights on a dedicated floor
-
- Start internal timer for creating time-dependant chains of events, such as PA evacuation announcements on different floors with 20 seconds delay
- Influence internal variable counters (count up/down) to count the number of specific events, such as generating a new event when 100 persons have passed a light barrier

Combined with the BMS timer/scheduler, time-dependant results must be possible, such as forwarding of alarms to dedicated operator groups depending of the day time.

Printer

The BMS must support any standard laser or inkjet printer that comes with a Windows-compliant printer driver for use as an alarm printer. The printers must be connectable directly to a workstation or to the network.

The BMS must allow the manual and automatic printing of all alarm documents, including location maps and instructions, and alarm details, such as location, detector address, and type.

The BMS access control management must support standard badge printers from the market that come with a Windows-compliant printer driver.

Event Log

All events, messages, controls, or alarms in the entire system, such as user login, fire/intrusion/access alarms, shall be seamlessly logged in the central BMS event log. The stored information must be secure from manipulation.

Individual filter functions shall be definable for outputting to screen or printer. Operators must have the ability to store their own individual filters. An export in a standard CSV format text file must be possible for additional processing in other applications.

Reporting Services

Report generation shall be available either from the event log page or directly from any detector in the device or location overview to display events from the event log database.

Reports shall be interactive allowing to zoom in with a mouse click for more detailed information

A set of minimum five pre-defined reports shall be offered.

Display, refresh, export and print functions shall be available for the reports.

Microsoft Report Builder 2.0 shall be used to create custom reports.

Ad hoc information of any detector shall be available on mouse click.

2. Technical Specification

2.1 General

The Building Management System (BMS) contractor shall furnish and install a fully integrated building automation system, incorporating direct digital controllers (DDC) for energy management, equipment monitoring and control, suitable for the building usage. The control strategies shall be developed to ensure that the specified environmental conditions are maintained, whilst giving due regard to minimizing of energy consumption.

The system design shall utilize the latest technology in “open” network architecture, distributive intelligence and processing, and direct digital control. The BMS system offered should be from the latest offerings and should be of freely programmable management and automation stations for the full spectrum of today’s building application services.

All peripheral equipment e.g. sensors, pressure switches, control valves and actuators, shall be of the same manufacture as the direct digital control modules and outstations. The system offered shall be completely modular in structure and freely expandable at any stage from the smallest system through to large distributed systems. Each level of the system shall operate independently of the next level up.

To provide maximum flexibility and to respond to changes in the building use, the system offered shall support the use of BACnet/Lon, LONworks, Profibus and Ethernet TCP/IP communication technologies.

2.2 Essential functions of system

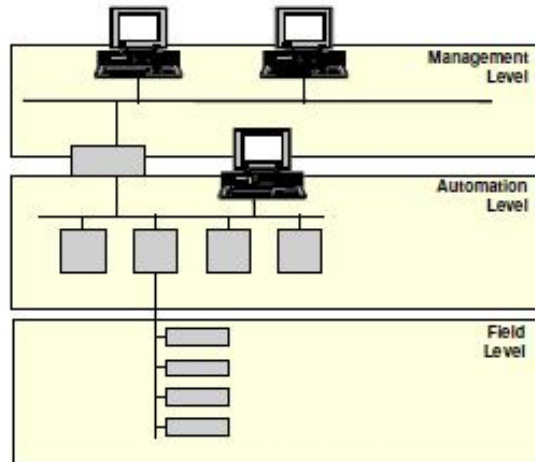
The system comprises the supply, engineering, testing and commissioning of an integrated building management system by a specialist manufacturer.

The essential functions of the system are as follows:

- Centralized operation of the plant (remote control)
- Dynamic and Animated Graphic details of Plant and building
- Early recognition of faults
- Faults statistics for identification
- Trend register to identify discrepancies, energy consumption, etc.
- Preventive maintenance and plant servicing
- Optimum support of personnel
- Control optimization of all connected electrical and mechanical plant
- Prevention of unauthorized or unwanted access
- Own error diagnosis integrated system

2.3 General System Architecture

The system shall be logically structured into three distinctive levels, which are Management Level, Automation Level, and Field Level. Each level shall be autonomous from the other. Peer to peer communication shall be possible on all system levels and the system design shall be modular in structure to allow straightforward extensions.



2.4 Use of communication standards

Only the following standards are appropriate to be used at the three levels.

- Management level - BACnet, Ethernet TCP/IP
- Automation level - BACnet on LonTalk, BACnet on ETHERNET/IP
- Field level - LonTalk with LonMark profiles

2.5 Management Level

The head-end management and operation of the plant shall include process visualization, data analysis, and exchange of data with 3rd parties. At the management level, it shall be possible for communication to flow in all directions, across networks and via direct connections.

Personal computer based operator management stations shall be provided for plant supervision and operation, alarm management, information and database management function. All real-time control functions shall be resident in the DDC controllers to facilitate greater fault tolerance and reliability.

The operator management station should be capable of multi-tasking 32-bit programs by utilizing Microsoft Windows 7 or higher.

The management level of the system shall consist of one, and shall be capable of handling more management station PCs and the associated software modules. The management station shall be capable of the following:

- Display of graphical representations of the plant overlaid with live data
- High quality dynamic graphics with true multitasking of all active pages
- Monitor and operate / influence process devices
- Receiving of alarm messages from the process level and directing them to the appropriate reporting device e.g. printer, pager, fax, e-mail
- Monitor process devices for communication problems and other device faults.
- Alarm handling – all the alarms shall be displayed in a graphical tree structure in order located alarms quick and easily.
- Adjusting time strategies in the process level.
- Long term storage of logged data from the process devices
- Multi level user access control for individual access to sites, applications, functions and objects
- Display graphically the logged data
- Custom application programming
- Use of graphical genies to allow manipulation of data.
- The user interface shall be based on a basic taskbar, which is always visible.
- History logging for alarms, user actions, system events and messages
- Alarm handling – all the alarms shall be displayed in a graphical tree structure in order located alarms quick and easily.
- Simultaneous connection of at least of 4 sites via serial connections / 50 sites via LAN/WAN connections for a comprehensive overview on geographically distributed projects

For maximum fault tolerance, the management stations connect to the process level via point-to-point communications.

This shall be via RS232, Ethernet/TCP/IP LAN / WAN or via AutoDial links.

2.6 Automation Level

General Purpose controllers shall be used for monitoring / controlling equipment which have to perform based on a customized logic, such as AHUs, Chillers, Chilled water pumps, Cooling towers, Lifts, signals from Fire Alarm panels, generators, transformers etc.,.

At the heart of the DDC system shall be the Microprocessor based modules, which can be individually programmed according to the functional requirements.

The automation level DDC controllers shall monitor and control the main plant in the building. The DDC controller outstations shall be freely programmable and have the ability to perform all the following routines:

- Process control & interlock functions.
- Generate alarms/events based on comparing measured values against know parameters.
- Time control strategies
- Runtime totalisation.
- Trend logging of specific data-points with transmission of the logged values to the management level
- Energy calculations
- Backup of the data/program (>= 5 years)

The DDC controllers shall be selected from either a modular or compact type of unit to suit the most economic inclusion of all the data points specified. Each control module shall be capable of operating on a stand-alone basis without control from a central computer.

The input/output connection to Modular controllers shall be via individual plug-in modules suitable for the particular peripheral device. The digital modules shall have visual indication of the status of the input/output. Digital input modules shall be capable of accepting control voltages up to 240vac and will have integral status indication.

It shall be possible to integrate both types of control module onto the same BACnet communication network. Each controller performance shall be to 0.5% control accuracy with sample rates of less than one second.

Main plant DDC controllers shall be 32 bits freely programmable. Controllers meant for VAV controls cannot be used as DDC controllers.

All DDCs must be UL approved, must have an in-built real time clock and be suitable for PID control.

The products used in constructing the BMS management and automation levels shall conform to BACnet protocol for building automation and control networks. All controllers shall have attained a BACnet Testing Laboratories (BTL) listing and display BTL logo.

Room units shall utilize a two-wire communication link at each controller for the acquisition of room temperature and local set point. These will also provide an integral temperature/set point digital display. Up to 5 room units shall be able to use the same two-wire communication link

The system shall have the facility for a Web server to be added to allow full operation of all automation station control modules connected to the Lon Talk BACnet network via a standard thin client/web browser. Functions to include:

- Display of graphical representations of the plant overlaid with live data
- Data point display and operation of all measured values, set points, plant States, operating states and parameters
- Alarm monitoring with acknowledgement and visual and audible alarm Indication.
- Alarm and event history
- Alarm transmission via SMS and e-mail
- Operation of all time schedules, exception calendar and heating curves.
- Reading of trend data with facility to export data to Microsoft Excel.
- Multi user level access protection
- Ethernet or Modem connection

DDC Control Module Specification

The DDC controllers shall be selected from either a modular or compact type of unit to suit the most economic inclusion of all the data points specified. The DDC controllers being used should confirm to the following specifications as a minimum:

- Based on ANSI/ASHRAE standard 135-2001 (BACNet), ENV13321-1
- Operation standalone or as part of Lon Talk (clause 11) system network TP/FT-10, 78kBits with Built in BACnet/Lontalk interface or ETHERNET / IP
- Optional connection to operator terminal, management station and via Web browser with Web server device.
- Freely Programmable
- Flash ROM, real time processing and multi tasking
- 32 bit processor system, 1.5 MB program memory, No 8 bit or multiple of 8 bit
- Supply voltage AC 24V +/-20% 50/60 Hz
- Event driven data transmission
- Automatic mains recovery
- PPS2 connection
- Digital output to be 250V 2A rated changeover contacts
- Historical data memory storage
- Software application stored in non volatile memory
- Battery back up >= 5 Years

For the generation of the application programs, the following function elements are required as a minimum.

- Reset functions
- Set point jump
- Positioning time
- P-controller (reverse or direct acting)
- P1-controller (reverse or direct acting)
- PI-controller with I-deletion (reverse or direct acting)
- PID controller (reverse or direct acting)
- 2-point controller (reverse or direct acting)
- Proportional additional sequences (reverse or direct acting)
- Data transmitter (digital or analogue)
- Data converter (analogue-digital or digital-analogue)
- Ring Counter
- Timer (switch on or switch off)
- Logic operations:
 - * logic "AND" (2,3 or 4)
 - * logic "OR" (2,3 or 4)
 - * logic "EXOR"
 - * logic "NOT"
- Comparative operations:
 - * Maximum values (2, 3 or 4)
 - * Minimum values (2, 3 or 4)
 - * Average values (2, 3 or 4)
- Enthalpy calculation
- Optimizer
- Mean value calculation
- Hysteresis
- Output steps (digital or analogue)

Digital outputs shall be potential free outputs. Analog outputs shall be true analog outputs (0-10 V DC, 0-20 ma & 4-20 ma)

Above blocks shall be resident in the DDC Controllers and independent of any high level interfaces/controllers. Further, the DDC unit software must have the following additional functions: Free selection of range and unit (dimension) of all signals (measured values, accumulated values, calculated values, etc.)

Free allocation of access protection in accordance with operating priorities.

Free definition of manual override priorities (software) from operator terminal and/or management station.

Wherever control logic is required for equipment such as AHUs, the DDC controller offered shall have a digital display on the fascia. This display shall be capable of displaying 2 categories of 3 parameters each. In the event of an alarm, the display shall switch over to an 'alarm' indication. In all, the controller shall have the capacity to indicate 8 different alarms. In case more than one alarm is active at the same time, the controller shall display a coded alphabet, to alert that there is more than one alarm in the controller.

Each DDC Controller shall have a resident real time clock with a battery back up for a minimum of 4 years. All DDC controllers shall be housed in IP 54 enclosures with proper termination of peripheral devices at the terminal strip and not directly to the controller.

2.7 Field Level

Individual terminal unit controllers for autonomous room – by – room comfort control, based on application specific logic written on the controllers. All the terminal unit controllers shall fulfill following general requirements:

- LONMARK communication
- AC230 V power supply
- Mountable with screws or DIN rail
- Optional terminal cover for local installation without cabinet
- Downloadable application software /adjustable parameter set. The type of use shall be defined by downloadable pre-tested application software.

Common functions like grouping, scheduling, etc., shall be realized within a master controller on automation level.

All terminal unit controllers supplied on the project shall have the facility for local setpoint adjustment via a room unit.

Application specific controllers shall be used for terminal devices such as Fan Coil Units and the like. These controllers shall be with Lon Mark compatible bus communication. Any failure problem in communication bus should not affect the working of the FCU controller. A dedicated stand-alone controller shall be provided for each FCU. A common controller for FCUs serving different areas shall not be acceptable. These controllers shall be looped with a bus cable and connected to the BMS.

In general they shall comply with the following specifications:

- For 2 or 4 pipe FCUs, with or without changeover
- PID control
- Downloadable application software over the BUS cable
- LonMark compatible bus communication
- To be integrated to the management station software
- Control of AC 24 V PWM valve actuators, 3 point AC 24 V valve and damper actuators, or electric heating coils
- Volt-free relays for fan control
- Operating Voltage _ 240 V
- Internal fuse, thermal, automatic reset
- Connectable to 1 room unit via local bus, 2/4 wire unscreened twisted pair

The application specific controllers shall be capable of working in conjunction with the following type of room controllers.

The specific type of room controller to be used in specific applications shall be selected from any one of the following types to meet the description written in the sequence of operation.

TYPE 1

- Integrated room temperature sensor

TYPE 2

- Integrated room temperature sensor
- Dial for temperature set point

TYPE 3

- Integrated room temperature sensor
- Dial for temperature set point
- Rocker switch for off/auto1 mode (single speed fan)

TYPE 4

- Integrated room temperature sensor
- Dial for temperature set point
- Rocker switch for off/auto1 mode and fan speeds (3 speed fan)

TYPE 5

- Integrated room temperature sensor
- Dial for temperature set point
- Rocker switch for off/auto1 mode and fan speeds (3 speed fan)
- LCD display of measured temperature

TYPE 6

- Integrated room temperature sensor
- Rocker switch for temperature set point (raise/lower)
- Rocker switch for off/auto1 mode and fan speeds
- LCD display of measured temperature
- Communication with controllers via Lon bus
- Exchangeable rocker switches for lighting and blinds
- Selection of downloadable software applications for the operation of lighting and blinds
- Operating mode 'auto' –comfort, 'off' – standby or economy

FCUs FOR CORRIDOR/ LOBBY AREAS

Each FCU control assembly shall consist of a dedicated controller mounted near the FCU and temperature sensor mounted in the return air path.

The FCU controller shall automatically change the FCU motor speed based on the temperature deviation. The FCU shall continue to operate at the low speed when the temperature conditions are achieved. It shall be possible to switch OFF the FCU motor either from the ON/OFF switches of the room unit or via BMS PC.

The temperature set point shall be selected through the set point provided on the controller fascia or via communication bus/BMS PC. It shall also be possible via the communication bus to operate the controller in comfort mode (normal operation)

stand-by mode (short break periods like lunch time etc.) and energy hold off mode (night mode or non-office hours) through time channel programming.

The FCU controller shall modulate the modulating valve to meet the desired temperature condition. In case multiple FCUs are serving the same common area/ lobby a common controller can be used if suitable from the site conditions.

FCUs FOR TYPICAL OFFICE/ PLANT ROOM ETC

Each FCU control shall consist of a dedicated controller mounted near the FCU above the false ceiling, a room unit with inbuilt temperature sensor, set point adjuster and 3-speed/OFF switch. The FCU thermostat shall operate the modulating valve to meet the desired temperature condition. The FCU thermostat shall be connected to the BMS to enable temperature set point override etc.

2.8 8. Networks & File Servers

Wherever the building configuration supports in - built network cables, the system shall be able to accommodate several PCs hooked up at locations designated by the user at a later date. The management station software shall support Windows 2003 server.

The management station(s) shall be set up on the network in two different ways, either operating independently or as client management stations in conjunction with an (optional) file server. To facilitate central storage of data and programs, the file server is envisaged. Central management of user-specific information such as passwords and protected access to data and programs shall thus be made easily possible. The file server shall also support software updates and changes in the project data. The file server shall also support consistent central archiving of alarms, off-line trend data, log data, graphics, data backup etc.

2.9 Printing

It shall be possible to connect printers either directly to the management station or to the file server.

2.10 Remote Monitoring and Control

It shall be possible, with additional hardware if necessary, to interrogate the system remotely via the following methods:

- Mobile Telephone connection
- Building IT network
- Web browser technology with password access via IT networks accessing information stored on dedicated embedded
- Web server device installed on automation controller network.
- Alarm reporting to mobile pagers/phones/e-mail etc
- Energy usage monitoring and control via Building Management Systems.

2.11 BMS – Records

General

The details of the building automatic system shall include all the manufacturers Technical Data Sheets and User Manuals. Control valve schedules shall be provided the flow rates; valve pressure drop and system design basis on which the particular valve type was selected.

DDC Control System Software Strategies

Controller strategies shall be provided, in both hard copy and on CD-ROM, for inclusion in the Operating & Maintenance Manuals.

BMS Software and Licences

All Licence rights to the control systems manufacturers software packages shall be transferred to the client at the time of hand over. User Registration must be made on behalf of the client, direct to the control system manufacturer by the specialist System House Partner.

Copies of all of the control system manufacturers Monitoring or BMS software shall be provided on CD-ROM, or other mass storage device, together with copies of any graphics and databases that may be required to re-install the system after a fatal computer failure.

Integration of secondary systems

Integrations shall be carried out at the most appropriate level within a system, depending on the functions and interaction required. The following integrations must be possible.

- Lon Works
- Lon Mark
- BACNet /LonWorks
- BACNet/IP
- OPC
- Integration of standard proprietary buses: Modbus, M Bus, KNX.

As part of the requirements for an open system devices with a Native BACnet protocol shall be connected onto a common field bus backbone network directly without any Gateway/Protocol converter device.

If interaction is required between different sub-systems, the integration shall be carried out at either the automation or field level. The integration must not occur at the management level. Link to a third party software package such as a Planned Preventive Maintenance package or an Energy Monitoring package shall be carried out at the management level.

When sharing alarm and historical information with Maintenance Management and Energy Management packages, the management system shall provide the information in a standard commercially available format e.g. MS Access and using standard mechanisms e.g. ODBC .Real-time “live” information shall be transferred from the management system to a third party package e.g. MS Excel, either by a standard inter-application mechanism e.g. DDE or OPC or by developing a connection by using a documented API for the management system.

Where a physical connection is required between a 3rd party device and the management system, the sub-system supplier shall provide the necessary line drivers and cables, documentation and support to make the connection into the device that will provide the protocol conversion.

2.12 Software Modules

The management station software shall be modular, object oriented, clearly structured and shall be based on Windows 7 (or later) standard 32 bit technology.

The main software applications shall, as a minimum, include:

- Plant Viewer : Graphics based operation of the plant
- Trend Viewer : Logging and display of measured values
- Alarm Viewer : Display of alarm messages
- Alarm Router : Automatic routing of alarms
- Log Viewer : Logging of alarms, system events and user activities

The Task Bar

The task bar shall be the 1st and last point of contact for all the interactions between user and system.

In addition to obtaining quick overview of vital system information, users shall be able to click on various icons in the task bar to switch from one program to another in the multi-tasking operating system. In systems, which include remote sites, the task bar shall be used to switch between sites (subject to user's access privileges).

To make the system easier for new users, the system shall support user-specific start-sequences with access to selected programs.

Features Of The Task Bar

- Control of access privileges and security mechanisms for access to program modules and 3rd part software at log-in and log-out.
- User-and-password dependent access to systems and sub-systems
- Automatic user-specific start sequences
- Display of alarm and system message status, site connection status, time and date
- Facility to connect and terminate connection at various sites
- Simultaneous connection to a maximum of 4 sites

Plant Viewer

The plant viewer shall support the following features:

- Hierarchically linked, animated high-resolution bit-map colour graphics (XGA 1024 x 768 pixels)
- Choice of 2D and 3D symbols with animation based on status
- Direct access to setpoints, parameters, operating modes, alarms, time-programs, on-line and off-line trend data features
- Dynamic multi-tasking with all active pages
- Monitoring and operation of plant at several levels
- Flexible operation of multiple pages using plant viewer navigation bar combined with standard handling of windows
- Navigation to all other management station software applications
- User-definable page size

- Jump tags for jumps on the same level or between levels
- ToolTips for all dynamic objects, with the option of 'User', 'Technical' or 'System' information
- Context-specific information (eg. data sheets) can be attached to any dynamic object
- Capable of graphics to be printed in colour or monochrome
- All 32 bit graphic file formats supported by Windows can be imported (eg _ AutoCAD, PCX etc.,)
- Dynamic display of the Psychrometric chart, enabling easy simulation of the air - conditioning processes.

Alarms Handling & Alarm Viewer

As a minimum, the system shall support the following features

- Operation and manipulation of alarms (based on user privileges)
- Alarm message printing
- Alarms printed independently of the management station (direct connection at automation level)
- Automatic pop-up windows for immediate display and operation of alarms (including pop-ups in 3rd party programs)
- Audible or multi-media alarm indication
- Continuous overview of all active alarms from site (updated automatically, displayed in order of priority, option of personalized view)
- Graphics based topological view of alarms
- Chronological alarm view
- Option of displaying detailed information
- Direct access to associated plant graphics
- Comprehensive filter and search criteria (time, date, priority, discipline, alarm status etc.,)
- Colour coding based on alarm priority / alarm status (screen and printer)
- Alarms for out of limit values (high, low), change of state, run-time limits exceeded etc.,
- Option of repeating unacknowledged alarms at regular intervals
- Creation of reports, with facility to print or export alarm data to 3rd party programs for further analysis
- Facility to save user-defined filter criteria
- User-specific configuration of the alarm view including on-line configuration

Alarm Routing

In order to monitor alarms round – the – clock, alarm routing is an important feature of the BMS.

The BMS shall have the following features:

- Routing of alarms to alarm printer, fax, pager or mobile phone
- Time schedule for each message recipient
- Alarm routing based on priority
- Alarm routing based on discipline (HVAC, Security etc.,)
- Alarms routing to person responsible at site
- Alarm routing based on text
- Alarm routing to person(s) responsible for specific equipment or systems
- Option of manual transmission of messages from the management system

Time Scheduling

The time-scheduler shall have the following features:

- 7 day time programs
- Exception programs (local, building-wise or system-wise)
- Direct display of time programs within Plant viewer graphics
- Simple graphics programming of switch times
- Graphics based overview of all time programs in the system
- Graphics based overview of a 7 day programme including all exception programmes
- Graphics based overview of all plant points affected by a time programme
- Direct entry of various operating modes (comfort, stand-by, energy hold-off)
- Easy creation, modification and deletion of all time programmes
- Scroll features for fast access to specific weeks or days
- Storage and processing independent of management station
- Automatic synchronization of all time programmes in a system
- Support of different time zones (remote managed sites)
- Option of synchronization via radio clock
- Printed reports in various display forms

Trend Viewer

The Trend Viewer shall have the following features:

- On-line or off-line real-time data
- Simultaneous display of up to ten signals per window
- Absolute or relative time intervals
- Zoom, scroll and cursor features for faster data analysis
- Flexible, easy-to-use scaling feature with charts displayed in 2D or 3D
- Drag-and-drop feature for trend views with automatic scaling and data export
- Off-line data logging triggered manually, automatically, or on a time or event basis
- Logging and intermediate storage of off-line trend data operates independently of the management
- Automatic upload from automation level to local or remote management stations
- Management station display and archiving of on-line and off-line trend data
- Print-outs of trend data
- Easy export of data to 3rd party software
- Facility to export trend data directly to auxiliary programs such as ADP (Advanced Data Processing) or to 3rd party software such as MS-Excel
- Trend Viewer time base can be used directly as a filter creation in Log Viewer

Log Viewer

The Log Viewer shall be categorized into the following sections:

ALARM LOG _ contains all incoming alarms in chronological order

SYSTEM LOG _ shows at a glance if a printer somewhere in the system has run out of paper, or a hard disk is full.

Communication events are also recorded here, showing for example when communication was established or terminated

USER LOG _ lists all the activities carried out by the user at the management station, unauthorized attempts, modification of parameters, set points etc.,

STATUS LOG _ to check the status of all incoming messages

The Log Viewer shall have the following features

- Storage of alarms routed to the management station
- Storage of all system messages (from printer, communications, management station, modem etc.,)
- Storage of all user activities performed at the management station
- Facility to enter and store user comments on events and activities
- Facility to display, at a keystroke, detailed information on every entry
- Extensive filter options to focus and reduce the volume of information displayed
- Comprehensive search features for fast access to information
- Facility to display an overview of data for a given day or week
- Once defined, filter and search criteria can be saved for future re-use
- Compact archiving of virtually un-limited number of entries (depending on hard-disk capacity)
- Automatic data management and archiving functions
- Facility to create and print log summaries
- Export of log entries for further analysis with 3rd party software (eg –MS access)
- User specific configuration of log view can be adapted directly on line

Internet Log Viewer

This is an application, which offers users even greater freedom in the management of a site. A browser such as Microsoft Internet Explorer or Netscape Navigator, for example, provides the user with access to the log database from any PC with an Internet connection. Just as with standard log viewer, the user can then obtain an overall view of all the plant and events stored or monitored by the system.

The Internet Log Viewer shall be started without any special management station software on the user's PC. Access to the Log Viewer will be password protected.

A Web Control

The system shall have the capability to connect to remote sites through a web control module. Individual DDC general purpose communication trunks (described elsewhere) shall have the feature to be connected to this web control module. This should facilitate viewing and controlling the DDC general-purpose controllers trunk via a remote PC / laptop. All parameters as appearing in the Portable Operator Terminal (described elsewhere) shall be available from this remote PC / laptop.

The system offered shall have the facility to control / monitor the plant and equipment connected to these communication trunks via password protection.

Integration Of 3rd Part Software And Exchange Of Data

The system shall support the use of standard interfaces and drivers that make it easy to integrate to 3rd party software directly at the management station level, or to make common use of data from the system, eg via ODBC (Open Database Connectivity). DDE (Dynamic Data Exchange) shall enable current data to be loaded continuously into a spreadsheet program such as MS Excel, so that constantly updated graphs can be created for further processing.

Object Viewer

To make operations easier, the software shall have two viewing modes.

System View _ Provides hierarchical view of the system network.

User Designation View _ Gives a hierarchical breakdown of user addresses based on the system database.

In general, the system shall support the following features:

- Fast navigation through the system
- Fast location of objects and alarms
- Detailed information of all objects
- Display of current values from the process level
- Modification of set points and parameters
- Users with appropriate access levels can also override outputs manually
- Two display modes _ system view and user designation view
- Search features
- Jump features and bookmark features as in various internet browsers
- Modification of users designation and alarms texts
- Customization of users addresses with a maximum of 10 hierarchical levels and up to 40 characters
- “Find” function to locate system objects

Reports

Reports shall provide the user with the latest information from the system at specific times or when specific events occur. The following features shall be supported:

- Reports routed on basis of time and / or priority
- Manual or automatic triggering
- User-definable or standard reports
- Facility to integrate 3rd party report programs into the management station software

Access Protection

The management station shall grant access to the system only to authorized users. The system administrator shall tailor an environment to match the individual requirements of each user. The access protection facility shall define the buildings (sites) and equipment to which a given user has access, the software modules and functions available to that user within the site. The system shall support the following features

- User name / password
- Individual access privileges covering access to sites, subsystems, program functions down to individual objects in Plant Viewer
- Up to 1000 users grouped into 100 user groups
- Automatic log – out (after period of inactivity)
- Encrypted passwords
- Network security provided by Windows

2.13 Hardware Requirements

DESKTOP COMPUTER

Hard Disk : 500 GB HDD

Monitor : 19” TFT

2.14 BAC net Routers

In addition to exchanging data with the management station and the other Controllers in the same network, a further capability of transferring global data between DDC modules in different groups (i.e. on different buses).

The BMS offered must be capable of being extended with controllers on the BACnet protocol and the LON bus.

The BMS must allow integrating future BACnet controllers on the process level and providing inter-process communication with existing controllers.

The BMS must allow to be extended with controllers on the BACnet protocol and the LON Talk technology.

The BMS must allow for integration of BACnet devices on the process level via LON bus and on the management level via

Ethernet TCP/IP.

2.15 DDC LON network

This network shall allow the DDC modules to communicate with each other and provides the user with access via the operator terminal to all the connected DDC controllers.

The DDC controllers, wherever used, within the same enclosure, should be connected to each other via twisted bus cable and it should have the DATA network cable between distant controllers.

Upto 30 DDC modules, and a maximum of 15 operator terminals may be connected to one DDC LON network.

Data must be kept even in the event of power failure. Power failures and peak loads must not cause data loss.

Permanent self-monitoring of the system must be ensured by integrated test and service functions.

Suitable interfaces and appropriate in/outputs must allow the integration of all electrical and mechanical plants.

2.16 Central setting of parameters/structuring and programming

It must be possible to enter and/or amend all parameters (setpoints, control algorithms, time, etc.) and the structure diagrams (control and interlock programs) into the lower levels system controllers and DDC units-centrally from the management station and/or the operator terminal from the system controller with a download function. The system manager must be able to read and write all data centrally.

It must be possible to set the parameters and structure the application programs by using a graphic and element oriented programming language.

2.17 Portable Operator Terminal (Pot)

Each DDC Controller shall have a dedicated service port to plug in the portable operator's terminal (POT). It shall be possible to read, write and change any parameters on a bus by plugging the POT to any one of the Controllers on the communication trunk.

The portable operator's terminal shall have a visual and audible alarm with mute facility on its fascia. The POT shall have minimum three password levels. Separate cabling for connecting the POT shall not be acceptable. Changing the parameters locally from any Outstation shall be done by POT which is truly portable and hand held and not via Laptops.

A local operator terminal shall allow full operation of all DDC control modules connected to the LonTalk BACnet network. Functions to include

- Alarm monitoring with acknowledgement and visual and audible alarm indication.
- Pop up window with detailed message for alarms and events
- Alarm and event history
- Data point display and operation of all measured values, setpoints, plant states, operating states and parameters
- Graphic based display and operation of all time schedules, exception calendar, online trending and heating curve.
- User specific configurable overview of main values in plant
- Multi user level access protection

The operator terminal shall have a high resolution six line illuminated display for graphics and text, keys for operation and a visual and audible common alarm indication. The textual information displayed must reflect the layout of building and plant with clear text English descriptions of up to 40 characters

2.18 Documentation

In order to have clear system documentation, the following documents have to be provided:

- System diagram
- Wiring diagram
- Lists of parameters

For hand-over all documents must be up to date and provided with the date.

2.19 Services

The type and scope of the required services are described below.

The rates for engineering, commissioning and adjustment must contain all services required to ensure optimum operation of the plants.

2.20 Engineering/Planning

In addition to the required, complete documentation, the service must include:

- analysis of all functions together with the contractor
- binding information about conditions of connection of equipment
- scheduling and co-ordination with the contractor and the engineer

2.21 Commissioning/Adjustment

Function-oriented commissioning includes the following services, which are to be provided by BMS specialist:

- verification of the external connections of the equipment
- verification of the data transfer channels of the system
- loading and testing of all basic and user programs belonging to the equipment
- optimisation of the control parameters

2.22 Electric & Electronic Related Equipment

Ambient Conditions

All controls shall be capable of operating in ambient conditions varying between 0-40°C and 90% r.h. non-condensing.

Conduit Entry

All control devices shall, unless provided with a flying lead, have a 20 mm conduit knockout. Alternatively, they shall be supplied with adapters for 20 mm conduit.

Ancillary Items

When items of equipment are installed in the situations listed below the BMS/ Control Specialist shall include the following ancillary items:

Weather Protection

All devices, which are exposed to the atmosphere, are to be weatherproofed. All controls, peripherals and associated accessories serving Chillers, Roof Mounted Air Handling Units and other equipment which are exposed shall be protected from Dust, Rain and Solar Radiation. Adequate protection shades etc., shall be provided by the Main contractor

Pipe work Immersion

Corrosion resisting pockets of a length suitable for the complete active length of the device, screwed 1/2" or 3/4" BSPT suitable for the temperature, pressure and medium.

Duct Mounting (Metal or Builders Work)

Mounting flanges, clamping bushes, couplings, lock nuts, gaskets, brackets, sealing glands and any special fittings necessitated by the device, shall be provided by the BMS contractor.

Samples

Samples of all types of room mounted equipment (i.e. detectors, thermostats, etc.) shall be provided by the BMS/Controls Specialist for approval by the Engineer.

Accuracy

Control and measuring devices shall have the following limits of accuracy:

Temperature : +/- 1°C over the range of 0°C to 50°C

Pressure : +/- 1.5% of measured value

Humidity : +/- 5% r.h over the range of 10 to 90% r.h

2.23 Averaging Elements

Averaging elements shall be used on supply air ducts having a cross-sectional area exceeding 1.6m² and shall have a minimum capillary length of 8.2 m.

The capillary element shall be serpentine across the whole duct.

Where the span of the element is less than 1 m then it shall be fixed with purpose-made clips and may be unsupported across the duct.

Where the span of the element is above 1 m then it should be supported on Unistrut or similar rigid support. The element shall be clipped every 200m and the supports and hangers shall be adequate to prevent vibration of the element.

2.24 Pressure switches for Air Systems

Pressure switches for Air Systems shall be diaphragm operated. Switches shall be supplied with air connections permitting their use as static or differential pressure switches.

The switch shall be of differential pressure type complete with connecting tube and metal bends for connections to the duct. The housing shall be IP54 rated. The pressure switches shall be available in minimum of 3 ranges suitable for applications like Airflow proving, dirty filter, etc. The setpoint shall be concealed type. The contact shall be SPDT type with 250 VAC, 1A rating.

Shall be supplied suitable for wall mounting or mounting on ducts in any plane. It should be mounted in such a way so that the condensation flow out of the sensing tips. Proper adapter shall be provided for the cables.

The setpoint shall fall within 40%-70% of the scale range.

Shall have differentials adjustable over 10%-30% of the scale range.

2.25 Air flow Switches

The Airflow switches shall be selected for the correct air velocity, duct size and mounting altitude. Where special atmospheric conditions are detailed in the Motor Control Panel Equipment Schedules, the parts of the switches shall be suitably coated or made to withstand such conditions. Any variations from standard shall be detailed in the Tender. Shall be suitable for mounting in any plane.

2.26 Water flow switches

Water flow switches shall be selected for the correct water velocity and pipe size and mounting attitude.

2.27 Room Temperature/Humidity Detectors

The temperature sensor shall have sensitivities such that a change at the detector of 0.2°C from the stabilised condition is sufficient to start modulating the corrective element.

The temperature sensor shall be with silicon sensor having positive temperature coefficient. The sensor shall be field wired using an unshielded cable to a base plate. The sensor housing shall plug into the base so that the same can be easily removed without disturbing the wiring connections. The protection standard shall be IP30 in accordance with IEC 144, DIN 40050. These should be generally mounted 1.5 m above the floor level. These should not be mounted near the heat sources such as windows, electrical appliances, etc. The final location shall be as per the consulting engineers' approval. The sensor shall be linear over 0°C to 50°C.

Shall operate on extra-low voltage and be suitable for mounting on British Standard conduit boxes. The humidity sensor shall be in an independent housing or be combined with the room/duct type temperature sensor in the common housing. The sensor should be electronic type with capacitive sensing element. As a minimum it should have a range of 10 to 90% RH.

2.28 Immersion/temperature detector and duct mounted temperature/humidity detectors

The temperature sensor shall have sensitivities such that changes at the detector, for 0.3°C and 0.2°C respectively, from the stabilized conditions, are sufficient to start modulating the corrective element.

The humidity sensor shall be in an independent housing or be combined with the room/duct type temperature sensor in the common housing. The sensor should be electronic type with capacitive sensing element. As a minimum should have a range of 10 to 90% RH.

The temperature sensor shall be with silicon sensor having Positive Temperature Coefficient. The sensor shall be field wired using an unshielded cable to a base plate. The sensor housing shall plug into the base so that the same can be easily removed without disturbing the wiring connections. The protection standard shall be IP43 in accordance with IEC 144, DIN 40050.

The wiring terminals shall be plug-in type for easy installation and maintenance. The sensor shall be mounted in the duct based on the guidelines given by the specialist control supplier. The sensor shall be linear over 0°C to 50°C.

2.29 Pressure Detectors (for liquids and gaseous media)

Pressure detectors shall be suitable for the medium and the working temperatures and pressures. The pressure detector shall be capable of withstanding a hydraulic test pressure of 2 times the working pressure.

Connections shall be suitable for 1/2 to 1/8th in o.d. copper tube.

Ductwork versions shall be supplied with the air connections permitting their use as static or differential pressure detectors.

The setpoint shall fall within 40%-70% of the sensing range of the detector.

The detector shall have sensitivity such that a change of 1.5% from the stabilized condition shall cause modulation of the corrective element.

The static pressure sensor shall be rated for IP65 and the differential pressure sensor shall be as a minimum IP54.

The principle of operation should be based on a hall-effect transducer. The diaphragm should be copper benylium type.

The sensor must be pressure compensated for a medium temperature of -10 to 80oC with ambient ranging between -25 to 60oC.

2.30 Air Pressure sensor:

The pressure sensor shall be differential type. The construction shall be spring loaded diaphragm type. The movement of the membrane in relation to the pressure should be converted by an inductive coupling, which would electromagnetically give an output suitable for the controller. The pressure sensor shall in a housing having IP54 ratings in accordance with IEC529. Suitable mounting arrangement shall be available on the sensor. The sensor shall come complete with the PVC tubes, probes, etc.

2.31 Level Switch/Transmitter

Level switches shall be directly vessel mounted type with either top or Side mounted as required. These shall be float type. Process connection shall be flanged.

2.32 Actuators

Shall be installed in accordance with the manufacturers' recommendations.

Shall have a sufficient torque to open and close valves and dampers against the maximum out of balance pressure across them.

Control Damper Actuators

Control Damper Actuators shall be of the type where the damper spindle passes through the actuator and is secured by a U clamp.

Rotary type damper actuators shall be used on the project. The actuators shall not require any maintenance. The actuators shall have sufficient torque ratings to operate the dampers of various sizes.

These should be available in spring return versions as specified elsewhere in the document. Limit switches, if required/specified shall be provided for.

The actuators shall be suitable for On/Off and modulating operations.

Actuator Additional features

Actuator Additional features are required when detailed in the Motor Control Panel Equipment Schedules or the Performance Section of the Specification.

Auxiliary Switches:

For On/off applications, the actuators shall have changeover contacts suitable for 220 VAC. 2 amp rating.

Auxiliary switch packs containing at least one, if specified two, electrically independent switches one for each end of the motor travel, adjustable for operation over at least half the motor travel. Feedback signal 0 to 10 V dc. signal should be available from the modulating damper actuator for parallel operation or as feedback. Please refer the data point schedules / sequence of operation/ drawings to incorporate this feature wherever asked for.

2.33 Control Valves (Modulating)**General**

All control Valves with Kv lesser than or equal to 4 shall have RG5 gunmetal / red bronze body.

Actuators shall be PWM or 0-10v

dc modulating motor type or 3 point reversible motor type. PWM actuators shall be used in conjunction with controllers having inbuilt PID algorithm.

Control Valves with Kv = 6.3 shall have RG5 gunmetal / red bronze body. Actuators shall be 3 point reversible motor type or 0 –10 V dc modulating motor type. Actuators shall have manual override hand-wheel.

Control valves with Kv >6.3 shall have RG5 gunmetal / CI. Actuators shall be magnetic / or 0 – 10 V dc modulating motor type.

Actuators shall have manual override hand-wheel.

Valves up to including 40 mm shall be rated for 16 bar Nominal Pressure. Valves for 50 mm and above shall be rated for nominal pressure of 10 bar, provided the operating pressure of the system is not greater than 6 bar. Valves above 100 mm shall be rated for 16 bar Nominal Pressure and actuators shall for these valves be magnetic / electro-hydraulic / motoric working a 0-10v DC modulating signal. Actuators for valves 100 mm dia and above shall have spring return feature as well as manual override handwheel.

All valves 15mm and above shall have rangeability > 100.

Authority

All 3 port modulating valves shall be selected to have an authority between 0.4 and 0.68.

For systems using 2 port modulating valves, the MEP contractor shall furnish the controls' supplier details such as Pressure drop across the index circuit based on which the pump head was calculated, the pump head calculation, the design head of the pump ordered for the project, the available pressure on the system and the nodal pressures on each branch circuit of each AHU /FCU.

Based on these data, the controls' supplier shall submit the working principle for valve selection.

Butterfly valves

Butterfly valves shall be manufactured by the Controls Manufacturer or alternative, approved by the Engineer.

2.34 Occupancy detector:

The occupancy detector should be microprocessor based passive infrared detector for control of lighting equipment and VAV boxes in the room. The detector shall operate at 240VAC and will give a potential free output of minimum rating of 2 amps at 240VAC for control of lighting and VAV boxes for maximum energy savings and demand dependant controls. It should have a adjustable switch on delay of minimum 0...300 sec and a adjustable switch off delay of minimum 0.5...30 minutes. The detector should cover a minimum zone of 6 X 12 meters. The detector should be capable of detecting a moving infrared source. It should be optimized to detect the low level of sedentary workers. The detector should have minimum sensitivity of 50cm physical movements. The detector should be minimum IP50 with CE conformance.

2.35 BTU meters:

The flow meter used in the above meter should be based on the ultrasonic principle with no moving parts. The temperature sensors used in the above meter should have a measuring range of 0...130 deg C with a resolution of 0.1 deg C. The BTU meter should have a built in minimum 8 digit LCD display for display of parameters, values and faults. The meter should be compatible with the BMS system. The minimum functions to be provided by the BTU meter is as under:

- Calculation and storage of maximum values
- Storage of billing data
- Measurement of tariff dependent data
- Storage of 13 monthly cumulative energy/volume values in EEPROM.
- Detection of faults
- Display of values , parameters and faults
- Selectable scope of display
- Test and service functions.

The BTU meter should have a minimum sampling time for flow every 3 seconds and temperature 24 seconds. Possible displays to be indicated are KWH, MWH, GJ, MJ, KW, m3 , m3/hr ,h and Deg C. The heat meter should have a minimum accuracy of class 2 with CE conformance.

2.36 DDC PANELS

The out-station panel housing the DDC controllers shall be located inside the conditioned area. Proper care shall be taken to ensure that there is no induction problem between the control and power cables. These panels shall be IP54 and supplied by the BMS contractor.

The DDC controllers located inside these out-station panels shall provide the required signals to the various equipment connected to these DDC controllers. The DDC controllers shall be capable of accepting digital input signals in the form of volt-free contacts from Motor control centres. The BMS contractor shall co-ordinate this activity.

All these outstations shall be connected with a communication bus cable and terminated to the BMS central station. The BMS contractor shall supply these bus cables.

It should be possible to connect the Portable hand held terminal to be connected to any of these panels and talk to any other DDC controllers on the same bus.

2.37 Training

All training shall be by the BMS contractor and shall utilise specified manuals and As-Built Documentation

Operator training shall include total seven sessions each of six-hour encompassing:

- - Modifying text and graphics
- - Sequence of operation review
- - Selection of all displays and reports
- - Use of all specified OS functions
- - Use of portable operators terminals
- - Trouble shooting of sensors (determining bad sensors)
- - Password assignment and modification

The training shall be under taken in two phases. One training session shall be conducted at system completion, and the other shall be conducted within forty-five days of system completion.

SECTION G

**SCHEDULE OF BUILDING MANAGEMENT SYSTEM INPUT-
OUTPUT POINTS**

SECTION H

SCHEDULE OF CONTRACT DRAWINGS

SCHEDULE OF CONTRACT DRAWINGS

Tenderers may inspect the Electrical services drawings at the office of the Consulting Electrical & Mechanical Engineer - Mecoy Consultants Ltd., at PCEA Foundation flats block G, along Jabavu road in Hurlingham Nairobi, during normal working hours.

These drawings shall indicate the location of the BMS room and the positions of the plants and equipment. The drawings shall however be availed, on award of the tender, to the nominated Sub-contractor.

SECTION I

**TECHNICAL SCHEDULE OF ITEMS TO BE
SUPPLIED**

CONTENTS

<u>CLAUSE No.</u>		<u>PAGE</u>
1.	GENERAL NOTES TO THE TENDERER.....	I/1
2.	TECHNICAL SCHEDULE.....	I/2

TECHNICAL SCHEDULES

- a) The tender shall submit technical schedules for all materials and equipment upon which he has based his tender sum.
- b) The Tenderer shall also **submit separate comprehensive descriptive and performance details** for all plant apparatus and fittings, as described in the technical schedule.
- c) Completion of the technical schedules shall not relieve the contractor from complying with the requirements of the specification except as may be approved by the Engineer.

TECHNICAL SCHEDULES

ITEM	DESCRIPTION	TYPE/MAKE	COUNTRY OF ORIGIN
1.	Differential pressure switch/sensor		
2.	Temperature sensor		
3.	Modulating damper actuator		
4.	Control valve		
5.	Modulating valve actuator		
6.	DDC controller		
7.	CO Detector		
8.	CO ₂ Detector		
9.	Level Sensor		
10.	Relay		
11.	Power Transducer		
12.	VFC (Voltage free contact)		
13.	BACnet Network Router/Controller (NRC)		
14.	Standalone Digital Control Units (SDCUs).		
15.	BACnet Gateway		
16.	Network Router		
17.	Main server		
18.	Operator Workstation		

SECTION J:

STANDARD FORMS

NOTE:

ALL FORMS IN THIS SECTION MUST BE FILLED AS THEY SHALL BE PART OF THE EVALUATION CRITERIA

STANDARD FORMS

CONTENTS

<u>FORM</u>	<u>PAGE</u>
1. PERFORMANCE BANK GUARANTEE.....	J-1
2. TENDER QUESTIONNAIRE.....	J-2
3. CONFIDENTIAL BUSINESS QUESTIONNAIRE.....	J-3 to J-4
4. KEY PERSONNEL.....	J-5
5. CONTRACTS COMPLETED IN THE LAST FIVE (5) YEARS.	J-6
6 SCHEDULE OF ON-GOING PROJECTS.....	J-7
7 FINANCIAL REPORTS FOR THE LAST FIVE YEARS...	J-8
8 EVIDENCE OF FINANCIAL RESOURCES.....	J-9
9 NAME OF THE BANKERS.....	J-10
10 DETAILS OF LITIGATIONS OR ARBITRATION PROCEEDINGS	J-11
11 STATEMENT OF COMPLIANCE	J-12

PERFORMANCE BANK GUARANTEE

To:
The Clerk of Senate/ Secretary,
The Parliamentary Service Commission
P. O. Box 41842,
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 recognized 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 there under 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

AddressDate

.....

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

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

Give details of partners as follows:

	<i>Name in full</i>	<i>Nationality</i>	<i>Citizenship Details</i>	<i>Shares</i>
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:

	<i>Name in full</i>	<i>Nationality</i>	<i>Citizenship Details*</i>	<i>Shares</i>
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 and volume over the last five years.

1.1.1.1.1 PROJECT NAME	1.1.1.1.2 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.

1.1.1.1.3 PROJECT NAME	1.1.1.1.4 NAME OF CLIENT	CONTRACT SUM	% COMPLETE	COMPLETION DATE

I certify that the above works are currently being carried out by ourselves.

.....

Title

.....

Signature

.....

Date

FINANCIAL REPORTS FOR THE LAST THREE YEARS

**(Balance sheets, Profits and Loss Statements, Auditor's reports, etc.
List below and attach copies)**

1. _____.
2. _____.
3. _____.
4. _____.
5. _____.
6. _____.
7. _____.
8. _____.
9. _____.
10. _____.

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 . _____.

NAME, ADDRESS AND TELEPHONE, EMAIL OF BANKS

(This should be for banks that may provide reference if contacted by the employer)

NAME	ADDRESS	TELEPHONE	EMAIL

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. _____.

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:



REPUBLIC OF KENYA

THE PARLIAMENTARY SERVICE COMMISSION

**PROPOSED MULTI STOREY OFFICE BLOCK FOR THE KENYA
NATIONAL ASSEMBLY.**

W.P. ITEM NO. D29 NB/NB 901 –JOB NO. 7753C

2. FINANCIAL TENDER DOCUMENT

**TENDER NO. PSC/012/2016-2017
FOR
SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING
OF
A BUILDING MANAGEMENT SYSTEM**

ARCHITECT

Chief Architect
Ministry of Transport, Infrastructure, Housing and Urban
Development
P.O. Box 30743-00100
NAIROBI

QUANTITY SURVEYOR

Chief Quantity Surveyor
Ministry of Transport, Infrastructure, Housing and Urban
Development
P.O. Box 30743-00100
NAIROBI

ENGINEER (STRUCTURAL)

Chief Engineer (Structural)
Ministry of Transport, Infrastructure, Housing and Urban
Development
P.O. Box 30743-00100
NAIROBI

MECHANICAL ENGINEER

Chief Engineer (Mechanical)
Ministry of Transport, Infrastructure, Housing and Urban
Development
P.O. Box 41191-00100
NAIROBI

ELECTRICAL ENGINEER

Chief Engineer (Electrical)
Ministry of Transport, Infrastructure, Housing and Urban
Development
P.O. Box 41191-00100
NAIROBI

PROJECT CONSULTANTS

CONSULTING ARCHITECT

Mutiso Menezes International
P.O. Box 44934 - 00100
NAIROBI

CONSULTING QUANTITY SURVEYOR

Quantech Consultancy
P.O. Box 44660 – 00100
NAIROBI

CONSULTING ELECT. AND MECH. ENGINEER

Mecoy Consultants Ltd
P.O. Box 20198-00200
NAIROBI

CONSULTING STRUCTURAL & CIVIL ENGINEER.

Wanjohi Mutonyi Consult
P.O. Box 21714 - 00505
NAIROBI

CLIENT

The Parliamentary Service Commission
P.O. BOX 41842,
Nairobi

FEBRUARY, 2017

TABLE OF CONTENTS

<u>TITLE</u>	<u>PAGES</u>
1. FORM OF TENDER	(1)
2. SECTION K: BILLS OF QUANTITIES	K/1 – K/24
3. SECTION L: SCHEDULE OF UNIT RATES	L/1 - L/2

FORM OF TENDER

To: Clerk to the Senate/ Secretary,
The Parliamentary Service Commission
P. O. Box 41842,
NAIROBI

Dear Sir,

THE SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A BUILDING MANAGEMENT SYSTEM FOR THE PROPOSED MULTI-STORIED OFFICE BLOCK FOR THE KENYA NATIONAL ASSEMBLY.

1. 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]*

2. 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.
3. 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 that date.
4. 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.
5. Understand that you are not bound to accept the lowest or any tender you may receive.

Dated this day of20.....

Signaturein 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

SECTION K

**BILLS OF QUANTITIES FOR THE BUILDING MANAGEMENT
SYSTEM**

SECTION H – BILLS OF QUANTITIES

A) PRICING OF PRELIMINARIES ITEMS

Prices will be inserted against item of preliminaries in the Contractor's Bills of Quantities and specification. These Bills are designated as Bill No.1 in this Section. Where the Contractor fails to insert his price in any item he shall be deemed to have made adequate provision for this on various items in the Bills of Quantities. The preliminaries form part of this contract and together with other Bills of Quantities covers for the costs involved in complying with all the requirements for the proper execution of the whole of the works in the contract.

The Bills of Quantities are divided generally into three sections:

(a) Preliminaries – Bill No.1

Contractor's preliminaries are as per those described in Section D – Contract Preliminaries and General Conditions of Contract. The Contractor shall study the conditions and make provision to cover their cost in this Bill. The number of preliminary items to be priced by the Tenderer has been limited to tangible items such as site office, temporary works and others. However the Tenderer is free to include and price any other items he deems necessary taking into consideration conditions he is likely to encounter on site.

(b) Installation Items – Other Bills

- (i) The brief description of the items in these Bills of Quantities should in no way modify or supersede the detailed descriptions in the contract Drawings, conditions of contract and specifications.
- (ii) The unit of measurements and observations are as per those described in clause 1.0 5 of the section D.

(c) Summary

The summary contains tabulation of the separate parts of the Bills of Quantities carried forward with provisional sum, contingencies and any prime cost sums included. The Contractor shall insert his totals and enter his grand total tender sum in the space provided below the summary.

This grand total tender sum shall be entered in the Form of Tender provided elsewhere in this document.

A. PREAMBLE

1. The Bills of Quantities shall be read in conjunction with the Notes to Tenderers, Preliminaries, General Conditions of Contract, Technical Specifications and Drawings.
2. The rates and prices tendered in the priced Bills of Quantities shall, except in so far as it is otherwise provided under the Contract, include all Plant, equipment, labour, supervision, materials, erection, maintenance, insurance, profit together with all general risks, liabilities and obligations set out or implied in the Contract, including taxes and duties (**including 16% V.A.T where applicable**). The quantities given are provisional and are for guidance only. The whole works shall be re-measured upon practical completion.

In accordance with Government policy, 3% Withholding Tax **shall be deducted** from all payments made to the Tenderer, and the same shall be forwarded to the **Kenya Revenue Authority (KRA)**.

3. A rate of price shall be entered against each item in the priced Bills of Quantities, whether quantities are stated or not. The cost of items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bills of quantities.
4. The whole cost complying with the provision of the contract shall be included in the Items provided in the Bills of Quantities, and where no items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.
5. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bills of Quantities. Reference to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bills of Quantities.
6. Provisional Sums and contingencies included and so designated in the Bills of Quantities shall be expanded in whole or in part at the direction and discretion of the Engineer.
7. Errors in pricing will be corrected by the Client for any arithmetic errors in computation or summation as follows:-
 - a) Where there is a discrepancy between amount in figures and in words, the amount in words will govern and
 - b) Where there is a discrepancy, between the unit rate and the total amount derived from the multiplication of the unit price and the quantity, the unit rate as quoted will govern, unless in the opinion of the Client, there is obviously gross misplacement of the decimal point in the unit prices, in which event total amount as quoted will govern and the unit rate will be corrected.
8. Should the Contractor install any material not specified here in before receiving **written approval** from the Project Manager, the Contractor shall remove the material in question and, **at his own cost**, install the proper material.
9. 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**.

10. The under listed information should accompany the tenders returned:-

Brochures of equipment model offered detailing all the features of interest and reference sites of similar installation. Where the brochure contains different models, the bidders MUST clearly mark out the models they intend to offer by using a 'mark pen'.

The brochures are to be used to ascertain the suitability of the equipment being offered by the bidders, and bidders not complying with this requirement will be considered non-responsive and shall subsequently be disqualified from technical evaluation.

- . 11. **TENDERERS MUST FILL ALL RATES AND PRICES IN THE BILLS/SCHEDULE OF UNIT RATES. FAILURE TO DO SO MAY LEAD TO DISQUALIFICATION**

BILL NO. 1 – SCHEDULE No. 1 CONTRACT PRELIMINARIES

ITEM	DESCRIPTION	QTY	UNIT	RATE (Ksh.)	AMOUNT (Ksh.)
1	Discrepancies clause 1.02				
2	Conditions of sub-contract Agreement clause 1.03				
3	Payments clause 1.04				
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 1.14 (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 K /6					

ITEM	DESCRIPTION	QTY	UNIT	RATE (Ksh.)	AMOUNT (Ksh.)
16	Supplies clause 1.20				
17	Bills of Quantities clause 1.23				
18	Contractor's Office in Kenya clause 1.24				
19	Builder's Work clause 1.25				
20	Setting to work and Regulating system clause 1.29				
21	Identification of plant components clause 1.30				
22	Working Drawings clause 1.32				
23	Record Drawings (As Installed) and Instructions clause 1.33				
24	Maintenance Manual clause 1.34				
25	Hand over clause 1.35				
26	Painting clause 1.36				
27	Testing and Inspection – manufactured plant clause 1.38				
28	Testing and Inspection – Installation clause 1.39				
29	Storage of Materials clause 1.41				
30	Initial Maintenance clause 1.42				
	SUB-TOTAL CARRIED TO PAGE K /6				

ITEM	DESCRIPTION	QTY	UNIT	RATE (Ksh.)	AMOUNT (Ksh.)
31	Attendance Upon Tradesmen, etc. (Insert percentage only) clause 1.58				
32	Local and other Authorities notices and fees clause 1.60				
33	Temporary Works clause 1.63				
34	Patent Rights clause 1.64				
35	Mobilization and Demobilization Clause 1.65				
36	Extended Preliminaries Clause 1.66(see appendix on page C- 24)				
37	Supervision by Engineer and Site Meetings Clause 1.67				
38	Allow for profit and Attendance for the above				
39	Amendment to Scope of Sub-contract Works Clause 1.68				
40	Contractor Obligation and Employers Obligation clause 1.69(see appendix page C- 24)				
41	Any other preliminaries;				
	SUB-TOTAL CARRIED TO PAGE K /6				

ITEM	DESCRIPTION	AMOUNT (KShs)
	Sub-total B/F	
A	Subtotal brought forward from page K/3	
B	Subtotal brought forward from page K/4	
C	Subtotal brought forward from page K/5	
	TOTAL FOR PRELIMINARIES CARRIED FORWARD TO PRICE SUMMARY PAGE	

ITEM No.	DESCRIPTION	QTY	UNIT	RATE (Ksh.)	AMOUNT (Ksh.)
<u>BILL No. 1: BMS INSTALLATION</u>					
SUPPLY, DELIVER, INSTALL SET TO WORK AND COMMISSION THE FOLLOWING:-					
A. <u>BMS SYSTEM</u>					
1.01	Microprocessor based Integrated Building Management System as per the detailed specifications for complete and satisfactory operation and control and to local authorities approval. Main stations and subsystems with LAN, complete with hardware and software to provide graphical users interface consisting of System PC as HP Z640 or approved equivalent complete with 4 No. 19" TFT LCD Colour Monitors with inbuilt audio speakers, Windows Server 2012 R2 operating system or higher, and as described in the particular specification of this tender document.	1	No.		
1.02	Windows based graphical software, (with necessary software addresses required as per I/O list) on MS windows 7 or higher platform, including Alarm Management for the BMS as per the above item	1	Item		
1.03	Software and Hardware for Interfacing through a gate way for monitoring through software interface for the data points for plant and equipment as per the detailed I/O summary as described in the particular specification of this tender document.	1	Item		
1.04	Monitoring station as per technical specification and system PC HP Z240 or approved equivalent complete with 2 No. 19" TFT LCD Colour Monitors with inbuilt audio speakers, Windows 7 operating system or higher, and as described in the particular specification of this tender document.	2	No.		
Total carried to Bill No.1 Collection Page					

ITEM No.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (Ksh.)
1.05	DIRECT DIGITAL CONTROLLER: Autonomous networkable DDC Controller with 32 bit microprocessor based standalone and networkable type with real time clock and historical database of min 1 Mb with panels, peer to peer communicable DDC modules, input or output relays, terminal block, real time clock, networking and inbuilt data buffer for Following requirement as per Enclosed I/O summary. The end controller shall provided with IP location wise				
a.	DDC-Type for HT & LT Electrical devices & equipment	1	Item		
b.	Soft points integration as per IO summary	1	Item		
c.	DDC-Type for Lighting Management System.	1	Item		
d.	DDC -Type for Lifts & Escalators.	1	Item		
e.	DDC-Type for Fans systems	1	Item		
f.	DDC-Type for Pump systems	1	Item		
g.	Tap boxes Soft points for meter recording	1	Item		
1.06	Weather proof enclosure for DDC panels to suit external use with suitable floor/wall mounting accessories.	1	Item		
1.07	Displacement Level Transmitter suitable for giving a linear output (0-10V) with installation hardware & accessories.				
a	linear type ultra sonic (0-10V) sensor with weather proof enclosure and suitable fixing accessories for Under ground sumps (4000MM length)	1	Item		
b	linear type ultra sonic (0-10V) sensor with weather proof enclosure and suitable fixing accessories for Under ground sumps (2000MM length)	4	Item		
1.08	2 Core 1.5 Sq.mm armoured twisted pair shielded cable	1,800	LM		
1.09	Communication cable/bus cables shielded 2C 1.5 Sqmm armoured cable to integrate all DDC etc	1,500	LM		
1.10	16C armoured 1.5Sqmm copper cable for DDC -Elect interface	2,500	LM		
Total carried to Bill No.1 Collection Page					

ITEM No.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (Ksh.)
B.	<u>INFRASTRUCTURE MANAGEMENT</u>				
1.01	Allow for intelligent infrastructure management system as specified elsewhere in this document	1	Item		
1.02	Allow for certification and manufacturer's warranty for cabling works	1	Item		
1.03	Allow for warranty for all active equipment as specified elsewhere in this document	1	Item		
1.04	Allow for `as built' documentation-Drawings (4No. A1 Sets) and Test results/certificates in hard and soft copies.	1	Item		
1.05	Allow for O&M manuals for the active equipment (hard and soft copies).	1	Item		
1.06	Allow for a tool kit for O&M comprising but not limited to: * Anti-Static Wrist Strap Three Prongs Holder * Electronic multi-purpose continuity tester and network identifier * Ultra Multi-Module Cable Tester * Knife * Hex Key Bits * Electronic Combination Wrench Set * Star Bits * Phillips Bits * Tri-Wing Bits * Square Bits * Flat Bits * Hex Key Bits * Torque Bits * Sockets * 3 - Way Reversible Ratchet Handle * Hex Keys * Side Cutter * Wire Cutter / Stripper * Long Nose Pliers * Crimping Tool * Pozidriver Bit * Mini Pan Flashlight * I.C. Insertion-Extraction Clipper * Solder Reel * Solder Iron * Splicing tool	4	Item		
Total carried to Bill No.1Collection Page					

Item	Description	AMOUNT (Ksh.)
BILL No. 1 COLLECTION PAGE		
1	TOTAL AMOUNT B/F PAGE K /7.....	
2	TOTAL AMOUNT B/F PAGE K /8	
3	TOTAL AMOUNT B/F PAGE K /9	
Total carried to Price summary Page		

PROVISIONAL SUMS

Item	Description	AMOUNT (Ksh.)
A	CONTINGENCY Allow a Provisional sum of Kenya Shillings One Million Four Hundred Thousand (1,400,000.00) only for contingency	1,400,000.00
B	FLUCTUATIONS Allow a Provisional sum of Kenya Shillings Seven hundred Thousand (700,000) only for fluctuations	700,000.00
C	EQUIPMENT FAMILIARIZATION & FACTORY INSPECTION Allow a Provisional sum of Kenya Shillings Five Million (5,000,000.00) only for equipment familiarization & overseas factory inspection	5,000,000.00
	Sub total for PROVISIONAL Sums C/F to price Summary page	7,100,000.00

ELECTRICAL ENGINEER'S STATIONERY

Item	Description	Qty	Unit	Rate (Ksh.)	Amount (Ksh.)
	<u>STATIONERY</u>				
	<u>Tenderers shall price for the following stationery requirements. These shall then be delivered, upon their first demand to the Chief Engineer (Electrical) (BS) immediately after the award to the successful Tenderer.</u>				
1	Laptop complete with 15.6 inches LCD screen, 1TB hard drive, at least 6GB Ram memory, core i7 intel processor. It shall have the following accessories, mouse, laptop bag, window 8 operating system and up-to-date antivirus software. It shall have one year warranty. To be as HP or Dell model or approved equivalent.	1	No.		
2	High back Office chair with heavy duty plastic armrests and heavy duty leather, swivel base, gas lift and castors as Supreme Furnitures or approved equivalent.	1	No.		
3	Low back visitor chair with heavy duty plastic armrests and heavy duty fabric as Supreme Furnitures or approved equivalent.	1	No.		
4	HP Laser jet 05A CE505A toner cartridge	2	No.		
5	HP Laser jet Q5949A toner cartridge	2	No.		
6	HP Laser jet 05A Q53A toner cartridge	2	No.		
7	Sharp photocopier AR-M531N/M351N toner cartridge	2	No.		
8	Ricoh/Nashuatec 9002 toner cartridge	2	No.		
9	2 Terabytes external drives with USB 3.0 interface, impact and shock protection cover and compatible software. To be as Transcend or approved equivalent.	2	No.		
10	16GB flash disks with USB 2.5 interface and to be as Transcend or approved equivalent.	4	No.		
11	Size A4 white paper with 80g/cm ² packed in 500 sheets ream.	4	No.		
12	Size A4 green letter head paper with 80g/cm ² packed in 500 sheets ream as Classic or approved equivalent	4	No.		
13	Size A4 blue letter head paper with 100g/cm ² packed in 500 sheets ream as Conqueror or approved equivalent	4	No.		
	Sub-total for Electrical Engineer's Stationery C/F to price Summary page				

PRICE SUMMARY

Item	Description	AMOUNT (Ksh.)
A.	PRELIMINARIES AND GENERAL CONDITIONS B/F FROM K/6.....	
B.	TOTAL AMOUNT B/F BILL No 1 COLLECTION PAGE K /10	
C.	SUB TOTAL FOR PROVISIONAL SUMS B/F FROM PAGE K/11.....	7,100,000.00
D.	SUB TOTAL FOR ELECTRICAL ENGINEER'S STATIONARY B/F FROM PAGE K/12.....	
E.	ALLOW FOR TRAINING OF TECHNICAL & OPERATIONAL STAFF.....	
	TOTAL AMOUNT FOR BMS INSTALLATIONS CARRIED TO FORM OF TENDER	

TOTAL AMOUNT IN WORDS.....

TENDERER'S NAME & STAMP.....

SIGNATURE.....

DATE.....

PIN No.

VAT CERTIFICATE No.....

WITNESS.....

ADDRESS.....

SIGNATURE OF WITNESS.....

DATE.....

SECTION L
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.
4. 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.

SCHEDULE OF UNIT RATES
(To be completed by the Tenderer)

ITEM	DESCRIPTION	QTY.	UNIT	RATE (Ksh.)
	<u>SUPPLY, DELIVER, INSTALL SET TO WORK AND COMMISSION</u>			
1.01	Differential pressure switch	1	No.	
1.02	Temperature sensor	1	No.	
1.03	Modulating damper actuator	1	No.	
1.04	Control valve	1	No.	
1.05	Modulating valve actuator	1	No.	
1.06	DDC controller	1	No.	
1.07	CO Detector	1	No.	
1.08	CO ₂ Detector	1	No.	
1.09	Level Switch	1	No.	
1.10	Relay	1	No.	
1.11	Power Transducer	1	No.	
1.12	VFC (Voltage free contact)	1	No.	
1.13	BACnet Network Router/Controller (NRC)	1	No.	
1.14	Standalone Digital Control Units (SDCUs).	1	No.	
1.15	BACnet Gateway	1	No.	
1.16	VAV Controller	1	No.	